Virtual Entities as Brand Endorsers

by

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Abstract

The prevalence of virtual agents across various sectors has led to the emergence of virtual influencers on social media platforms as computer-generated alternatives to human social media influencers. Virtual influencers are not very different from their human counterparts. On social media platforms, they are presented with their own personas, and, just like human influencers, they display human emotions, state their opinions about social issues, and post about their daily activities. Furthermore, from the perspective of firms that consider employing virtual influencers to endorse their brands on social media, virtual influencers seem to offer advantages over human influencers, such as greater control over their images in promotional social media posts to align with brand interests and not suffering from physiological limitations like sickness, fatigue, and aging. Although human influencers have been extensively studied, many questions regarding the use of virtual influencers in marketing practices remain unanswered. This dissertation, across two essays, aims to address two key issues related to the effectiveness of virtual influencers as brand endorsers, including (1) the factors contributing to virtual influencers' effectiveness as brand endorsers and (2) whether they can be as effective as human influencers in generating a positive brand attitude.

Essay 1 sheds light on the factors influencing virtual influencers' effectiveness in brand endorsements by examining three types of realism and the interplay between them. Four experiments show that form and behavioral realism of virtual influencers, as well as the domain realism of endorsed products affect virtual influencers' effectiveness as brand endorsers. All else being equal, virtual influencers with high (vs. low) form realism generate more positive brand outcomes because they are perceived as more trustworthy. However, there are no differences in brand outcomes for high (vs. low) form realism when virtual influencers display low behavioral

realism by refraining from using self-referential pronouns in endorsements. Furthermore, when virtual influencers with low (vs. high) form realism endorse products belonging to domains characterized by low realism (i.e., the digital world), they generate more positive brand outcomes due to stronger influencer-domain fit perceptions.

Essay 2 examines the effectiveness of the brand endorsements by virtual influencers in comparison to those by human influencers. Five experiments show that the perceived lack of credibility of virtual influencers compared to their human counterparts leads to a less positive attitude toward the brands that they endorse. Using the language expectancy theory, this essay identifies a boundary condition for this general finding. When virtual influencers use rational language (rather than emotional language) in their endorsements, they can be as effective as their human counterparts in generating a positive attitude toward the brands they endorse.

This dissertation contributes to social media, influencer marketing, and consumer-technology interactions literatures by examining an emerging influencer type within the brand endorsement context. This research also offers practical implications for firms regarding selecting the right influencer and crafting effective endorsement content.

Keywords: virtual influencers, social media, influencer marketing, brand endorsement

Note: This dissertation is written by Ozan Ozdemir. Any reference to “we” is to keep the essays consistent with the joint submissions to target journals based on this dissertation.

Preface

This thesis is an original work by Ozan Ozdemir. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Virtual Social Media Influencers as Brand Endorsers," No. Pro00106238, December 08, 2020.

Chapter 3 of this dissertation has been published as Ozdemir, O., Kolfal, B., Messinger, P. R., & Rizvi, S. (2023). Human or virtual: How influencer type shapes brand attitudes. *Computers in Human Behavior*, 145, 107771. I was responsible for the data collection and analysis as well as the manuscript composition. Drs. Paul Messinger and Bora Kolfal supervised the study design and the data collection and contributed to manuscript edits. Dr. Shaheer Rizvi was involved with concept formation.

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Dedication

To Feyzan, for everything.

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Chapter 1 – Introduction

Social media has gained widespread usage among billions of consumers globally and has quickly become an integral part of daily life (Appel et al., 2020). According to Meta Platforms', formerly Facebook, quarterly earnings report, they have 3.07 billion daily active users and 3.88 billion monthly active users on their platforms as of June 30, 2023 (Meta, 2023). This extensive reach of social media platforms has prompted firms to shift their focus from conventional marketing channels to digital platforms to utilize social media as a means of communicating with consumers through advertising (Batra & Keller, 2016). As brands increasingly abandon conventional channels, their advertising efforts have also shifted from endorsement collaborations with traditional celebrities, who gained fame through established mass media outlets such as magazines or television, to collaborations with social media celebrities known as influencers (De Veirman et al., 2017; Lou & Yuan, 2019).

Social media influencers are described as individuals with significant social influence over their large network of followers on social media platforms (Leung et al., 2022). Social media influencers position themselves as more relatable and approachable alternatives to traditional celebrities with the rapport they establish with their followers (Jin et al., 2019). They leverage their popularity and significant levels of audience interaction to promote brands through sponsored content (Kádeková & Holiencinova, 2018). Because of their ability to forge strong connections and establish trust with consumers on social media platforms, the utilization of social media influencers for advertising has emerged as a prominent digital marketing strategy (Djafarova & Rushworth, 2017). Indeed, the global forecast for ad spending in the influencer advertising market is projected to reach US$35.09 billion by the end of 2024 and US$56.28 billion by 2029 (Statista, 2024).

The Oxford Advanced Learner's Dictionary's (n.d.) defines an influencer as "a person or thing that influences somebody/something." Under this definition, the influencer need not be a real person. Indeed, recently, a new type of social media influencer has emerged on these platforms: virtual influencers (VIs). VIs, alternatively referred to as CGI (computer-generated imagery) influencers, are digitally created characters with a significant influence on social media platforms (Moustakas et al., 2020). These influencers are introduced as computer-generated alternatives to human social media influencers. Although, in reality, a content team is in charge of VIs' social media accounts and creating their social media posts (Thomas & Fowler, 2021), VIs have similarities in their presentation to that of human influencers. Indeed, VIs are presented with their own personas, and their accounts feature biographical information about themselves (Arsenyan & Mirowska, 2021). Additionally, they appear to display human emotions, state their opinions about social issues, and post about their daily activities (e.g., eating pasta or hanging out with real people at real-life events and locations), which facilitates the interaction between VIs and consumers (Arsenyan & Mirowska, 2021). Indeed, a 2022 survey results showed that 58% of consumers follow at least one VI on social media, and VIs' social media accounts generate higher engagement rates than those of their human counterparts (Balkanov, 2019; Kuzminov, 2023). Moreover, VIs offer advantages over their human counterparts (Moustakas et al., 2020). For example, unlike human influencers, they are not constrained by physical limitations such as getting tired or sick (Appel et al., 2020). In addition, they can be depicted to be anywhere, with anyone in their promotional posts (Drenten & Brooks, 2020). As a result, an increasing number of firms utilize VIs for their endorsement campaigns (Thomas & Fowler, 2021). Prada, Samsung, IKEA, and Calvin Klein are some of the brands that have collaborated with VIs (Kuzminov, 2023).

Despite the rising interest of brands and the media in VIs, marketing literature has yet to carefully explore the effectiveness of VIs as brand endorsers. Although human influencers have been extensively studied (e.g., Jin et al., 2019; Schouten et al., 2020), VIs have received little attention. In particular, we do not know what factors contribute to VIs' effectiveness as brand endorsers. Indeed, recent literature reviews have stressed the need for more research on this topic (e.g., Appel et al., 2020; Miao et al., 2022). This dissertation, across two essays, aims to address this gap in the literature by examining the effectiveness of VIs as brand endorsers.

The remainder of this dissertation is organized as follows. First, Chapter 2 focuses on the factors influencing VIs' effectiveness in brand endorsements by examining three types of realism and the interplay between them. Four experiments show that form realism, behavioral realism, and product domain realism affect VIs' effectiveness as brand endorsers. Next, Chapter 3 shifts the focus to the comparison between virtual and human influencers. In particular, Chapter 3 examines whether endorsements from VIs have as large an impact on consumers' brand attitudes as endorsements from human influencers. Five experiments show that while VIs are not as successful as human influencers in creating a positive brand attitude, endorsement language (rational vs. emotional) moderates this general finding. Next, Chapter 4 discusses the limitations and future research directions, and includes a general discussion.

Chapter 2 – Essay 1: The Role of Realism in Virtual Influencer Endorsements

Just like other virtual entities, VIs can take various forms, ranging from two-dimensional cartoonlike characters to three-dimensional hyper-realistic humanlike characters (Mouritzen et al., 2023). Similarly, they can be designed to display various behavioral realism (Bailenson et al., 2006; Miao et al., 2022). Accordingly, Essay 1 examines the effects of form and behavioral realism of VIs, as well as the domain realism of the products they endorse on the brands they collaborate with.

Form realism denotes the resemblance of a virtual entity's appearance to a human (Miao et al., 2022). Prior literature investigating virtual entities' form realism suggests mixed findings regarding the effects of virtual entities' form realism on consumers' responses (Crolic et al., 2022; Velasco et al., 2021). Both high form realism (e.g., Qiu & Benbasat, 2009) and low form realism (e.g., Holzwarth et al., 2006) have been shown to elicit positive responses from consumers. There is also research suggesting that form realism has no effect on attitudes toward brands (e.g., Verhagen et al., 2014; Zhou et al., 2023). These mixed results observed in the literature could be attributed to focusing only on the impact of form realism, without considering additional factors that contribute to the realism of virtual entities beyond their visual attributes (Crolic et al., 2022; Miao et al., 2022; Velasco et al., 2021).

Behavioral realism of virtual entities, which denotes the resemblance of their behaviors to a human's, is one of those factors (Miao et al., 2022). Especially in the context of VIs, it would be incomplete to evaluate the effectiveness of VIs as brand endorsers solely based on their appearance without considering their behavioral realism (Crolic et al., 2022). This is because a typical brand endorsement post of a VI comprises elements that signal both form and behavioral realism, both of which influence the effectiveness of VIs' brand endorsements (Deng et al.,

2021). Indeed, consumers do not evaluate a virtual entity's form and behavioral realism independently. In particular, visual first impressions of form realism are observed first, which shapes consumers' expectations for the behavioral realism of an entity (Fox et al., 2015; McGloin et al., 2009; Nowak & Biocca, 2003). Accordingly, we focus on the effect of the interaction between VIs' form and behavioral realism on the effectiveness of their endorsements in generating positive brand outcomes. Although behavioral realism can be displayed in a variety of ways, in the social media context, linguistic styles employed by influencers have been shown to be reliable indicators of behavioral realism. We focus on VIs use of singular self-referential pronouns as an indicator of behavioral realism (other indicators are possible, as we note in Chapter 4).

Moreover, our focus on VI brand endorsements allowed us to examine another potential moderator on the effect of VIs' form realism on brand outcomes. Accordingly, in addition to the form and behavioral realism of VIs, Essay 1 examines the effect of another type of realism on the efficacy of VIs' brand endorsements: the domain realism of the endorsed products. Product domain realism is defined to describe whether a product exists in the physical or digital world (e.g., printed book vs. e-book). Consumers perceive products from physical and digital domains differently (Atasoy & Morewedge, 2018). Therefore, we investigate the moderating effect of the domain realism of endorsed products on the relationship between VIs' form realism and brand outcomes.

Next, we lay out our theoretical framework and hypotheses.

Theoretical Background

The Effect of Form Realism

An important overarching theoretical framework that serves as the foundation for studies on human-virtual entity interactions is the paradigm known as computers-as-social-actors or CASA (Nass & Moon, 2000). Studies drawing on the CASA paradigm show that increasing virtual entities' form realism—the degree to which the shape of a virtual entity closely resembles the human form—creates a sense of companionship for consumers, as if they are interacting with another social entity (e.g., Nass & Moon, 2000; Von der Putten et al., 2010). As a result, consumers feel that their interactions with virtual entities are more similar to those with a real person, which leads to more positive social responses from consumers (Gefen & Straub, 2004; Nass & Moon, 2000; Qiu & Benbasat, 2009).

Accordingly, in the context of VIs, consumers' responses to VIs may vary depending on the degree of these influencers' form realism. While some VIs resemble cartoon characters (low form realism), others display human-like appearance (high form realism). For example, the creators of the VI Imapoki made no attempt to conceal the digital nature of the influencer while the design of another VI, Imma, closely resembles a realistic human form (see Figure 1; Imapoki, 2022; Imma, 2022).

Figure 1. Tommy Hilfiger endorsements of VIs Imapoki (left) and Imma (right)

Regardless of what their appearance may suggest, it is not possible for VIs to have real life experiences (Moustakas et al., 2020). However, due to their human-like appearance, consumers may disregard this fact and still ascribe human capabilities to VIs with high form realism. For example, even if eating is associated with living things, users on Instagram appeared to respond to Imma's Magnum ice cream endorsement post no differently than they would to a similar post from a human influencer (see Figure 2; Imma, 2020).

Figure 2. Imma's Magnum endorsement post

Furthermore, virtual entities that closely resemble the human form are perceived as possessing greater levels of competence and persuasive ability (Fox et al., 2015; Mull et al., 2015). This suggests that VIs with high form realism can be perceived as more trustworthy than those with low form realism. Indeed, compared to the VIs with high form realism, it is more salient that those with low form realism only exist in the digital world and lack the capacity to genuinely possess the experiences and opinions that they claim to have (Moustakas et al., 2020). Therefore, consumers should perceive VIs with high form realism as more trustworthy than those with low form realism in their promotional social media posts (i.e., brand endorsements). Accordingly, we predict that:

H1: All else being equal, collaborating with VIs with high (vs. low) form realism generates more positive downstream consequences for the brands.

H2: This is mediated by the perceived trustworthiness of VIs: VIs with high (vs. low) form realism generate a higher perception of trustworthiness.

The Effect of Behavioral Realism

Although the CASA paradigm suggests positive effects of high form realism over low form realism, other factors have been found to be relevant and critical (Crolic et al., 2022; Velasco et al., 2021). In particular, contextual factors and supplementary elements, alongside VIs' visual characteristics, have been shown to alter the effect of form realism on consumers' social responses. Therefore, it would be unrealistic to judge the effectiveness of VIs as brand endorsers solely on their physical appearance.

One such supplementary element that affects social responses to virtual entities is the entities' behavioral realism, which refers to the degree to which virtual entities' behaviors are similar to those of humans (Miao et al., 2022). We argue that consumers' reactions to VIs' brand endorsements may depend on the behavioral expectations created by their form realism. This is because visual first impressions of form realism are observed first, which shapes consumers' expectations for the behavioral realism of an entity (Fox et al., 2015; McGloin et al., 2009; Nowak & Biocca, 2003). Indeed, consumers develop an anticipation of an unfamiliar attribute by relying on a familiar feature that is believed to be connected to it, and they feel disappointed when the actual outcomes fail to meet their initial expectations (Dick et al., 1990; Oliver, 1980).

Research has identified several indicators of behavioral realism, including language use. For example, linguistic cues that convey a sense of humanness result in positive outcomes for chatbots (Schuetzler et al., 2020). Virtual entities can employ such cues to signal high behavioral realism and, thereby, enhance consumers' positive attitudes toward them (Cassell & Bickmore, 2000). Importantly, in the context of social media, the language use of influencers has been shown to be an appropriate indicator of behavioral realism (Kim et al., 2024; Miao et al., 2022). Accordingly, we examine VIs' language use in brand endorsement posts as an instantiation of

behavioral realism; in particular, we investigate the influence of VIs' singular self-referential pronoun use on brand outcomes.

The Role of Singular Self-Referential Pronoun Use of VIs. Linguistic research has provided abundant evidence that subtle linguistic variations may have a significant influence on consumers' understanding and perception of textual content (e.g., Brunyé et al., 2009; Fitzsimons & Kay, 2004). One of these linguistic variations emerges in the use of pronouns as they provide references to the important entities in a text (Wang & Karimi, 2019). Indeed, prior research has repeatedly shown the importance of pronoun use in several contexts, including brand messaging (Cruz et al., 2017), consumer-firm interactions (Packard et al., 2018), interpersonal interactions (Barash & Berger, 2014), and word-of-mouth (Packard & Wooten, 2013). Importantly, for the purpose of the current essay, personal pronouns have the power to draw attention to a specific subject (Tausczik & Pennebaker, 2010). For example, "this ice cream is good" focuses attention on the ice cream, and because of this, readers connect with only one entity, ice cream, in their minds to comprehend the text. In contrast, because of the singular self-referential pronoun "I" in the sentence "I like this ice cream," readers form associations between the author of the text and ice cream in order to comprehend the sentence (Bower & Morrow, 1990).

Similarly, the use of singular self-referential pronouns (i.e., "I", "me", "my", "mine", "myself") has been shown to signal personality traits and other individual-level characteristics and to highlight the narrator's presence (e.g., Chung & Pennebaker, 2007; Kashima & Kashima, 1998; Packard et al., 2018). Importantly, for the VI context, virtual entities' use of singular self-referential pronouns signals autonomy in action (Kashima & Kashima, 1998) and personal experience (Wang et al., 2015), and emphasizes the presence of the narrator in the described situation (Bower & Morrow, 1990). Accordingly, just as the singular self-referential pronoun use

in “I like this ice cream” makes the narrator prominent in the statement, VIs’ singular self-referential pronoun use puts the emphasis on the influencer and signals their active role in the described situation in their social media posts (Kashima & Kashima, 1998; Lee & Theokary, 2021).

Singular self-referential pronoun use is particularly important in the context of social media influencers’ brand endorsements. This is because consumers expect social media influencers to share their opinions and experiences regarding the products they endorse, which makes the use of such pronouns inevitable (De Veirman et al., 2017; Jin et al., 2019; López-Barceló & López, 2022). Indeed, one advantage of employing social media influencers is that their utilization enables brands to engage consumers more effectively through first-person narration, as opposed to traditional advertisements (Chang et al., 2019). Therefore, it is critical for social media influencers to share their personal experiences with the products that they promote in order to mitigate the overtly promotional nature of their endorsements and to prevent consumers from resorting to coping mechanisms in response to persuasive efforts in brand endorsements (Campbell & Kirmani, 2000; Hudders et al., 2022).

In the context of VIs, however, consumers’ reactions to VIs’ brand endorsements featuring singular self-referential pronouns may depend on the extent of VIs’ form realism. Consider the endorsement statement “I like X-Brand ice cream.” On the one hand, although it is not possible for VIs with either high or low form realism to experience the taste of ice cream, the “I like X-Brand ice cream” endorsement statement of a VI with low form realism may negatively violate consumers’ expectations of the influencer and lead to negative responses. This is because while the use of “I” in “I like X-Brand ice cream” puts the influencer at the center of attention as the actor that shares their experience with the ice cream, the influencer’s low form realism

suggests their inability to engage in real-life experiences (Lee & Theokary, 2021; Moustakas et al., 2020). Hence, we argue that the singular self-referential pronoun use will make the influencer's digital-only existence more salient, thereby further decrease their trustworthiness as a brand endorser and lead to less positive attitudes toward the brand.

On the other hand, consumers may develop expectations of VIs with high form realism similar to those they hold for human social media influencers due to their high form realism. Thus, VIs with high form realism are less likely to get negative responses from consumers when they use high behavioral realism cues like singular self-referential pronouns (Cassell & Bickmore, 2000; Miao et al., 2022). In fact, in the context of brand endorsement, when VIs with high form realism avoid using self-referential pronouns to express their opinions or experiences with the endorsed products, consumers are more likely to perceive the endorsement post as a paid promotional message of an insincere influencer. This, in turn, can reduce consumers' perception of the influencer's trustworthiness.

Building on these insights we predict that:

H3: The behavioral realism of VIs moderates the relationship between influencers' form realism and brand outcomes: when VIs with high (vs. low) form realism display high behavioral realism by using self-referential pronouns in endorsements, they generate more positive brand outcomes. However, when VIs with high (vs. low) form realism display low behavioral realism by refraining from using self-referential pronouns, the positive effect of form realism on brand outcomes will be diminished.

The Effect of Product Domain Realism

Products that were previously accessible only in the physical world are now also offered in digital format as a part of the digital world (Morewedge et al., 2021). For example, chess and

many other traditional board games, which were once only available in physical form, are now available in digital format and can be played on a variety of electronic devices, such as computers, smartphones, and tablets.

Despite the availability of the same product in both physical and digital forms, research shows that consumers do not perceive the physical and digital forms of the same product as being the same (e.g., Atasoy & Morewedge, 2018). Indeed, while the immaterial nature of digital products hinders consumers from engaging in physical interactions with them, physical products inherently possess tactile properties that make them easier to touch, manipulate, and control than their digital equivalents (Atasoy & Morewedge, 2018; Brasel & Gips, 2014; Peck & Shu 2009). For example, digital symbols representing chess pieces are less touchable or holdable than physical chess pieces (Morewedge et al., 2021).

Furthermore, the sense of touch serves as a fundamental means of connecting with the external world (Luangrath et al., 2022). The ability to physically interact with an object creates a sense of familiarity and closeness, thereby diminishing the psychological distance between consumers and the object (Edwards et al., 2009). This, in turn, reinforces the perception that the physical world is more real than the digital world. Accordingly, we define the physical world as a domain with high realism and the digital world as a domain with low realism. This is consistent with the "reality-virtuality continuum," which distinguishes the physical and digital worlds, with the reality end depicting an environment that solely consists of physical objects and the virtuality end depicting an environment solely consisting of digital objects (Milgram & Kishino, 1994; Mouritzen et al., 2023).

Research comparing physical products to their digital counterparts shows the difference in reality perception between the domains with high and low realism. For example, consumers

showed a greater tendency to engage in virtuous behavior when they were asked to write on paper as opposed to a digital device because they perceived their choices on paper as more real and belonging to the physical world rather than the digital one (Touré-Tillery & Wang, 2022). Similarly, consumers perceived physical money as having greater purchasing power than digital money due to its touchable and holdable nature (Zhou et al., 2023) and were willing to pay more for the physical versions of books, films, and photographs than for the digital versions (Atasoy & Morewedge, 2018).

Accordingly, because VIs also differ in their form realism, consumers may react differently to VIs' brand endorsements depending on the domain of the product they endorse. In particular, consumers may form fit perceptions between VIs and the domains of the endorsed products depending on VIs' form realism (Miao et al., 2022; Park et al., 1991). They may more easily associate VIs with high form realism with products from a domain characterized by high realism (i.e., the physical world) and VIs with low form realism with products from a domain characterized by low realism (i.e., the digital world). This is because consumers are more likely to perceive VIs with high form realism as belonging to the physical world and VIs with low form realism as belonging to the digital world. As a result, we argue that VIs with high form realism could be perceived as plausible endorsers of products from domains with high realism, whereas those with low form realism could be perceived as plausible endorsers of products from domains with low realism. And these perceptions may have downstream consequences.

The fit between endorsers and the products that they endorse impacts the effectiveness of brand endorsements (Kamins, 1990; Till & Busler, 2000). When an influencer's characteristics match those of the endorsed product (e.g., Michael Jordan endorsing basketball shoes ("Air Jordans") rather than ballet slippers), consumers show more positive attitudes toward the

products (Breves et al., 2019; Schouten et al., 2020). However, a mismatch between VIs' form realism and the domain realism of the endorsed products will lead to less positive brand outcomes. Formally, we predict that:

H4: The domain realism of the endorsed products moderates the relationship between influencers' form realism and brand outcomes: when VIs with high (vs. low) form realism endorses products with high domain realism (i.e., from the physical world) they generate more positive brand outcomes. However, when VIs with high (vs. low) form realism endorses products with low domain realism (i.e., from the digital world) they generate less positive brand outcomes.

H5: This is mediated by the perceived fit between VIs' form realism and the domain realism of the endorsed products: there is a stronger fit between VIs with high (low) form realism and products from domains with high (low) realism.

Empirical Evidence

We tested our hypotheses in four experimental studies (see Table 1). Study 1 uses a brand-VI collaboration scenario to examine how a brand's announcement of collaboration with a VI with high (vs. low) form realism affects downstream consequences for the brands. Studies 2a and 2b use realistic social media endorsements to test the moderating role of VIs' behavioral realism. Finally, Study 3 tests the moderating role of the domain realism of endorsed products. Details on study stimuli, exclusions, and pretests are available in the appendix 1.

Table 1. Essay 1 – Overview of Studies

Study	Design	Participants	Context
1	2 (form realism: high, low)	N = 292 (56% female, M_{age} = 42.22 years, MTurk)	Collaboration announcement scenario
2a	2 (form realism: high, low) x 2 (behavioral realism: high, low)	N = 411 (55% female, M_{age} = 43.45 years, MTurk)	Fictitious Instagram endorsement

2b	2 (form realism: high, low) x 2 (behavioral realism: high, low)	N = 436 (52% female, M_{age} = 39.60 years, MTurk)	Fictitious Instagram endorsement
3	2 (form realism: high, low) x 2 (domain realism: high, low)	N = 409 (58% female, M_{age} = 41.82 years, MTurk)	Collaboration choice scenario

Study 1

Study 1 tests the main effect of form realism on brand outcomes as well as the mediating role of VIs' perceived trustworthiness. We predict that the brand endorsements of VIs with high (vs. low) form realism should generate more positive brand outcomes. Additionally, VIs with high (vs. low) form realism should be perceived as more trustworthy, and this should mediate the relationship between VIs' form realism and brand outcomes.

Participants, Design, and Measures. 292 MTurk participants (M_{age} = 42.22 years; 55.5% female, 44.2% male, 0.3% non-binary) were randomly assigned to a condition in a one-factor, 2-level (form realism: high, low) between-subjects design in exchange for a small payment. First, participants read a brief description of VIs. Then, participants were introduced to a VI with either high or low form realism and the apparel brand Mavi. A desirable feature of the brand and the influencers used in this study is that the participant pool was mostly unfamiliar with them. The influencer images were pretested to be similar in likability, attractiveness, cuteness, and creepiness, but different in humanness (see appendices 1.A and 1.B). In addition, a fictitious name, Quinn, was used for the influencers (see appendix 1.C for stimuli details).

Afterward, participants read the announcement that "Mavi has collaborated with Quinn to promote their collection on social media."

We measured participants' attitudes toward the brand (using four items – pleasant, favorable, like, good – from Spears & Singh, 2004) and brand quality perceptions. These two measures formed a single brand outcomes measure (α = .97). Additionally, we measured

participants' trustworthiness perceptions of the influencers (using four items – *trustworthy, reliable, honest, dependable*; α = .97; all seven-point scales; from Ohanian, 1990).

Results. One-way ANOVAs revealed significant main effect of form realism on brand outcomes and on the perceived trustworthiness of the influencers. Participants in the high (vs. low) form realism condition reported more positive brand outcomes ($M_{\text{high-form}}$ = 4.50, SD = 1.39; $M_{\text{low-form}}$ = 3.67, SD = 1.58; $F(1, 290) = 22.68$, $p < .001$). Furthermore, participants in the high (vs. low) form realism condition reported higher trustworthiness perceptions of the influencers ($M_{\text{high-form}}$ = 3.73, SD = 1.61; $M_{\text{low-form}}$ = 3.34, SD = 1.69; $F(1, 290) = 4.03$, $p = .05$).

Finally, we tested for mediation, using PROCESS model 4 (10,000 bootstrap samples; Hayes, 2017). As predicted, the VI with high (vs. low) form realism was perceived as more trustworthy. As a result, participants reported more positive brand outcomes (95% CI for the indirect effect = [0.01, 0.48]).

Study 2a

Study 2a uses realistic social media stimuli to test the moderating effect of VIs' behavioral realism. We predict that Study 1 results will be replicated when the behavioral realism of VIs is high (i.e., when they use self-referential pronouns in endorsements). But when the behavioral realism is low (i.e., when VIs refrain from using self-referential pronouns in endorsements), the difference between high vs. low form realism will be diminished.

Participants, Design, and Measures. 411 MTurk participants (M_{age} = 43.45 years; 54.7% female, 44.3% male, 1.0% non-binary) were randomly assigned to a condition in a 2 (form realism: high, low) x 2 (behavioral realism: high, low) between-subjects design in exchange for a small payment. We followed a similar procedure used in Study 1, again promoting the apparel brand Mavi by the same two VIs (both named Quinn). Different from

Study 1, in Study 2a, participants were also presented with a fictitious Instagram brand endorsement post of the VI with either high or low form realism. Influencers' behavioral realism was manipulated through the language used in the endorsement messages. In particular, the endorsement message included singular self-referential pronouns in the high behavioral realism conditions, but not in the low behavioral realism conditions (see appendix 1.D for stimuli details).

The Instagram posts created for the study featured "like" and "dislike" buttons, and participants could react to the post by using the buttons if they chose to do so. Besides participants' reaction to the Instagram post, we measured brand outcomes ($\alpha = .97$) and participants' trustworthiness perceptions of the influencers ($\alpha = .98$; all seven-point scales) with the same items we used in Study 1.

Results. Two-way ANOVAs revealed significant main effects of form realism on the downstream consequences. Participants in the high (vs. low) form realism conditions reported more positive brand outcomes ($M_{\text{high-form}} = 4.35$, SD = 1.44; $M_{\text{low-form}} = 3.79$, SD = 1.58; $F(1, 407) = 14.12$, $p < .001$). We also calculated an engagement valence by using the "like" and "dislike" clicks. The engagement valence was higher for participants in the high (vs. low) form realism conditions ($M_{\text{high-form}} = 0.15$, SD = 0.65; $M_{\text{low-form}} = -0.11$, SD = 0.63; $F(1, 407) = 16.85$, $p < .001$).

Importantly, there were interaction effects of influencers' form and behavioral realism on brand outcomes ($F(1, 407) = 18.43$, $p < .001$; see Figure 3) and the engagement valence ($F(1, 407) = 13.19$, $p < .001$). Within the high behavioral realism conditions, participants in the high (vs. low) form realism condition reported more positive brand outcomes ($M_{\text{high-behavioral\_high-form}} = 4.60$, SD = 1.32; $M_{\text{high-behavioral-low-form}} = 3.42$, SD = 1.68; $F(1, 407) = 32.80$, $p < .001$) and showed

higher engagement valence ($M_{\text{high-behavioral-high-form}} = 0.28$, SD = 0.64; $M_{\text{high\_behavioral-low\_form}} = -0.20$, SD = 0.65; $F(1, 407) = 30.29$, $p < .001$). As predicted, no significant difference occurred within the low behavioral realism conditions for brand outcomes ($M_{\text{low-behavioral\_high-form}} = 4.10$, SD = 1.52; $M_{\text{low-behavioral-low-form}} = 4.17$, SD = 1.36; $F(1, 407) = 0.14$, $p = .71$) and engagement valence ($M_{\text{low-behavioral\_high-form}} = 0.02$, SD = 0.64; $M_{\text{low-behavioral-low-form}} = -0.01$, SD = 0.59; $F(1, 407) = 0.11$, $p = .74$).

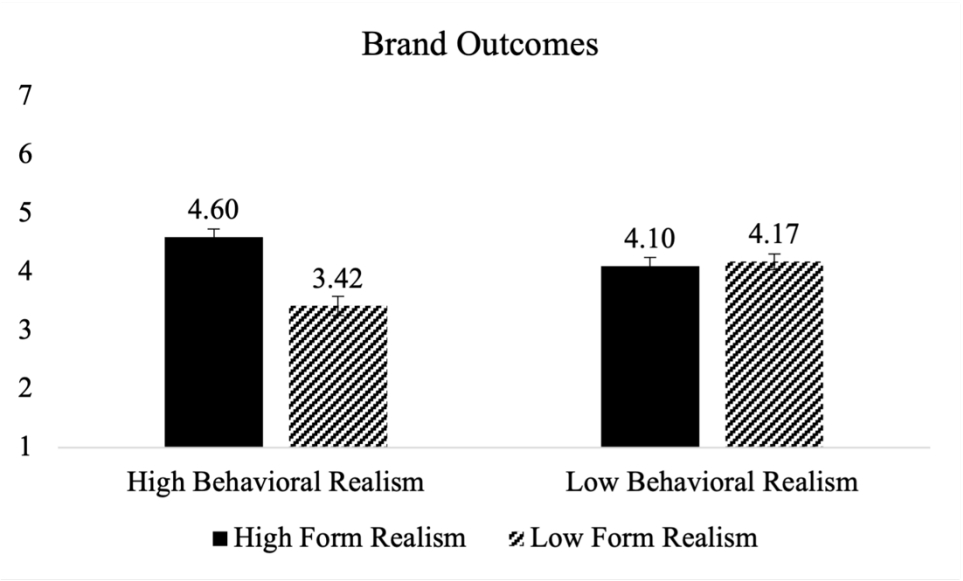

Figure 3. The interaction effect of form and behavioral realism on brand outcomes. Error bars represent ±1 SE.

Furthermore, participants in the high (vs. low) form realism conditions reported higher trustworthiness perceptions of the influencers ($M_{\text{high-form}} = 3.83$, SD = 1.73; $M_{\text{low-form}} = 3.28$, SD = 1.60; $F(1, 407) = 10.98$, $p = .001$).

Importantly, there were interaction effects of influencers' form and behavioral realism on the perceived trustworthiness of the influencers ($F(1, 407) = 13.64$, $p < .001$). Within the high behavioral realism conditions, participants in the high (vs. low) form realism condition perceived the influencer as more trustworthy ($M_{\text{high-behavioral\_high-form}} = 4.17$, SD = 1.58; $M_{\text{high-behavioral\_low-form}} = 3.04$, SD = 1.65; $F(1, 407) = 24.84$, $p < .001$). As predicted, no significant difference occurred

within the low behavioral realism conditions for the perceived trustworthiness of the influencers ($M_{\text{low-behavioral\_high-form}}$ = 3.48, SD = 1.81; $M_{\text{low-behavioral-low-form}}$ = 3.54, SD = 1.51; $F(1, 407) = 0.72$, $p = .79$).

Finally, we tested for moderated mediation, using PROCESS model 7 (10,000 bootstrap samples; Hayes, 2017). The index of moderated mediation for both brand outcomes and the engagement valence were significant (95% $CI_{\text{brand\_outcomes}}$ = [0.37, 1.25], 95% $CI_{\text{engagement\_valence}}$ = [0.09, 0.34]). As predicted, the difference in VIs' perceived trustworthiness mediates the effect of form realism on the downstream consequences for high behavioral realism conditions (95% $CI_{\text{brand\_outcomes}}$ for the indirect effect = [0.47, 1.08], 95% $CI_{\text{engagement\_valence}}$ for the indirect effect = [0.11, 0.29]), but not for low behavioral realism conditions (95% $CI_{\text{brand\_outcomes}}$ for the indirect effect = [-0.35, 0.26], 95% $CI_{\text{engagement\_valence}}$ for the indirect effect = [-0.09, 0.07]).

Study 2b

Study 2b aimed to replicate Study 2a results with a relatively more experiential product (i.e., coffee shop). Also, the endorsement post did not feature the "like" and "dislike" buttons to present more typical Instagram stimuli.

Participants, Design, and Measures. 436 MTurk participants (M_{age} = 39.60 years; 52.1% female, 47.5% male, 0.5% non-binary) were randomly assigned to a condition in a 2 (form realism: high, low) x 2 (behavioral realism: high, low) between-subjects design in exchange for a small payment. The influencers and the procedure were the same as in Study 2a, except that we replaced the apparel brand with a fictitious coffee shop brand. First, participants read about the collaboration between the coffee shop and the VI with either high or low form realism. Then, participants were presented with a fictitious Instagram endorsement post about the coffee shop posted by the VI. Also, as in Study 2a, Influencers' behavioral realism was

manipulated through the language used in the endorsement messages (i.e., through their use of self-referential pronouns in endorsements; see appendix 1.E for stimuli details).

We measured brand outcomes (α = .97) and participants' trustworthiness perceptions of the influencers (α = .98; all seven-point scales) with the same items we used in the previous studies.

Results. A two-way ANOVA revealed a significant main effect of form realism on brand outcomes. Participants in the high (vs. low) form realism conditions reported more positive brand outcomes ($M_{\text{high-form}}$ = 4.63, SD = 1.51; $M_{\text{low-form}}$ = 4.34, SD = 1.45; $F(1, 432) = 4.12$, p = .04).

Importantly, there were interaction effects of influencers' form and behavioral realism on brand outcomes ($F(1, 432) = 17.17$, $p < .001$). Within the high behavioral realism conditions, participants in the high (vs. low) form realism condition reported more positive brand outcomes ($M_{\text{high-behavioral\_high-form}}$ = 4.95, SD = 1.38; $M_{\text{high-behavioral\_low-form}}$ = 4.09, SD = 1.56; $F(1, 432)$ = 18.97, $p < .001$). As predicted, no significant difference occurred in brand outcomes within the low behavioral realism conditions ($M_{\text{low-behavioral\_high-form}}$ = 4.30, SD = 1.58; $M_{\text{low-behavioral-low-form}}$ = 4.59, SD = 1.30; $F(1, 432) = 2.25$, p = .14).

Furthermore, participants in the high (vs. low) form realism conditions reported higher trustworthiness perceptions of the influencers ($M_{\text{high-form}}$ = 3.72, SD = 1.81; $M_{\text{low-form}}$ = 3.25, SD = 1.76; $F(1, 432) = 7.92$, p = .005).

Importantly, there were interaction effects of influencers' form and behavioral realism on the perceived trustworthiness of the influencers ($F(1, 432) = 10.99$, p = .001). Within the high behavioral realism conditions, participants in the high (vs. low) form realism condition perceived the influencer as more trustworthy ($M_{\text{high-behavioral\_high-form}}$ = 4.03, SD = 1.80; $M_{\text{high-behavioral\_low-form}}$ =

2.99, SD = 1.70; $F(1, 432) = 18.70$, $p < .001$). As predicted, no significant difference occurred within the low behavioral realism conditions for the perceived trustworthiness of the influencers ($M_{\text{low-behavioral\_high-form}} = 3.41$, SD = 1.78; $M_{\text{low-behavioral-low-form}} = 3.50$, SD = 1.79; $F(1, 432) = 0.13$, $p = .72$).

Finally, we tested for moderated mediation, using PROCESS model 7 (10,000 bootstrap samples; Hayes, 2017). The index of moderated mediation was significant (95% CI = [0.29, 1.13]). As predicted, the difference in VIs' perceived trustworthiness mediates the effect of form realism on brand outcomes for high behavioral realism conditions (95% CI for the indirect effect = [0.36, 0.94]), but not for low behavioral realism conditions (95% CI for the indirect effect = [-0.35, 0.24]).

Study 3

Study 3 tests the moderating effect of the domain realism of endorsed products. We predict that Study 1 results will be replicated for the endorsements of products from domains with high realism. However, the endorsements of VIs with low (vs. high) form realism should generate more positive brand outcomes for products from domains with low realism due to stronger influencer-domain fit perceptions.

Participants, Design, and Measures. 409 MTurk participants ($M_{\text{age}} = 41.82$ years; 57.9% female, 41.1% male, 1.0% non-binary) were randomly assigned to a condition in a 2 (form realism: high, low) x 2 (product domain realism: high, low) between-subjects design in exchange for a small payment. We used the same influencers as in the previous studies but used a fictitious game company brand. The influencer images were pretested to be similar in playfulness, boringness, seriousness, likability, attractiveness, cuteness, and creepiness, but different in humanness (see appendix 1.F). Similar to the previous studies, participants, first read

a brief description about VIs and were introduced to a VI with either high or low form realism. Then, participants read about the game described either as a board (high domain realism) or video game (low domain realism) company. Finally, participants were presented with the game company's VI choice for collaboration (see appendix 1.G for stimuli details).

We measured brand outcomes with the same items we used in the previous studies (α = .96). We also measured perceptions of the fit between the influencer and product domain (three items; *fit together; belong together, go together*; α = .97; all seven-point scales; Till & Busler, 2000).

Results. A two-way ANOVA result revealed significant interaction effects of influencers' form realism and domain realism on brand outcomes ($F(1, 405) = 13.15$, $p < .001$; Figure 4). Within the high domain realism conditions, participants in the high (vs. low) form realism condition reported more positive brand outcomes ($M_{\text{high-domain\_high-form}} = 4.95$, SD = 1.19; $M_{\text{high-domain\_low-form}} = 4.47$, SD = 1.41; $F(1, 405) = 7.24$, $p = .007$). However, as predicted, the opposite was true within the low domain realism conditions ($M_{\text{low-domain\_high-form}} = 4.44$, SD = 1.33; $M_{\text{low-domain\_low-form}} = 4.88$, SD = 1.14; $F(1, 405) = 5.95$, $p = .02$).

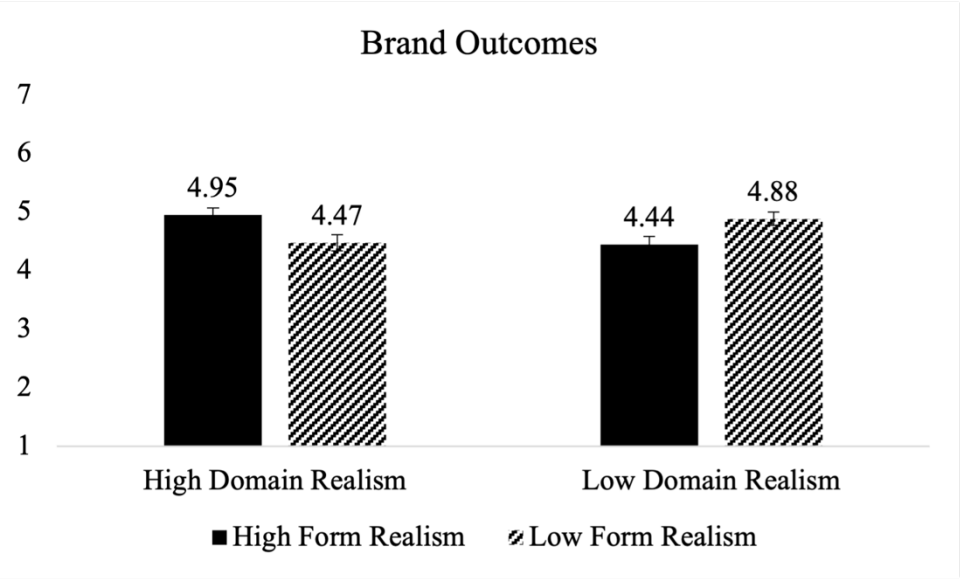

Figure 4. The interaction effect of form and domain realism on brand outcomes. Error bars represent ±1 SE.

Furthermore, there were interaction effects of influencers' form realism and domain realism on participants' fit perceptions ($F(1, 405) = 18.90$, $p < .001$). Within the high domain realism conditions, participants in the high (vs. low) form realism condition perceived the influencer and the product to fit better ($M_{\text{high-domain\_high-form}} = 4.19$, SD = 1.66; $M_{\text{high\_domain-low\_form}} = 3.32$, SD = 1.86; $F(1, 405) = 16.66$, $p < .001$). However, as predicted, the opposite was true within the low domain realism conditions ($M_{\text{low-domain\_high-form}} = 4.88$, SD = 1.26; $M_{\text{low-domain\_low-form}} = 5.33$, SD = 1.26; $F(1, 405) = 4.34$, $p = .04$).

Finally, we tested for moderated mediation, using PROCESS model 7 (10,000 bootstrap samples; Hayes, 2017). The index of moderated mediation was significant (95% CI = [0.36, 0.86]). As predicted, for high domain realism conditions, increasing the VI's form realism increased the perceived fit between the influencer and the endorsed product, which in turn increased the brand outcomes (95% CI for the indirect effect = [0.24, 0.62]). However, for low domain realism conditions, increasing the VI's form realism decreased the perceived fit between the influencer and the endorsed product, which in turn decreased the brand outcomes (95% CI for the indirect effect = [-0.32, -0.04]).

Discussion

VIs are designed to exhibit varying degrees of form realism. Our results show that VIs' form realism is an important factor for the effectiveness of their endorsements in generating positive brand outcomes. However, there are other realism factors that influence the effect of VIs' form realism on the effectiveness of their brand endorsements. Therefore, it is essential to consider these factors when evaluating the effect of form realism on brand outcomes. Essay 1 identifies two realism factors that moderate the relationship between VIs' form realism and

brand outcomes: the behavioral realism of VIs and the domain realism of the products that VIs endorse. Accordingly, this research examines the interplay between the form and behavioral realism of VIs (as displayed through self-referential pronouns), and the domain realism of the endorsed products.

Our results show that, all else being equal—without considering VIs' behavioral realism and the domain realism of the endorsed products—VIs with high form realism are more effective than those with low form realism in generating positive brand outcomes. This is because VIs with high (vs. low) form realism generate a higher trustworthiness perception. However, we show a boundary condition to this general finding: when VIs exhibit low behavioral realism—by avoiding the use of singular self- referential pronouns—VIs with low form realism can be as effective as those with high form realism in generating positive outcomes for brands. This is because, when VIs exhibit low behavioral realism through refraining from using self-referential pronouns, VIs with low form realism generate the same level of perceived trustworthiness as those with high form realism.

Moreover, we show that the positive effect of form realism on brand outcomes reverses when VIs endorse products belonging to domains characterized by low realism. In particular, while VIs with high (vs. low) form realism are more effective in generating positive brand outcomes when they endorse products with high domain realism; VIs with low (vs. high) form realism are more effective in generating positive brand outcomes when they endorse products belonging to domains characterized by low realism. This is because of the strong fit perception, in these two cases, between VIs' form realism and the domain realism of the products that they endorse.

Theoretical Contributions and Practical Implications

Essay 1 makes several theoretical contributions. First, this research contributes to the social media and influencer marketing literatures by examining an emerging influencer type. Social media influencers and their effectiveness as brand endorsers have been examined in the literature (Leung et al., 2022; Wies et al., 2023). However, less is known about VIs. We address this gap in the literature by examining the factors contributing to the effectiveness of VIs as brand endorsers.

Second, this research contributes to the consumer-technology interactions literature. Virtual entities are prevalent in the marketplace. Interacting with virtual entities from digital assistants to AI chatbots has become a part of consumers' daily lives. Although there is research examining these interactions (e.g., Longoni et al. 2019; Puntoni et al. 2021), a lot remains to be uncovered to understand how consumers respond to virtual entities. We address this gap by demonstrating how three types of realism affect consumers' responses. Our findings improve our understanding of the roles of form realism, behavioral realism, and product domain realism in the efficacy of VI brand endorsements. Furthermore, we examine visual and verbal cues in VIs' brand endorsements collectively and show that the interplay between form and behavioral realism matters. Our findings show that complementing high form realism with high behavioral realism, as displayed through self-referential pronouns in this case, is critical to enhancing the benefits of high form realism. Moreover, we examine the congruency between VIs' form realism and product domain realism and show that the lack of congruency between these two crucial components of brand endorsements reverses the positive effect of high form realism on brand outcomes. In fact, VIs with low form realism are more effective than VIs with high form realism in endorsing products with low domain realism. Although we focus on VIs, our results regarding

the interaction of form and behavioral realism may potentially be extended to the broad category of virtual entities.

Third, the current essay also contributes to the literature by advancing knowledge on the factors that improve consumers' perceptions of VIs' trustworthiness. Trust influences consumers' responses to influencers' social media brand endorsements (Djafarova & Rushworth, 2017). However, research on how to improve VIs' trustworthiness is limited. This research provides insights into the role of VIs' form and behavioral realism as well as their interaction in improving the trustworthiness of VIs.

This research also offers contributions to marketing practice. Our findings offer insights for firms that engage in partnerships with VIs, particularly with regard to selecting the right influencer and crafting effective endorsement content. Firms who are willing to increase their online presence on social media by collaborating with VIs can use our results to maximize their outcomes by choosing the right VI. For example, when using singular self-referential pronouns is critical for a brand's endorsement message, collaborating with a VI with high form realism could be more advantageous than collaborating with a VI with low form realism. Additionally, when endorsing a product with low domain realism, collaborating with a VI with low form realism could be more advantageous than collaborating with a VI with high form realism. Moreover, firms can benefit from our results in designing their endorsement campaigns. Given their VI choice, firms can tailor the endorsement message to generate the most promising brand outcomes in light of our results.

Chapter 3 – Essay 2: Virtual Versus Human Influencers as Brand Endorsers

VIs and human influencers share many similarities in their presentation on social media platforms. From the perspective of social media users, VIs, much like human influencers, share

their personal lives and experiences, interact with their followers, and those with high form realism closely resemble the physical appearance of human beings (Moustakas et al., 2020). For example, Miquela, one of the most popular VIs with over three million followers, is depicted as a 19-year-old living in Los Angeles, CA, (see Figure 5; Miquela, n.d.). Despite not being a real person, she has a human-like appearance and provides narratives of realistic actions. In 2018, Time magazine named Miquela one of the twenty-five most influential people on the Internet (Time, 2018). Of course, in reality, VIs' social media accounts are typically managed by a human team (Thomas & Fowler, 2021), but these accounts are designed to give the impression that the posts are created by the VIs themselves and the experiences presented are their own.

Figure 5. Miquela (left) and profile header for Miquela's Instagram page (right) https://www.instagram.com/lilmiquela/

Because of the advantages VIs offer over their human counterparts, such as greater control of their images in promotional social media posts to align with brand interests, firms may perceive VIs as more appealing to collaborate with than human influencers (Thomas & Fowler, 2021). Indeed, an increasing number of firms have started to collaborate with VIs (Kuzminov, 2023; Thomas & Fowler, 2021). Despite the advantages VIs offer, they only exist in the digital world and cannot really have the experiences and feelings that they profess to have in their social

media posts (Moustakas et al., 2020) – and consumers may recognize this. Therefore, the question remains: are VIs as effective as their human counterparts as brand endorsers?

In an attempt to answer this question, Essay 2 examines whether endorsements from VIs have as large an impact on consumers' brand attitudes as endorsements from human influencers. We draw on the source credibility model (Hovland et al., 1953; Hovland & Weiss, 1951; Ohanian, 1990) to examine whether VIs are perceived as credible as human influencers as brand endorsers. In addition, drawing on the language expectancy theory (Burgoon & Miller, 1985), we examine the moderating effect of language type (rational vs. emotional) on the relative credibility and effectiveness of VIs as brand endorsers.

Next, we lay out our theoretical framework and hypotheses.

Theoretical Background

The Effect of Credibility

The source credibility model states that credibility is one of the most essential factors for the persuasiveness of a source (Hovland et al., 1953; Hovland & Weiss, 1951; Ohanian, 1990). Additionally, research has shown that there is a positive relationship between the credibility of a source and its influence on consumers' behaviors (Tripp et al., 1994). Accordingly, when social media influencers are perceived as credible, their endorsement of a brand enhances the persuasiveness of a firms' brand messages (Carrillat et al., 2013; De Veirman et al., 2017; Munnukka et al., 2016).

According to the source credibility model, the credibility of a source depends on the "trustworthiness" and the "expertness" of the source (Hovland et al., 1953). In the source credibility context, trustworthiness is related to concepts such as honesty, sincerity, and truthfulness, whereas expertness refers to competence-related concepts such as knowledge and

experience (Munnukka et al., 2016). When consumers evaluate the trustworthiness and expertness of virtual entities, they use concepts similar to the ones used when they evaluate the trustworthiness and expertness of human beings (Cassell & Bickmore, 2000; Komiak & Benbasat, 2006). Therefore, it is crucial for VIs to exhibit trustworthiness and expertness traits similar to those of human influencers to be considered as credible in their brand endorsements.

On the one hand, human influencers' regularly sharing about their everyday lives helps them build large networks of highly engaged followers who value their opinions (Kim & Kim, 2021). Furthermore, the sharing of their everyday lives, interests, and hobbies leads their followers to perceive human influencers as organic and genuine, which strengthens the bond between human influencers and their followers (Kim & Kim, 2021; Lueck, 2015). As a result, human influencers are perceived as close and accessible to their followers (Meyers, 2017), and brand endorsements by human influencers are often deemed to be endorsements by peers (Munnukka et al., 2016). This results in followers treating their interactions as similar to face-to-face conversations, even though most of the time the direction of the interactions is one-way (Colliander & Dahlén, 2011; Knoll et al., 2015). Consequently, human influencers' brand endorsements are viewed as sincere, which enhances the impact of these endorsements (Lyons & Henderson, 2005; Watts & Dodds, 2007). Furthermore, as human influencers post about their hobbies and interests over time, their followers come to see them as experts on these topics (Khamis et al., 2017; Lou & Yuan, 2019; Schouten et al., 2020). And product experience and product knowledge are key factors for influencers to be considered as experts in the product category that they endorse (Packard & Wooten, 2013).

On the other hand, VIs' digital-only existence is salient to the users because VIs typically state that they are virtual characters in the biography section of their social media accounts (e.g.,

see Figure 5) and their posts do not conceal this fact. Therefore, unlike human influencers, the sharing of posts about their everyday lives – as if they are actually alive and conscious – conflicts with VIs' digital-only existence, which may compromise their perceived trustworthiness in the eyes of consumers. Additionally, although VIs' social media accounts are typically managed by a human team (Thomas & Fowler, 2021), their social media profiles are designed to give the impression that their posts are created by the VIs themselves, reflecting their own experiences. As a result of being presented as autonomous entities, VIs could be perceived as entities with a machine-like mind rather than a human-like mind due to their digital-only existence being salient. Research has shown that compared to a machine-like mind, a human-like mind is perceived as being more capable of having experiences or feeling emotions (Gray et al., 2007; Weisman et al., 2017). Accordingly, when VIs recommend a product, consumers may think that VIs cannot have real experiences with that product (Moustakas et al., 2020). In fact, VIs have been found to have lower proximal sensory capacities (i.e., haptic, olfactory, and gustatory) than human influencers (Zhou et al., 2023). As a result, consumers may think that VIs are not trustworthy and cannot have expertise in the product category. Building on these insights, we formally hypothesize the following:

H1: Virtual (vs. human) influencers' brand endorsements will generate a less positive attitude toward the endorsed brands.

H2: As brand endorsers, virtual (vs. human) influencers will be perceived as less credible.

H3: The perceived credibility of influencers will mediate the relationship between influencer type (human influencer versus VI) and consumers' attitude toward the brand.

The Effect of Language Type

Consumers construct an expectation of an unknown characteristic based on a known feature with which it is thought to be associated (Dick et al., 1990). Similarly, consumers may construct different behavioral expectations from their interactions with social media influencers depending on the type of influencer. Consumers experience a negative violation when the actual result of their interactions do not meet their expectations (Oliver, 1980). This mismatch between expectations and actual outcome from interactions leads to a decrease in overall satisfaction (Miao et al., 2022).

Influencers' language use is one of the domains for which consumers form expectations – "how it is said" can be as critical as "what is said" in endorsement posts (Lee & Theokary, 2021). Research has shown the importance of adopting an appropriate communication style for the effectiveness of a message. Language expectancy theory suggests that by observing their own and others' language usage, consumers develop expected norms for appropriate communication styles (Averbeck, 2010; Averbeck & Miller, 2014; Burgoon & Miller, 1985). Unexpected, out-of-norm language usage can violate the expectations of appropriate communication (Averbeck & Miller, 2014; Burgoon & Miller, 1985). Thus, individuals from a specific group should not use a language that was not expected of an individual from that group (Averbeck, 2010). Negative violations that fail to meet the expectations from a message source lead to negative attitude change and decrease the persuasiveness and credibility of the source (Hamilton et al., 1990). And negative violations in language usage can impact consequential downstream outcomes and, thus, decrease the effectiveness of a message (Burgoon & Miller, 1985). In sum, the use of appropriate language is crucial for influencers' credibility and the effectiveness of their endorsements.

Even though humans have both cognitive and emotional abilities, emotion is perceived to be more important for judging humanness than cognition (Gray et al., 2007; Waytz & Norton, 2014). Notably, research on dehumanization has demonstrated that while machines such as robots or digital entities are believed to have human abilities that are cognitive in nature (such as rationality), they lack the capacity for emotion, so characteristic of human nature (Gray et al., 2007; Haslam, 2006; Haslam et al., 2008; Loughnan & Haslam, 2007). For example, consumers trust and use algorithms for tasks that typically require cognitive abilities, but not so much for tasks that typically require emotional abilities (Castelo et al., 2019). Accordingly, we suggest that when VIs use language that is associated with emotional abilities, consumers will respond negatively since they expect VIs to lack these abilities.

The language of brand endorsements can be tailored using rational or emotional elements (Heath, 2011). Endorsements with rational language are associated with rationality. Such rational language is constructed with clear, direct, factual or functional information about endorsed products (Okazaki et al., 2010; Stafford & Day, 1995). Endorsements with emotional language, on the other hand, are associated with emotions. Such emotional language is constructed with emotional words and phrases (Cutler & Javalgi, 1993; Okazaki et al., 2010). The literature on human-technology interaction suggests that consumers associate the use of emotional words only with humans, whereas consumers can associate the use of cognitive words with both machines and humans (Loughnan & Haslam, 2007). Accordingly, when digital entities, such as algorithms, use emotional language rather than rational language, they get a less positive response from consumers (e.g., Castelo et al., 2019; Nowak & Rauh, 2008). A parallel argument suggests that when VIs use emotional language in their endorsements, there is a clear violation of expectations of VIs (since it is salient that VIs are digital entities and cannot have feelings). However, there is

less of a violation when VIs use rational language in their endorsements. Table 2 summarizes consumers' expectations of human influencers and VIs.

Table 2. Consumers' expectations of human influencers versus VIs

	Human Influencers	VIs
Abilities		
Cognitive abilities	Expected	Expected
Emotional abilities	Expected	Unexpected
Endorsement language		
Rational	Plausible	Plausible
Emotional	Plausible	Implausible

Building on these insights, we formally hypothesize the following:

H4: The language that influencers use in their endorsements moderates the relationships between influencer type and (a) attitude toward brands and (b) the perceived credibility of the influencers: when emotional language is used in the endorsements, VIs' brand endorsements will generate a less positive attitude toward the endorsed brands and VIs (vs. human influencers) will be perceived as less credible. However, when rational language is used in the endorsements, the effect of influencer type on (a) attitude toward brands and (b) the perceived credibility of the influencers will be diminished.

Empirical Evidence

We tested our hypotheses in five experimental studies (see Table 3). Study 1 uses a brand-influencer collaboration scenario to examine how a brand's collaboration with virtual over human influencers and vice versa affects attitude toward the brand. Study 2 uses a hypothetical t-shirt brand endorsement to provide support for our predictions in the social media brand endorsement context. Study 3 further tests the proposed effects using two product replications (i.e., ice cream and sunglasses) in realistic social media endorsement scenarios to enhance the external validity of our results. Study 4 tests the proposed underlying process by directly

manipulating the credibility of the influencers. Finally, Study 5 tests the moderating role of the endorsement language type (emotional vs. rational) on the proposed effects. Details on study stimuli and exclusions are available in the appendix 2.

Table 3. Essay 2 – Overview of Studies

Study	Design	Participants	Context
1	2 (influencer: human, virtual)	N = 302 (46% female, M_{age} = 39.44 years, MTurk)	Collaboration announcement scenario
2	2 (influencer: human, virtual)	N = 251 (43% female, M_{age} = 38.91 years, MTurk)	Hypothetical endorsement scenario
3	2 (influencer: human, virtual) x 2 (product replications)	N = 319 (48% female, M_{age} = 41.70 years, MTurk)	Fictitious Instagram endorsement
4	2 (influencer: human, virtual) x 2 (credibility: control, high)	N = 401 (49% female, M_{age} = 39.38 years, MTurk)	Fictitious Instagram endorsement
5	2 (influencer: human, virtual) x 2 (language: emotional, rational)	N = 461 (58% female, M_{age} = 40.92 years, MTurk)	Fictitious Instagram endorsement

Study 1

Study 1 tests the main effect of influencer type on brand outcomes, as well as the mediating role of perceived credibility of the influencers. We predict that participants' attitude toward a brand promoted by a VI would be less positive than toward a brand promoted by a human influencer. Furthermore, participants would perceive VIs as less credible than human influencers, and this would mediate the relationship between influencer type and attitude toward the brand.

Participants, Design, and Measures. 302 MTurk participants (M_{age} = 39.44 years; 46.0% female, 53.6% male, 0.3% non-binary) were randomly assigned to a condition in a one-factor, 2-level (influencer type: human, virtual) between-subjects design in exchange for a small payment.

First, participants read brief descriptions about social media influencers and VIs. Then, participants were presented with a scenario in which Brand A had the option to collaborate with either a virtual or a human influencer, and Brand A decided to collaborate with the human (human influencer condition) or the virtual (VI condition) influencer to promote their brand and products (see appendix 2.A for stimuli details).

We measured participants' attitude toward Brand A (four items; *pleasant, favorable, appealing, positive*; α = .98; Spears & Singh, 2004). Additionally, we measured participants' credibility perceptions of influencers (three items; *credible, trustworthy, expert*; α = .96; all seven-point scales; Ohanian, 1990).

Results. One-way ANOVAs revealed significant main effect of influencer type (human, virtual) on attitude toward the brand and the credibility perceptions of influencers. Participants in the virtual (vs. human) influencer condition reported a less positive attitude toward the brand ($M_{virtual}$ = 3.37, *SD* = 1.70; M_{human} = 5.60, *SD* = 1.39; $F(1, 300) = 155.80$, $p < .001$; Figure 6). Furthermore, participants in the virtual (vs. human) influencer condition perceived the influencer as less credible ($M_{virtual}$ = 3.08, *SD* = 1.70; M_{human} = 4.79, *SD* = 1.49; $F(1, 300) = 85.92$, $p < .001$; Figure 6).

Finally, we tested for mediation, using PROCESS model 4 (10,000 bootstrap samples; Hayes, 2017). As predicted, the virtual (vs. human) influencer was perceived as less credible, which in turn led to a less positive attitude toward the brand (95% CI for the indirect effect = [−1.54, −0.97]).

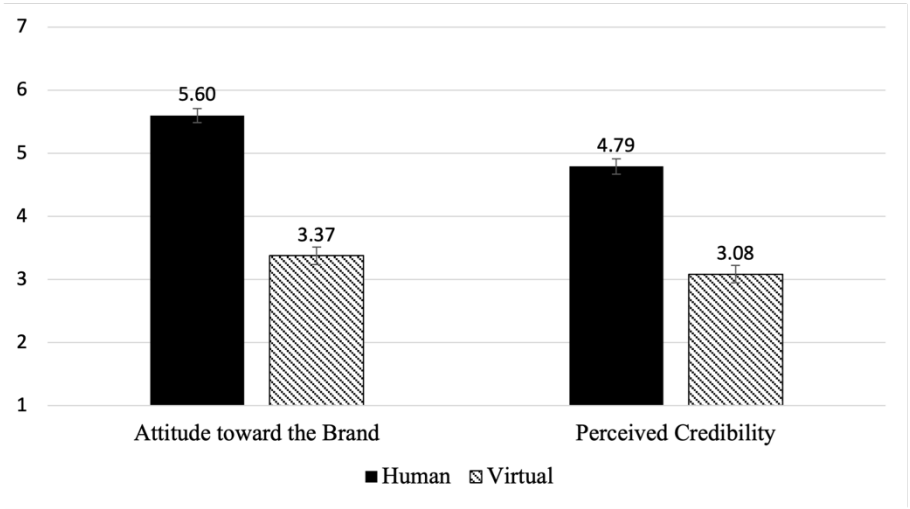

Figure 6. Effect of influencer type on attitude toward the brand and the perceived credibility of the influencers. Error bars represent ± 1 SE.

Study 2

Study 2 tests the main effect of influencer type on brand outcomes, as well as the mediating role of perceived credibility of the influencers in a hypothetical t-shirt brand endorsement context. We predicted that, when the brand is endorsed by a VI, participants' attitude toward the brand would be less positive than their attitude toward the brand when it is endorsed by a human influencer. Furthermore, participants would perceive the influencer as less credible when the influencer is introduced as a VI, and this would mediate the relationship between the influencer type and attitude toward the brand.

Participants, Design, and Measures. 251 MTurk participants (M_{age} = 38.91 years; 43.0% female, 56.2% male, 0.8% non-binary) were randomly assigned to a condition in a one-factor, 2-level (influencer type: human, virtual) between-subjects design in exchange for a small payment.

Participants in the human influencer condition read brief descriptions about social media influencers, while participants in the VI condition read the same description as well as text about VIs. We manipulated the influencer type by introducing the influencer used in the study either as

an influencer or a VI. We asked participants to imagine that they were planning to buy a t-shirt and they saw a social media endorsement post about Burlay brand t-shirts by Quinn introduced either as an influencer (human influencer condition) or a VI (VI condition). In order to eliminate the effects of participants' pre-established attitudes toward the existing influencer and brand names, fictitious names were used for both the influencer (Quinn) and the brand (Burlay). Specifically, in the human influencer (VI) condition, participants were asked to imagine that they saw influencer (VI) Quinn's posts about Burlay's t-shirts on their social media feed (see appendix 2.B for stimuli details).

We measured participants' attitude toward the brand by the same four items we used in Study 1 ($\alpha = .97$). Additionally, we measured participants' credibility perceptions of influencers (ten items; *credible, trustworthy, expert, experienced, knowledgeable, qualified, sincere, honest, reliable, dependable*; $\alpha = .98$; all seven-point scales; Ohanian, 1990).

Results. One-way ANOVAs revealed significant main effect of influencer type (human, virtual) on attitude toward the brand and the credibility perceptions of influencers. Participants in the virtual (vs. human) influencer condition reported a less positive attitude toward the brand ($M_{virtual} = 3.98$, $SD = 1.43$; $M_{human} = 4.64$, $SD = 1.29$; $F(1, 249) = 14.86$, $p < .001$). Furthermore, participants in the virtual (vs. human) influencer condition perceived the influencer as less credible ($M_{virtual} = 3.49$, $SD = 1.63$; $M_{human} = 4.35$, $SD = 1.37$; $F(1, 249) = 20.69$, $p < .001$).

Finally, we tested for mediation, using PROCESS model 4 (10,000 bootstrap samples; Hayes, 2017). As predicted, the virtual (vs. human) influencer was perceived as less credible, which in turn led to a less positive attitude toward the brand (95% CI for the indirect effect = [−0.85, −0.32]).

Study 3

Study 3 uses realistic social media stimuli to test the main effect of influencer type on brand outcomes, as well as the mediating role of perceived credibility of the influencers. We had the same predictions as in Studies 1 and 2.

Participants, Design, and Measures. 319 MTurk participants (M_{age} = 41.70 years; 48.0% female, 51.7% male, 0.3% non-binary) were randomly assigned to a condition in a 2 (influencer type: human, virtual) x 2 (product replications: ice cream, sunglasses) between-subjects design in exchange for a small payment.

Participants in the human influencer condition read brief descriptions about social media influencers, while participants in the VI condition read brief descriptions about VIs. We manipulated the influencer type by introducing the influencer used in the study either as an influencer (human influencer condition) or a VI (VI condition). The picture of the influencer used in this study was, in fact, a picture of an actual VI from Instagram. The influencer used in the study was selected because of the influencer's relatively low popularity on Instagram, which reduces the likelihood that participants would have pre-existing opinions about the influencer. After the introduction of the influencer, participants were provided with a fictitious Instagram post by the influencer endorsing either ice cream or sunglasses from Burlay (see appendix 2.C for stimuli details).

We measured participants' attitude toward the brand (α = .98) and credibility perceptions of the influencer (α = .99) by the same items we used in Study 2.

Results. Two-way ANOVAs revealed significant main effect of influencer type (human, virtual) on attitude toward the brand and the credibility perceptions of influencers.

Participants in the virtual (vs. human) influencer conditions reported a less positive attitude toward the brand ($M_{virtual}$ = 4.27, SD = 1.86; M_{human} = 4.74, SD = 1.54; $F(1, 315) = 6.37$, $p = .01$). There was no significant interaction effect between influencer type and product replications ($p = .40$) showing that the effect of influencer type on attitudes toward the brand did not change with product domain.

Furthermore, participants in the virtual (vs. human) influencer conditions perceived the influencer as less credible ($M_{virtual}$ = 3.18, SD = 2.01; M_{human} = 3.87, SD = 1.58; $F(1, 315) = 11.75$, $p = .001$). There was no significant interaction effect between influencer type and product replications ($p = .60$) showing that the effect of influencer type on perceived credibility did not change with product domain.

Finally, we tested for mediation, using PROCESS model 4 (10,000 bootstrap samples; Hayes, 2017). As predicted, the virtual (vs. human) influencer was perceived as less credible, which in turn led to a less positive attitude toward the brand (95% CI for the indirect effect = [−0.82, −0.22]).

Study 4

Study 4 tests the mediating role of perceived credibility of the influencers by manipulating the credibility of the influencers. We predicted that increasing the credibility of the influencers should increase their effectiveness in generating a positive attitude toward the brand in both virtual and human influencer conditions. In particular, we predict that participants' attitude toward the brand endorsed by a highly credible VI (human influencer) should be more positive than their attitude toward the brand endorsed by a VI (human influencer) in the control condition.

Participants, Design, and Measures. 401 MTurk participants (M_{age} = 39.38 years; 48.6% female, 50.9% male, 0.5% non-binary) were randomly assigned to a condition in a 2 (influencer type: human, virtual) x 2 (influencer credibility: control, high) between-subjects design in exchange for a small payment.

Similar to the previous studies, participants in the human influencer condition read brief descriptions about social media influencers, while participants in the VI condition read brief descriptions about VIs. We manipulated the influencer type by introducing the influencer used in the study either as an influencer (human influencer condition) or a VI (VI condition). We used the same influencer picture that we used in Study 3. After the introduction of the influencer, participants were provided with a fictitious Instagram post by the influencer endorsing Burlay's sunglasses (see appendix 2.D for stimuli details).

In addition, the credibility of the influencer was manipulated by increasing the expertness and trustworthiness of the influencer. Specifically, in the high credibility conditions the credibility of the influencer was enhanced through the use of various credibility-enhancing statements in the text introducing the influencer and through various credibility-enhancing user-generated comments on the Instagram post. Furthermore, participants in the high credibility conditions read additional credibility-enhancing descriptions about either influencer type depending on the influencer type condition (e.g., "Social media [Virtual social media] influencers are individuals [digital characters] who have built a reputation for their knowledge and expertise on a specific topic . . ."). In the control conditions, we did not include credibility-enhancing statements or user-generated comments (see appendix 2.D for stimuli details).

We measured participants' attitude toward the brand (α = .98) and credibility perceptions of the influencer (α = .98) by the same items we used in Study 2.

Results. As a manipulation check, we conducted an ANOVA with influencer credibility (control, high) as the independent variable and participants' credibility perceptions of the influencer as the dependent variable. The analysis revealed that participants in the high credibility (vs. control) conditions perceived the influencer as more credible ($M_{\text{high credibility}} = 4.40$, $SD = 1.72$; $M_{\text{control}} = 3.43$, $SD = 1.82$; $F(1, 399) = 30.00$, $p < .001$).

We next conducted an ANOVA with influencer type (human, virtual) and influencer credibility (control, high) as independent variables and participants' attitude toward the brand as the dependent variable. The analysis revealed main effects of influencer type and credibility. Participants in the virtual (vs. human) conditions reported a less positive attitude toward the brand ($M_{\text{virtual}} = 4.35$, $SD = 1.84$; $M_{\text{human}} = 4.92$, $SD = 1.59$; $F(1, 397) = 11.71$, $p = .001$). Furthermore, participants in the control (vs. high credibility) conditions reported a less positive attitude toward the brand ($M_{\text{control}} = 4.34$, $SD = 1.82$; $M_{\textit{high credibility}} = 4.93$, $SD = 1.60$; $F(1, 397) = 12.74$, $p < .001$).

Also, results revealed that compared to the participants in the VI control condition, participants in the VI high credibility condition reported a more positive attitude toward the endorsed brand ($M_{\text{high credibility}} = 4.65$, $SD = 1.73$; $M_{\text{control}} = 4.04$, $SD = 1.90$; $F(1, 397) = 6.53$, $p = .01$; Figure 7). Similarly, compared to the participants in the human influencer control condition, participants in the human influencer high credibility condition reported a more positive attitude toward the endorsed brand ($M_{\text{high credibility}} = 5.22$, $SD = 1.41$; $M_{\text{control}} = 4.63$, $SD = 1.70$; $F(1, 397) = 6.22$, $p = .01$; Figure 7).

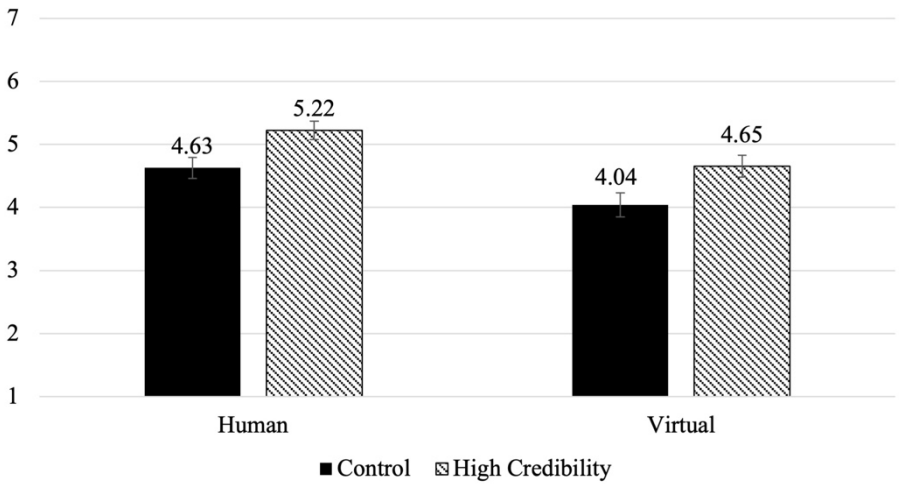

Figure 7. Effect of credibility on attitude toward the brand.
Error bars represent ± 1 SE.

Study 5

Study 5 tests the moderating role of the language type used in influencers' endorsements. We predict that when emotional language is used in the endorsements, VIs' brand endorsements will generate a less positive attitude toward the endorsed brands and VIs (vs. human influencers) will be perceived as less credible. However, when rational language is used in the endorsements, the effect of influencer type on attitude toward brands and the perceived credibility of the influencers will be diminished.

Participants, Design, and Measures. 461 MTurk participants (M_{age} = 40.92 years; 58.4% female, 41.6% male) were randomly assigned to a condition in a 2 (influencer type: human, virtual) x 2 (language type: emotional, rational) between-subjects design in exchange for a small payment.

Participants first read that Burlay Software Company collaborated with a social media influencer (human influencer condition) or a VI (VI condition). Then, similar to the previous studies, they read brief descriptions about social media influencers (human influencer condition) or VIs (VI condition). Next, participants were presented with a fictitious social media

endorsement post about Burlay's new product by either an influencer (human influencer condition) or a VI (VI condition).

In addition, the language type that the influencer used in the endorsement message was manipulated. Specifically, the language of the endorsement message was either emotional or rational depending on the language type condition (see appendix 2.E for stimuli details).

We measured participants' attitude toward the brand ($\alpha = .95$) and credibility perceptions of the influencer ($\alpha = .97$) by the same items we used in Study 2. Additionally, we measured participants' perceptions of the endorsement language types that we used as a manipulation check. Specifically, we asked participants to indicate the extent to which they perceived the brand endorsement message rational and emotional.

Results. As a manipulation check, we conducted an ANOVA with endorsement language type (emotional, rational) as the independent variable and perceived emotionality of the endorsement language as the dependent variable. The analysis revealed that participants in the emotional (vs. rational) language conditions perceived the brand endorsement message to be more emotional ($M_{emotional} = 4.22$, $SD = 1.75$; $M_{rational} = 2.21$, $SD = 1.49$; $F(1, 459) = 176.61$, $p < .001$). Furthermore, we conducted an ANOVA with endorsement language type (emotional, rational) as the independent variable and perceived rationality of the endorsement language as the dependent variable. The analysis revealed that participants in the rational (vs. emotional) language conditions perceived the brand endorsement message to be significantly more rational ($M_{emotional} = 4.83$, $SD = 1.44$; $M_{rational} = 5.63$, $SD = 1.25$; $F(1, 459) = 40.41$, $p < .001$).

Next, a two-way ANOVA revealed significant main effect of influencer type (human, virtual) on attitude toward the brand. Participants in the virtual (vs. human) influencer conditions reported a less positive attitude toward the brand ($M_{virtual} = 4.84$, $SD = 1.56$; $M_{human} = 5.22$, $SD =$

1.38; $F(1, 457) = 7.98$, $p = .005$). Importantly, there was a significant interaction effect between influencer type and language type which impacted participants' attitude toward the brand ($F(1, 457) = 5.53$, $p = .02$). Within the emotional language conditions, participants who read the virtual (vs. human) influencer's endorsement post reported a less positive attitude toward the brand ($M_{virtual} = 4.72$, $SD = 1.62$; $M_{human} = 5.43$, $SD = 1.34$; $F(1, 457) = 13.26$, $p < .001$; Figure 8). As predicted, no significant difference occurred within the rational language conditions ($p = .74$; Figure 8).

Furthermore, a two-way ANOVA revealed significant main effect of influencer type (human, virtual) on participants' credibility perceptions of influencers. Participants in the virtual (vs. human) influencer conditions perceived the influencer as less credible ($M_{virtual} = 4.16$, $SD = 1.66$; $M_{human} = 4.55$, $SD = 1.29$; $F(1, 457) = 8.38$, $p = .004$). Importantly, there was a significant interaction effect between influencer type and language type which impacted participants' credibility perceptions of influencers ($F(1, 457) = 6.68$, $p = .01$). Within the emotional language conditions, participants who read the virtual (vs. human) influencer's endorsement post perceived the influencer as less credible ($M_{virtual} = 3.89$, $SD = 1.59$; $M_{human} = 4.65$, $SD = 1.34$; $F(1, 457) = 14.84$, $p < .001$; Figure 9). As predicted, no significant difference occurred within the rational language conditions ($p = .83$; Figure 9).

Finally, we tested for moderated mediation, using PROCESS model 7 (10,000 bootstrap samples, Hayes, 2017). The index of moderated mediation was significant (95% CI = [0.12, 0.92]). As predicted, the difference in credibility perceptions mediates the effect of influencer type on attitude toward the brand for emotional language (95% CI for the indirect effect = [−0.84, −0.27]) but not for rational language conditions (95% CI for the indirect effect = [−0.31, 0.25]).

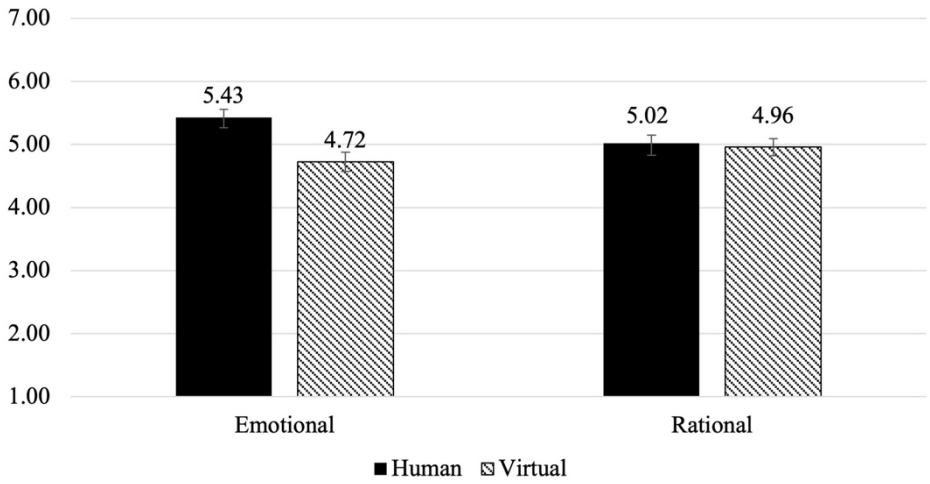

Figure 8. Attitude toward the brand according to influencer and language types. Error bars represent ± 1 SE.

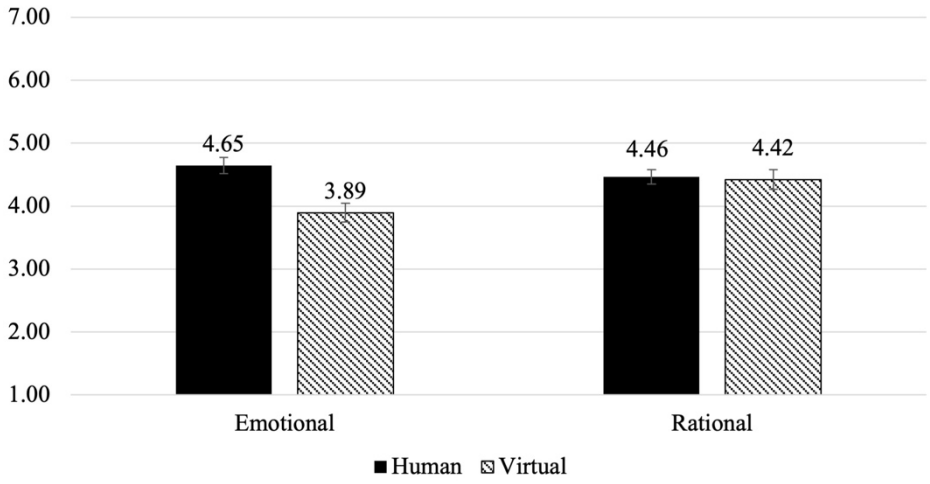

Figure 9. Perceived credibility according to influencer and language types. Error bars represent ± 1 SE.

Discussion

Recent review papers mention the advantages of using VIs for marketing purposes and point to the need for research on consumers' perceptions of the effectiveness of VIs as brand endorsers (e.g., Appel et al., 2020; Miao et al., 2022). To answer their call, Essay 2 examines the effectiveness of VIs in creating a positive attitude toward brands by comparing them with human influencers in controlled experiments.

Although VIs position themselves as similar to human influencers and an increasing number of brands collaborate with them for endorsement campaigns (Moustakas et al., 2020; Thomas & Fowler, 2021), our results show that consumers' credibility perceptions of VIs (vs. human influencers) is an important factor for the effectiveness of their endorsements in generating a positive attitude toward the endorsed brands. However, drawing on the language expectancy theory (Burgoon & Miller, 1985), our results also show that it is essential to consider the type of language that VIs use in their endorsements when evaluating the effect of influencer type on consumers' attitude toward the endorsed brands.

Our results show that, all else being equal, VIs' (vs. human influencers') brand endorsements are less effective in generating a positive attitude toward the endorsed brands. This is because consumers perceive VIs as less credible sources than human influencers. However, our results also show a boundary condition to this general finding: VIs can be as credible and effective brand endorsers as their human counterparts when they use rational rather than emotional language in their endorsements.

Theoretical Contributions and Practical Implications

Essay 2 makes several theoretical contributions. First, this research contributes to the social media, influencer marketing, and consumer-technology interactions literatures by shedding light on a newly emerging influencer type and its use for brand endorsement campaigns on social media. In particular, this research improves our understanding of the roles of consumers' credibility perceptions of VIs and the rational and emotional language use in brand endorsements in the effectiveness of VIs' brand endorsements compared to those of human influencers.

This research also offers contributions to marketing practice. Our findings offer insights for firms that employ social media marketing practices, particularly with regard to selecting the

right influencer and crafting effective endorsement content. Our findings show that compared to the endorsements of human influencers, VIs' endorsements lead to a less positive attitude toward the endorsed brands. However, under the right circumstances (which we identify as the boundary condition), VIs' brand endorsements can be as effective as human influencers' endorsements. Our findings suggest that firms should avoid using emotional language and use rational language instead in their endorsement messages when they collaborate with a VI. Firms can use our findings in comparing the advantages and disadvantages of collaborating with a VI to make more informed decisions. For example, when using rational language in an endorsement fits well with a brand's image, VIs can be viable alternatives to human influencers (and less costly and easier to manage).

Chapter 4 – General Discussion, Limitations, and Directions for Future Research

General Discussion

With the increasing presence of virtual entities in many domains, it becomes important to understand the factors influencing their effectiveness as marketing tools. This research, across two essays, focuses on one of these entities: Virtual Influencers. By examining the roles of three types of realism, trustworthiness, credibility, and language choice in consumer outcomes, this research provides a set of benchmark results in the emerging arena of VIs.

In particular, this research aims to broaden our understanding of the effectiveness of VIs as brand endorsers by exploring the roles of form realism, behavioral realism, and product domain realism, as well as the interplay between them. The results show that these three types of realism affect VIs' effectiveness as brand endorsers, and they should be considered simultaneously when evaluating the effectiveness of VIs' brand endorsements.

Additionally, this research aims to enhance our understanding of how the effectiveness of brand endorsements by VIs compares to that of human influencers by exploring the roles of the perceived credibility of the influencers and their language choice (rational vs. emotional) in brand endorsements. The results show that although VIs' (vs. human influencers') brand endorsements are generally less effective in generating a positive attitude toward the endorsed brands, with the right endorsement language choice (i.e., rational language), VIs' brand endorsements can be as effective as those of human influencers.

The results of Essays 1 and 2 collectively show "if," "when," and "how" VIs can be effective brand endorsers on social media by highlighting the factors contributing their effectiveness. Importantly, Essays 1 and 2 collectively provide a comprehensive understanding of VIs as brand endorsers by covering important perspectives about a wide range of VIs. The results emphasize the importance of VIs' trustworthiness as a key factor in their effectiveness as brand endorsers, just as it is for human social media influencers. Importantly, the results also show that consumers' trustworthiness perceptions of VIs are malleable and that incorporating VIs' form realism into the selection of endorsed products and the crafting of endorsement content can enhance their effectiveness as brand endorsers.

In recent years, while major technology firms including Meta, Microsoft, and Nvidia have been committing substantial financial resources to the development of a digital world aligned with the concept of the metaverse, brands including Nike, Puma, Gucci, Disney, Chipotle, and McDonald's have already started to investigate potential opportunities to engage with consumers in the metaverse (Barrera & Shah, 2023). Accordingly, it is anticipated that advancements in technology, particularly in the domains of artificial intelligence (AI) and virtual reality (VR), will improve the interactions between consumers and VIs in the metaverse (Conti et

al., 2022). And as the metaverse gains prominence (in such areas as product endorsements, other consumer communications, retailing, and the provision of consumer service), it becomes important to understand VIs' role in the metaverse. For example, the rise of non-fungible tokens (NFTs) may encourage luxury brands to turn to VIs for collaborations to leverage the inherent resemblance between VIs and NFTs (Joy et al., 2022). Furthermore, while language serves as one important aspect of behavioral realism for 2D social media platforms, body movements, facial expressions, mimics, and gestures may become equally important aspects of behavioral realism in the metaverse. Therefore, understanding the interplay between form realism and behavioral realism displayed in ways beyond language use will be important for brand endorsements in the metaverse.

Limitations and Directions for Future Research

This research examines the effectiveness of VIs as brand endorsers by exploring the effects of form and behavioral realism of VIs, as well as the domain realism of the products they endorse (Essay 1) and by exploring whether VIs can be as effective brand endorsers as their human counterparts (Essay 2). However, it is not without limitations and future research may build on the current findings in several ways.

First, while this research focuses on the effect of form realism on the effectiveness of VIs' endorsements in generating positive brand outcomes, we exclusively focused on human form realism and compared VIs that appeared human and used female virtual influencers as stimuli. It is relevant that research shows that female virtual entities may elicit different responses from consumers than male virtual entities (Borau et al., 2021). Additionally, there are also VIs with non-human forms such as inanimate objects or pets (Mouritzen et al., 2023; Myers et al., 2022). Because it is readily apparent that VIs with non-human forms lack human

capabilities, they can be mistaken for brand mascots. As a result, their endorsements may be interpreted as advertisements originating from the brand itself, rather than being perceived as genuine endorsements by an influencer, which may alter the effect of behavioral realism on brand outcomes. Future research could explore how consumers respond to different behavioral realism levels of VIs, female as well as male, or those with non-human form.

Second, while this research investigates VIs' language use as a means of enhancing behavioral realism, social media posts often include visual elements such as images and videos in addition to a brief text (Arsenyan & Mirowska, 2021). Accordingly, to convey a higher level of behavioral realism, VIs could also employ nonverbal design elements such as humanlike movements, facial expressions, mimics, and gestures (Verhagen et al., 2014; Von der Pütten et al., 2020). However, employing non-verbal cues to exhibit behavioral realism could potentially cause eeriness or discomfort especially for VIs with high form realism. This idea is reflected in the Uncanny Valley hypothesis, which suggests that as non-human entities closely resemble humans but not entirely, they may provoke a negative response from users (Mori, 1970; Mori et al., 2012). Therefore, the positive effect of form realism on brand outcomes might diminish or even invert if high behavioral realism is conveyed by non-verbal cues, particularly by visual non-verbal cues (e.g., humanlike movements or facial expressions) because visual elements are more easily noticed and processed (McGloin et al., 2009; Nowak & Biocca, 2003). To address this point, future research could examine the influence of other cues for behavioral realism and the interaction between form and behavioral realism considering those cues. In addition, this research focuses on the use of self-referential pronouns in brand endorsement messages as an instantiation of behavioral realism. There might be other language styles or cues that influence consumers' perceptions of VIs' behavioral realism. For example, the use of warm or competent

language affects consumers' responses to virtual entities (Kull et al., 2021; Roy & Naidoo, 2021). Similarly, VIs use of warm (vs. competent) language in their brand endorsements may be interpreted differently by consumers. Therefore, future research could explore how other verbal cues affect consumers' responses to VIs' brand endorsements.

Third, this research makes an effort to minimize the influence of specific social media platforms in our research, in both essays, our realistic endorsement scenarios were exclusively within the context of Instagram. Instagram is widely recognized as a prominent platform for influencer marketing campaigns (Jin et al., 2019). However, it is important to acknowledge that the effectiveness of VIs may vary across different social media platforms due to disparities in platform norms and user behavior (Reich & Pittman, 2020). Thus, future research could examine the effect of variations across social media platforms on the effectiveness of different types of VIs as brand endorsers. Additionally, the average age of the participants for the scenario-based Instagram studies in this research is close to 40. Because, globally, almost half of Instagram users are aged 34 or younger (Statista, 2024), the participants in this research might not accurately represent the primary target audience for Instagram brand endorsements. Therefore, it might be desirable for future research to use data from real influencer endorsements and behavioral dependent variables in experimental studies to mitigate the limitations associated with utilizing online participant pools. For example, a consequential study featuring an Instagram endorsement, where the participants receive the endorsed product, can be conducted to show the actual behavioral outcome of VI brand endorsements.

Fourth, future research could explore the potential benefits of brands creating their own VIs as opposed to collaborating with VIs that are created and managed by external entities. The literature on brand mascots has demonstrated numerous benefits of using mascots in promotional

activities. For example, brands that have their own mascots do not need to share the profits generated through the brand endorsements, while also benefiting from the long-term promotional potential that mascots offer (Kraak & Story, 2015). Furthermore, mascots are associated with their brands and help building nostalgic attachment to the brands through memorable slogans and jingles (Brown, 2010; Macklin, 1996). Mascots and VIs have some fundamental differences, however. For example, mascots do not have separate identities or social media profiles to directly engage with consumers. Nevertheless, creating their own VIs could offer advantages for brands that externally-managed VIs do not. For example, just like mascots, a brand's own VI can help with the humanization of the brand (Brown, 2010; Cayla, 2013) while also creating a friendly and trustworthy brand image with their activities on their separate social media accounts. Additionally, brands will have more control over the images and behaviors of the VIs that they own. Considering this, future research could examine the effects of form and behavioral realism when exploring the advantages and disadvantages of brands creating their own VIs in comparison with collaborating with externally-managed VIs.

Fifth, future research could examine the differences between the effectiveness of brand endorsements of VIs and traditional celebrities. Compared to traditional celebrities, social media influencers are perceived as more credible, relatable, and approachable since they regularly interact with their followers (Djafarova & Rushworth, 2017; Jin et al., 2019). Just like their human counterparts, VIs also interact with their followers by regularly sharing posts on social media. So, while the present research demonstrates that VIs are not perceived as credible as human influencers, as influencers, they may still be perceived as credible as or more credible than traditional celebrities as brand endorsers. Future research could examine whether the same

principles apply in a comparison of VIs and traditional celebrities in their effectiveness for brand endorsements.

Finally, this research shows that VIs are not as effective brand endorsers as human influencers since they are not as credible. This raises a natural question: why do VIs exist in the marketplace at all? This research also shows that VIs are suitably employed when rational language in an endorsement fits well with a brand's image. But there may be other cases when VIs can be efficaciously employed. There appears to be trade-offs between the disadvantages and advantages of using VIs. While this research focuses on the disadvantage that VIs are often less credible and effective at promoting a positive brand attitude, countervailing advantages may exist. VIs may be lower cost, more easily targeted at particular market segments, more predictable than human influencers, more flexible over time, less prone to aging, more popular as digital social media continue to grow, and even more fun – particularly for younger generations. It will be desirable for future research to explore the trade-offs that determine when VIs can be efficacious promoters of brands.

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Appendix

Appendix 1 – Essay 1: The Role of Realism in Virtual Influencer Endorsements

Appendix 1.A: Essay 1 – Pretest for Virtual Influencer Images

Exclusions. Participants who reported that they had known the influencer in the study were excluded from the analyses. In total, 914 participants completed the study. 12 participants were excluded, and 902 participants were included in the analysis.

Method. Online participants (N = 902; MTurk; 47.6% female, 52.1% male, 0.3% non-binary) were randomly introduced to one of 22 virtual influencers. Virtual influencers displaying various levels of form realism were selected to be pretested. Participants were presented with five representative images of a particular influencer, which were collected from the influencer's Instagram account.

Participants evaluated each influencer on form realism (1 = like a cartoon character, 7 = humanlike), attractiveness (1 = not attractive, 7 = attractive), and cuteness (1 = not cute, 7 = cute). Participants also evaluated the influencer on creepiness in three items (eerie, unnatural, creepy) on a seven-point scale. In addition, we measured participants' attitudes toward the influencer in three items (favorable, positive, and like) on a seven-point scale.

Results. For Studies 1, 2A, 2B, and 3, we selected two virtual influencers that varied in form realism but were similar in attractiveness, cuteness, creepiness, and likability. The detailed results for the virtual influencers used in the studies are displayed in Table 4.

Table 4. Essay 1 – Pretest results

Measure	Condition		F-test
	High form	Low form	
Form Realism	4.74 (1.89)	1.95 (1.17)	$F(1, 83) = 67.02$, $p < .001$
Attractiveness	5.69 (1.52)	5.28 (1.28)	$F(1, 83) = 1.82$, $p = .18$

Cuteness	5.62 (1.51)	5.58 (1.37)	$F(1, 83) = .02$, $p = .90$
Creepiness	3.72 (1.92)	3.57 (1.47)	$F(1, 83) = .18$, $p = .67$
Likability	4.79 (1.85)	4.55 (1.42)	$F(1, 83) = .43$, $p = .51$

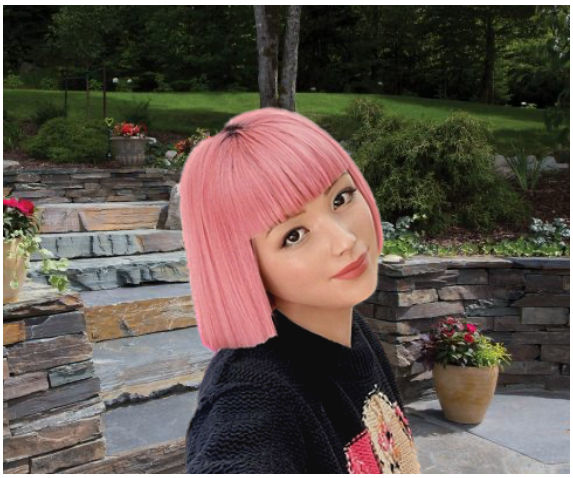
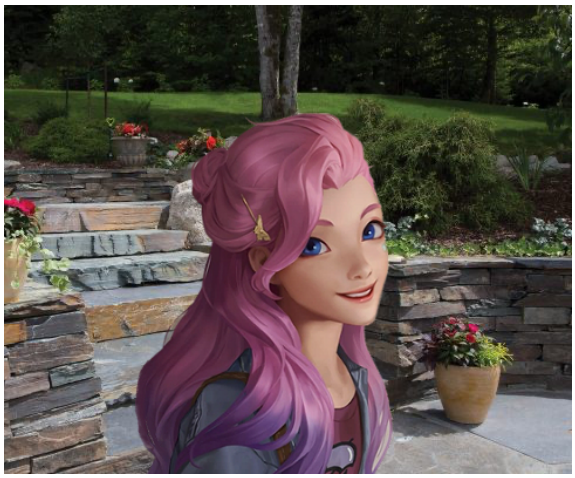
Note: Results are means (SD).

Appendix 1.B: Essay 1 – Second-step Pretest

We conducted a second-step pretest to ensure that the particular virtual influencer images used in the studies were perceived as different in form realism but similar in attractiveness, cuteness, creepiness, and likability.

Method. The study followed a similar procedure to the initial pretest. Online participants ($N = 119$; MTurk; 49% female, 51% male) were randomly presented with a virtual influencer with either high or low form realism.

Stimuli.

High Form Realism Condition	Low Form Realism Condition
	

Similar to the pretest, participants evaluated each influencer on form realism (1 = like a cartoon character, 7 = humanlike), attractiveness (1 = not attractive, 7 = attractive), and cuteness (1 = not cute, 7 = cute). Participants also evaluated the influencer on creepiness in three items

(eerie, unnatural, creepy) on a seven-point scale. In addition, we measured participants' attitudes toward the influencer in three items (favorable, positive, and like) on a seven-point scale.

Results. The second step pretest confirmed that the virtual influencer images used in Studies 1, 2A, and 2B varied in form realism but were similar in attractiveness, cuteness, creepiness, and likability. The detailed results are displayed in Table 5.

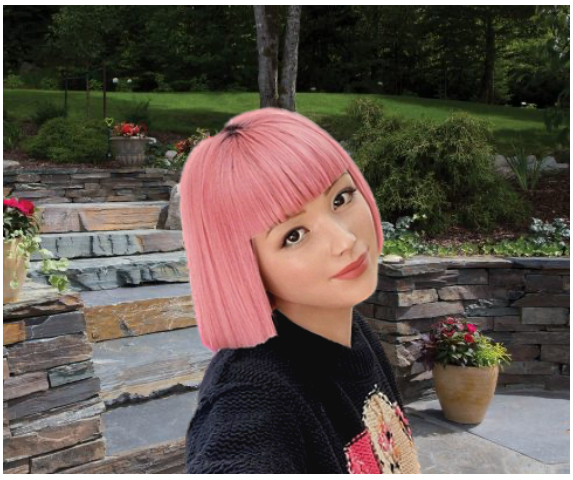
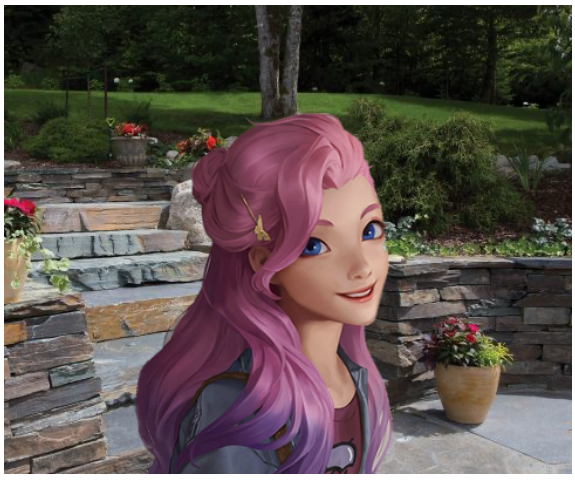
Table 5. Essay 1 – Second-step pretest results

Measure	Condition		F-test
	High form	Low form	
Form Realism	5.03 (1.71)	2.03 (1.37)	$F(1, 117) = 67.02$, $p < .001$
Attractiveness	5.05 (1.37)	4.72 (1.80)	$F(1, 117) = 1.30$, $p = .26$
Cuteness	5.10 (1.39)	5.18 (1.56)	$F(1, 117) = .09$, $p = .76$
Creepiness	3.59 (1.81)	3.82 (1.47)	$F(1, 117) = .57$, $p = .45$
Likability	4.38 (1.45)	4.58 (1.63)	$F(1, 117) = .50$, $p = .48$

Note: Results are means (SD).

Appendix 1.C: Essay 1 – Study 1 Stimuli and Exclusions

Stimuli.

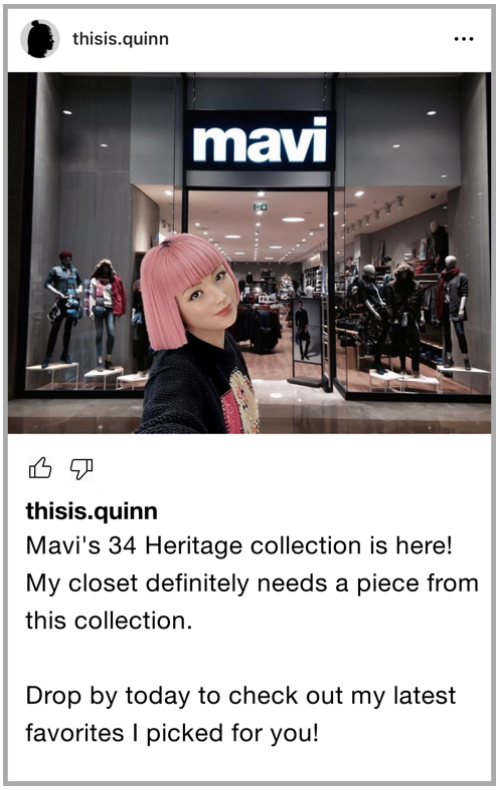
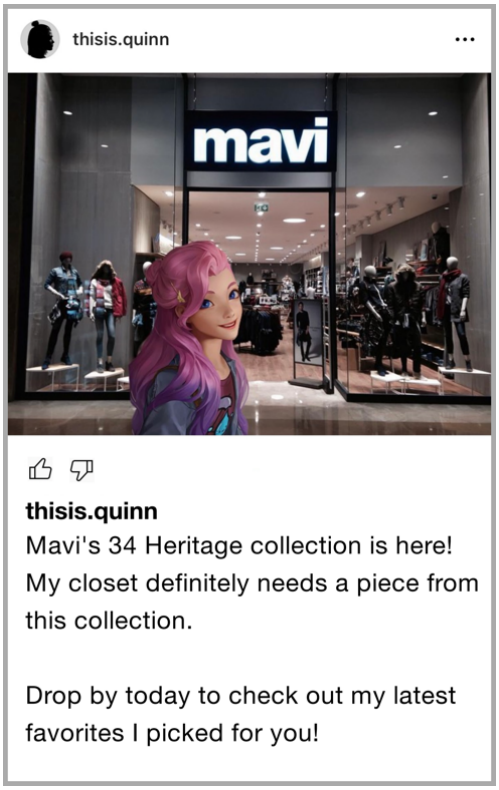
High Form Realism Condition	Low Form Realism Condition
	

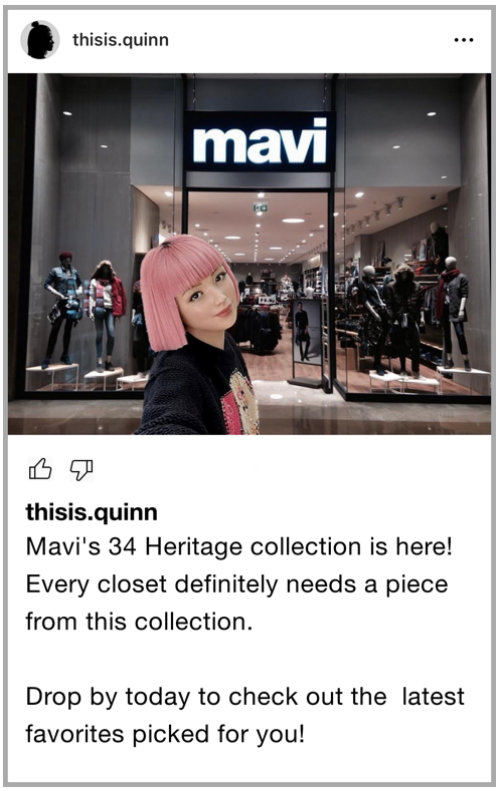
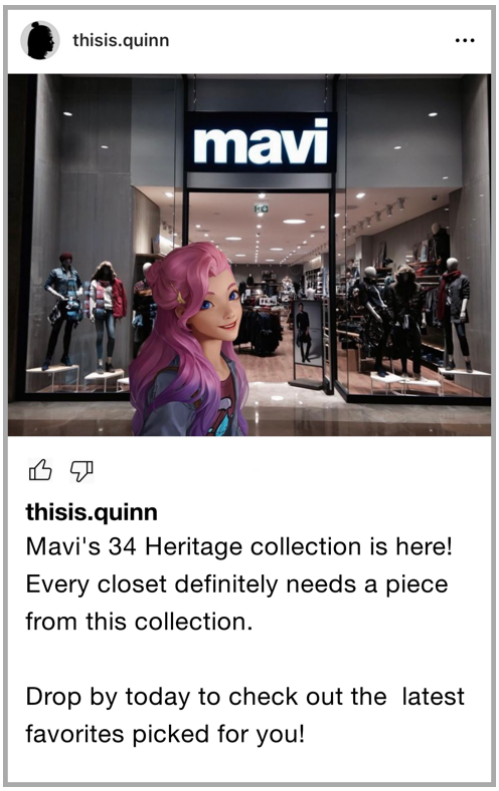
Exclusions. The virtual influencer and the brand used in the study were selected because the participant pool was mostly unfamiliar with them. Nevertheless, participants who reported that they had known the influencer or the brand introduced in the study were excluded from the analyses.

In total, 299 participants completed the study. Seven participants were excluded, and 292 participants were included in the analysis.

Appendix 1.D: Essay 1 – Study 2A Stimuli and Exclusions

Stimuli.

	High Form Realism Condition	Low Form Realism Condition
High Behavioral Realism Condition		

Low Behavioral Realism Condition		

Exclusions. The virtual influencer and the brand used in the study were selected because the participant pool was mostly unfamiliar with them. Nevertheless, participants who reported that they had known the influencer, or the brand introduced in the study were excluded from the analyses.

In total, 420 participants completed the study. Nine participants were excluded, and 411 participants were included in the analysis.

Appendix 1.E: Essay 1 – Study 2B Stimuli and Exclusions

Stimuli.

	High Form Realism Condition	Low Form Realism Condition
High Behavioral Realism Condition		
Low Behavioral Realism Condition		

Exclusions. The virtual influencer and the brand used in the study were selected because the participant pool was mostly unfamiliar with them. Nevertheless, participants who reported that they had known the influencer, or the brand introduced in the study were excluded from the analyses.

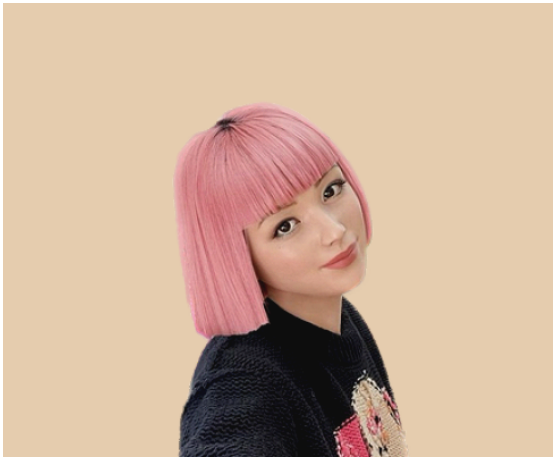
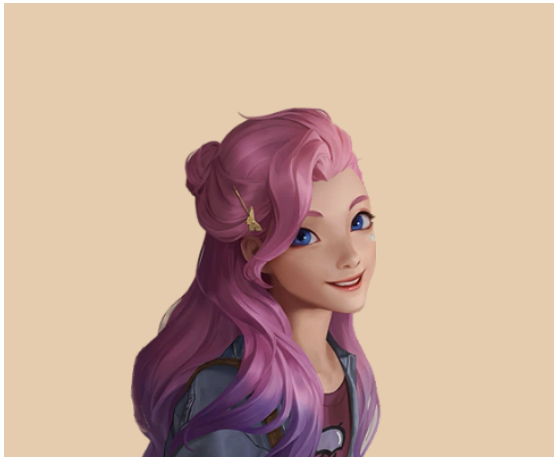
In total, 439 participants completed the study. Three participants were excluded, and 436 participants were included in the analysis.

Appendix 1.F: Essay 1 – Study 3 Pretest

Study 3 used the same influencers as in the previous studies. However, we changed the background used in the images. Therefore, we again pretested the virtual influencer images to ensure that the virtual influencer images used in the study were perceived as different in form realism but similar in attractiveness, cuteness, creepiness, and likability. Additionally, because we use a game brand in Study 3, in the pretest, we pretested the virtual influencer images to ensure that the virtual influencer images used in the study were perceived as similar in playfulness, boringness, and seriousness.

Method. Online participants (N = 100; MTurk; 50% female, 50% male) were randomly presented with a virtual influencer with either high or low form realism.

Stimuli.

High Form Realism Condition	Low Form Realism Condition
	

Participants evaluated each influencer on form realism (1 = like a cartoon character, 7 = humanlike), attractiveness (1 = not attractive, 7 = attractive), cuteness (1 = not cute, 7 = cute), creepiness (1 = not creepy, 7 = creepy), likability (1 = not likable, 7 = likable), playfulness (1 = not playful, 7 = playful), boringness (1 = not boring, 7 = boring), and seriousness (1 = not serious, 7 = serious).

Results. Results showed that the virtual influencer images used in the study varied in form realism but were similar in attractiveness, cuteness, creepiness, likability, playfulness, boringness, and seriousness. The detailed results are displayed in Table 6.

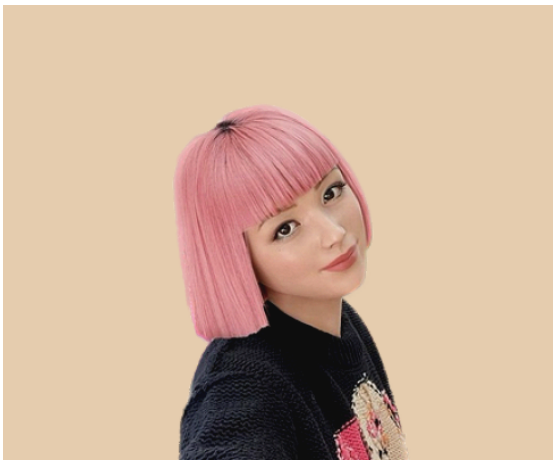
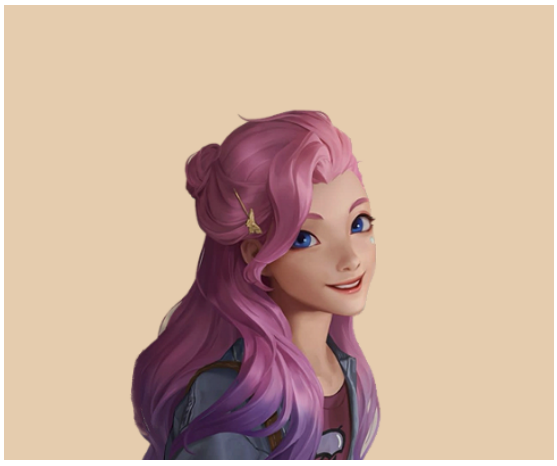
Table 6. Virtual influencer pretest results for Essay 1 – Study 3

Measure	Condition		F-test
	High form	Low form	
Form Realism	5.31 (1.41)	2.53 (1.73)	$F(1, 98) = 78.00$, $p < .001$
Attractiveness	5.02 (1.44)	5.31 (1.29)	$F(1, 98) = 1.11$, $p = .30$
Cuteness	5.61 (1.10)	5.63 (1.24)	$F(1, 98) = .01$, $p = .92$
Creepiness	3.18 (1.90)	3.12 (1.76)	$F(1, 98) = .02$, $p = .88$
Likability	5.12 (1.38)	5.39 (1.37)	$F(1, 98) = .97$, $p = .33$
Playfulness	5.71 (1.04)	5.84 (0.94)	$F(1, 98) = .43$, $p = .51$
Boringness	3.00 (1.56)	2.80 (1.63)	$F(1, 98) = .41$, $p = .52$
Seriousness	3.47 (1.58)	3.22 (1.50)	$F(1, 98) = .64$, $p = .43$

Note: Results are means (SD).

Appendix 1.G: Essay 1 – Study 3 Stimuli and Exclusions

Stimuli.

Form Realism Conditions	
High Form Realism Condition	Low Form Realism Condition
	

Product Domain Realism Conditions	
High Domain Realism Condition	**Rendlay Board Game Company** Rendlay is a game company known for developing and publishing **physical board** games. Rendlay's **board** games are played without the assistance of an electronic device. Rendlay has just released a new **board** game and decided to collaborate with one of the virtual influencers on the next page to promote this game. In this new **board** game, players move their characters around the **physical game board** and try to complete the game tasks strategically and effectively.
Low Domain Realism Condition	**Rendlay Digital Video Game Company** Rendlay is a game company known for developing and publishing **digital video** games. Rendlay's **video** games are played with the assistance of an electronic device. Rendlay has just released a new **video** game and decided to collaborate with one of the virtual influencers on the next page to promote this game. In this new **video** game, players move their characters around the **digital game world** and try to complete the game tasks strategically and effectively.

Exclusions. The virtual influencer and the brand used in the study were selected because the participant pool was mostly unfamiliar with them. Nevertheless, participants who reported that they had known the influencer in the study were excluded from the analyses.

In total, 411 participants completed the study. Two participants were excluded, and 409 participants were included in the analysis.

Appendix 2 – Essay 2: Virtual Versus Human Influencers as Brand Endorsers

Appendix 2.A: Essay 2 – Study 1 Stimuli

Human Influencer Condition
Participants were randomly presented with one of the following screens:

Brands collaborate with social media influencers for promotional activities.

Consider the following scenario:
Brand A had the following two options to promote their brand and products:

- To collaborate with a **human** influencer.
- To collaborate with a **virtual** influencer.

Brand A decided to collaborate with a **human** influencer to promote their brand and products.

or

Brands collaborate with social media influencers for promotional activities.

Consider the following scenario:
Brand A had the following two options to promote their brand and products:

- To collaborate with a **virtual** influencer.
- To collaborate with a **human** influencer.

Brand A decided to collaborate with a **human** influencer to promote their brand and products.

Virtual Influencer Condition

Participants were randomly presented with one of the following screens:

Brands collaborate with social media influencers for promotional activities.

Consider the following scenario:
Brand A had the following two options to promote their brand and products:

- To collaborate with a **virtual** influencer.
- To collaborate with a **human** influencer.

Brand A decided to collaborate with a **virtual** influencer to promote their brand and products.

or

Brands collaborate with social media influencers for promotional activities.

Consider the following scenario:
Brand A had the following two options to promote their brand and products:

- To collaborate with a **human** influencer.
- To collaborate with a **virtual** influencer.

Brand A decided to collaborate with a **virtual** influencer to promote their brand and products.

Appendix 2.B: Essay 2 – Study 2 Stimuli

Human Influencer Condition

Quinn is a social media influencer. Quinn regularly shares posts with their followers on social media platforms. Brands collaborate with Quinn for promotional activities.

Imagine that you are planning to buy a t-shirt.

On your social media feed, you see influencer Quinn's posts about **Burlay**'s t-shirts.

Virtual Influencer Condition

Quinn is a **virtual** influencer **created in computer graphics software**. Just like human influencers, Quinn regularly shares posts with their followers on social media platforms. Brands collaborate with Quinn for promotional activities.

Imagine that you are planning to buy a t-shirt.

On your social media feed, you see **virtual** influencer Quinn's posts about **Burlay**'s t-shirts.

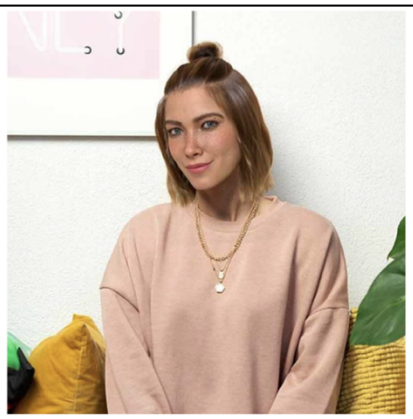
Appendix 2.C: Essay 2 – Study 3 Stimuli and Exclusions

Stimuli.

Human Influencer Conditions

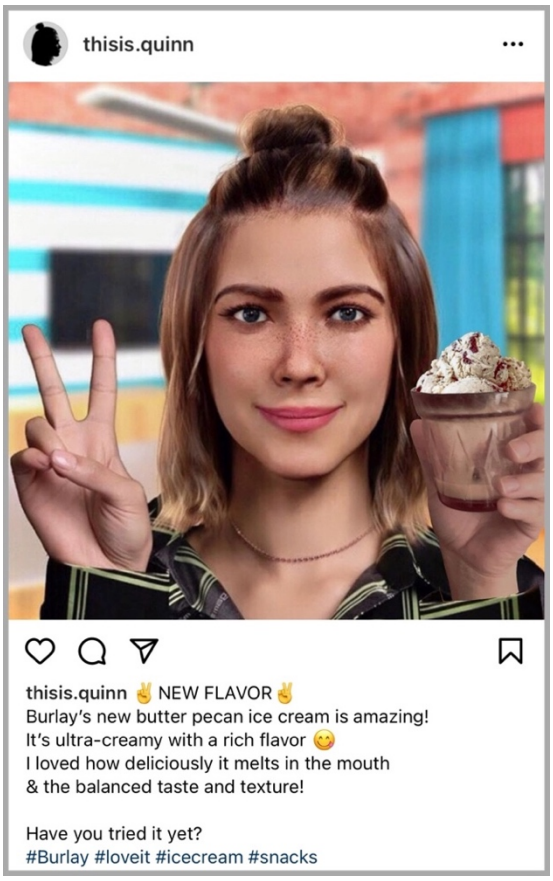
This is Quinn. She is a social media influencer. She regularly shares her everyday life with her followers on her Instagram account. As an influencer, she collaborates with brands and promotes the products of those brands by sharing her experiences with the products.

Virtual Influencer Conditions



This is Quinn. She is a **virtual** social media influencer. She regularly shares her everyday life with her followers on her Instagram account. As an influencer, she collaborates with brands and promotes the products of those brands by sharing her experiences with the products.

Ice Cream Endorsement



Sunglasses Endorsement

Exclusions. Participants who reported that they had known the influencer in the study were excluded from the analyses. In total, 329 participants completed the study. 10 participants were excluded, and 319 participants were included in the analysis.

Appendix 2.D: Essay 2 – Study 4 Stimuli and Exclusions

Stimuli.

Virtual Influencer Control Condition

This is Quinn. She is a **computer-generated virtual** social media influencer. She regularly shares posts with her followers on Instagram. Also, as an influencer, she collaborates with brands for promotional activities.

Virtual Influencer High Credibility Condition

This is Quinn. She is a **computer-generated virtual** social media influencer. She does extensive research on eyewear and regularly shares eyewear review posts with her followers on Instagram. She is one of the top influencers in her field of expertise. Also, as an influencer, she collaborates with brands for promotional activities.

Quinn's followers describe her as a knowledgeable and trustworthy influencer, and mostly find her posts helpful and reliable.

User-generated comments in the virtual influencer high credibility condition

Additional text in the virtual influencer high credibility condition

Virtual Social Media Influencers

Virtual social media influencers are digital characters who have built a reputation for their knowledge and expertise on a specific topic. They make regular posts about that topic on social media channels and generate large followings of enthusiastic, engaged people who pay close attention to their posts.

Human Influencer Control Condition

This is Quinn. She is a social media influencer. She regularly shares posts with her followers on Instagram. Also, as an influencer, she collaborates with brands for promotional activities.

Human Influencer High Credibility Condition

This is Quinn. She is a social media influencer. She does extensive research on eyewear and regularly shares eyewear review posts with her followers on Instagram. She is one of the top influencers in her field of expertise. Also, as an influencer, she collaborates with brands for promotional activities.

Quinn's followers describe her as a knowledgeable and trustworthy influencer, and mostly find her posts helpful and reliable.

User-generated comments in the human influencer high credibility condition

Additional text in the human influencer high credibility condition

Social Media Influencers

Social media influencers are individuals who have built a reputation for their knowledge and expertise on a specific topic. They make regular posts about that topic on social media channels and generate large followings of enthusiastic, engaged people who pay close attention to their posts.

Exclusions. Participants who reported that they had known the influencer in the study were excluded from the analyses. In total, 405 participants completed the study. Four participants were excluded, and 401 participants were included in the analysis.

Appendix 2.E: Essay 2 – Study 5 Stimuli

Virtual Influencer Conditions

Burlay Software Solutions

Burlay Software Solutions recently added a cloud based file compression platform to their online software offerings. The online platform allows users to compress and share their files between their devices.

In order to promote their new service on social media, Burlay Software Solutions collaborated with a **virtual influencer**.

The virtual influencer, with whom Burlay Software Solutions collaborated, typically shares new online service and mobile app reviews with the followers of the account and collaborates with brands to promote their products.

Human Influencer Conditions

Burlay Software Solutions

Burlay Software Solutions recently added a cloud based file compression platform to their online software offerings. The online platform allows users to compress and share their files between their devices.

In order to promote their new service on social media, Burlay Software Solutions collaborated with a **social media influencer**.

The social media influencer, with whom Burlay Software Solutions collaborated, typically shares new online service and mobile app reviews with the followers of the account and collaborates with brands to promote their products.

Emotional Language Conditions

I loved Burlay's new compression software! It provides an admirable solution to compress files for easy storage and sharing. I'm so impressed with the encrypted file sharing straight out of the software without worrying about reduction in quality. And I adore the auto mode! This mode automatically handles most of the tasks without eating up memory.

5-Star performance!

Rational Language Conditions

Burlay's new compression software provides a smart solution to compress files for easy storage and sharing. The impressive algorithm of the software enables encrypted file sharing with password protection straight out of the software without any reduction in quality. And most of the tasks are handled automatically by the auto mode without draining RAM.

5-Star performance!