Humanized Vs. Animated Virtual Influencer: An Experimental Study

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Abstract
This study examines the effectiveness of human-like virtual influencers (HVIs) and animated virtual influencers (AVIs) on audience responses in electronic product promotion, framed within the Human–Computer Interaction (HCI) perspective. Data were collected from 100 respondents through an experimental design and analyzed using one-way ANOVA with bootstrapping. Results indicate that HVIs are more effective in generating congruence and trustworthiness. In contrast, AVI elicited stronger purchase intentions despite the expectation that HVI would perform better. This finding suggests that cartoon-like features can enhance emotional engagement and emphasize functional attributes, while HVI may face limitations due to uncanny valley effects. This study contributes to HCI and influencer marketing literature by clarifying the distinct strategic roles of HVIs and AVIs. This outcome highlights that while HVI leverages anthropomorphic cues to build social trust and seamless interaction, AVI may outperform in stimulating emotional engagement and functional message processing, partly due to reduced uncanny valley effects. From a managerial perspective, HVIs are recommended for product introduction to strengthen congruence and trustworthiness. Whereas AVIs are more suitable for promoting well-established products by driving purchase intention through functional and emotional appeal. Future research may further examine utilitarian versus hedonic responses, cross-gender dynamics, and the impact of diverse content formats such as short-form videos on TikTok and YouTube.

Keywords: *virtual influencers, human–computer interaction, congruence, trustworthiness, purchase intention, digital marketing*

I. Introduction

Virtual influencers (VIs) are perceived as more informative, consistent, controlled, less prone to high-risk scandals, and unaffected by physiological limitations compared to human influencers [1], [2], [3]. Recent reports show that 58% of consumers follow VIs, with Generation Z comprising 75% of this group [4]. Another study reported that 51% of respondents follow VIs through Instagram [5]. VIs are considered particularly suitable for endorsing electronic products, as their nature aligns with the advancement of the digital world [6], [7].

In Indonesia, several virtual influencers (VIs) have gained popularity, including Thalasya Pov (@thalasya_), Arbie Seo (@arbie_seo), Kobo Kanaeru (@kobokanaeru), and Maya Putri (@mayaputriid), all of whom have engaged in multiple brand collaborations. For example, Laverda Salsabila (@lav_caca) has promoted Samsung products, while the local electronics brand Fantech has collaborated with Mythia Batford (@mythiavtuber) on several occasions. Based on their levels of realism and anthropomorphism, these examples reveal the presence of two distinct VI categories: Humanized Virtual Influencers (HVIs) and Animated Virtual Influencers (AVIs) [8], [9].

This study examines the comparative effects of different types of virtual influencers (VIs) in digital marketing, focusing on their impact on congruence, trustworthiness, and purchase intention. Congruence

enhances persuasion by embedding commercial intent within seemingly authentic recommendations [10], [11]. Trustworthiness, in digital contexts, serves as a key mechanism to reduce uncertainty and maintain reputational value [12], [13]. Purchase intention, meanwhile, provides a direct measure of marketing effectiveness and consumer response [14].

Several studies have investigated customer responses to virtual influencers through behavioral and cognitive perspectives, such as social identity, purchase intention, and source credibility. However, most of these studies primarily compared VIs with human influencers, while limited attention has been given to examining differences between HVIs and AVIs [15], [16]. In Indonesia, existing research has largely focused on general adoption rather than comparative impacts of VIs in marketing [17], [18], [19]. Although some studies suggest HVIs —due to their high degree of human likeness and realism—tend to exert stronger effects on congruence, trustworthiness, and purchase intention [20], [21], [22].

Empirical evidence from Indonesian cases illustrates this distinction. For instance, as an example of HVI endorsement, Laverda Salsabila (@lav_caca), with 17,700 followers, received minimal engagement (around 40 likes, no comments) in promoting Samsung tablets. In contrast, as an AVI, Mythia Batford (@mythiavtuber), with 301,000 followers, generated significantly higher responses (around 3,000 likes with active consumers expressing enthusiasm) for Fantech TWS. This contrast suggests that AVIs may currently generate stronger audience engagement in Indonesia. These inconsistencies underscore a theoretical and empirical gap regarding the differential effects of HVIs and AVIs. Given these theoretical limitations and the observed phenomenon, this study seeks to examine and compare the influence of HVI and AVI marketing on consumer responses especially on congruence, trustworthiness, and purchase intention.

II. Literature Review

Virtual Influencer

Virtual influencers, with their human-like presence, are perceived as entities capable of engaging in interactions similar to human–human interaction [23]. They are generally defined as influencers created through Computer-Generated Imagery (CGI) technology that adopt human characteristics and behaviors [8]. Individuals often anthropomorphize such virtual agents and attribute human-like personalities to them, positioning the interaction between virtual influencers and users within the scope of human–computer interaction or human–virtual agent interaction [24].

Human–computer interaction (HCI) research primarily focuses on how individuals interact with computer systems (Sharples, 1996). In this regard, virtual influencers function as human-like entities that communicate and perform through screens and social media platforms [25], effectively masking computational complexity via visual metaphors aligned with user experience [26]. Designed with naturalistic facial features and engaging personalities [27], virtual influencers are capable of shaping perceptions, eliciting emotions, and influencing decision-making processes [28]. Their digital essence enables them to transcend physical, temporal, and spatial limitations, thereby offering strategic benefits for brand marketing [16].

Previous studies have categorized virtual influencers based on their level of anthropomorphism and perceived realism [8], [9], [29]. In Indonesia, two dominant categories are recognized: Humanized Virtual Influencers (HVIs) and Animated Virtual Influencers (AVIs). HVIs are designed to have appearances that are highly indistinguishable from those of real humans, making them challenging to differentiate from actual individuals, In contrast, AVIs exhibit cartoon-like human features, making them clearly distinguishable from real humans [30].

Congruence

In the context of technology adoption, including virtual influencers (VIs), anthropomorphism shapes consumer expectations by positioning anthropomorphic agents as capable of interacting with users in ways that resemble human-to-human interaction. This, in turn, encourages consumers to perceive such agents as part of their self-concept [31]. Accordingly, characters with higher levels of anthropomorphism can facilitate human–computer interactions that align with individuals' actual self-image. Beyond this actual-self congruence (representing one's current self-image), congruence can also be evaluated from the perspective of the ideal self, which reflects aspirational identity alignment [32], [33]. Within the VI context, human-like figures tend to evoke intimacy and a sense of closeness [25], thereby reinforcing their perceived congruence with consumers. Consequently, humanized virtual influencers (HVIs) are often considered to exhibit stronger congruence than animated virtual influencers (AVIs) due to their resemblance to human appearance and behavior [21]. This effect may be attributed to consumers' greater tendency to feel represented by more relatable and self-relevant figures [15], [34]. However, the hyperrealistic visuals of HVIs may also generate cognitive strain and even discomfort in audiences, as they risk being misinterpreted as real humans. By contrast, AVIs, with their cartoon-like graphics, are easier to process cognitively and may reduce the risk of perceptual dissonance or unease [9].

H1. There is a significant difference between virtual influencer type (humanized vs. animated) in influencing audience congruence. Congruence will be higher for humanized virtual influencers.

Trustworthiness

Trust in virtual influencers (VIs) can be conceptualized as a form of human–computer trust [35], which reflects a deterministic approach in which individuals assess rational options by evaluating perceived risks [36]. Trust functions as a critical determinant in user interaction and acceptance, enabling seamless technology adoption and personalized digital experiences [37]. In marketing contexts, when a source is perceived as untrustworthy, audiences are more likely to disregard or discredit the information provided [38]. Within influencer-based marketing, trustworthiness is shaped by the appearance of the influencer [34]. Several studies suggest that the closer the resemblance of VIs to humans, the greater the audience's perceived trust [22], [39], [40], [41]. Specifically, resemblance to human facial features combined with high-resolution graphics has been shown to strengthen credibility and trustworthiness perceptions [42]. However, hyperrealistic similarities may also generate a sense of artificiality, undermining perceived authenticity and thereby limiting the extent to which audiences trust HVIs [2].

H2. There is a significant difference between virtual influencer type (humanized vs. animated) in influencing trustworthiness. Trustworthiness will be higher for humanized virtual influencers.

Purchase Intention

Purchase intention refers to the consumer's decision-making process when considering a purchase, while also representing marketers' efforts to shape consumer choice in purchasing decisions [43]. Virtual influencers (VIs) have been shown to exert a positive influence on purchase intention across both online and offline marketing channels [44]. Moreover, the type of influencer has been shown to directly affect purchase intention [16]. In particular, virtual influencers with high human-likeness demonstrate stronger positive effects on consumers' purchase intention [20], [45]. This finding aligns with evidence that human-like characteristics positively influence purchasing behavior [46]. Further, research suggests that HVI generates higher levels of purchase intention compared to AVI [23]. Nonetheless, contradictory findings propose that differences in influencer type may not significantly affect purchase intention outcomes [47], thereby highlighting the need for empirical investigation.

H3. There is a significant difference between virtual influencer type (humanized vs. animated) in influencing purchase intention. Purchase intention will be higher for humanized virtual influencers.

III.   Research Methodology

Design

The study employs a single-factor, between-subjects experimental design with two conditions: Humanized Virtual Influencer (HVI) versus Animated Virtual Influencer (AVI). Experimental studies require a minimum of 30 respondents per group to ensure adequate statistical power [48]. This research involved 50 respondents in each group, with the inclusion criteria being Generation Z Instagram users residing in Jakarta. In the first condition, participants were exposed to an Instagram post featuring an HVI endorsing an electronic product, while in the second condition, participants were shown an Instagram post featuring an AVI promoting the same category of product. A stimulus development test was conducted to determine the appropriate virtual influencer stimuli for each condition. To ensure relevance, laptops were chosen as the endorsed product, as they represent one of the most commonly owned digital devices in Indonesia.

Procedure and Measurement

Data for this study were collected through an online questionnaire comprising demographic questions, a manipulation check, and measurement scales for congruence, trustworthiness, and purchase intention. First, participants completed demographic questions to capture background information. Subsequently, a manipulation check was conducted in which participants were exposed to the assigned stimulus and asked questions to verify their understanding and alignment with the experimental condition. Afterward, participants responded to measurement items assessing their perceived congruence, trustworthiness, and purchase intention following exposure to the stimulus.

All constructs were measured using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Congruence was measured with four items [34], trustworthiness with five items [35], and purchase intention with four items [16]. Prior to hypothesis testing, data were examined for validity and reliability. Hypotheses were then tested using a one-way ANOVA to examine differences between the experimental conditions.

Stimuli Development Test

For the stimuli development, three Humanized Virtual Influencers (HVIs: Thalasya Pov, Arbie Seo, Laverda Salsabila) and three Animated Virtual Influencers (AVIs: Maya Putri, Kobo Kanaeru, Mythia Batford) were initially presented to participants. Respondents were asked to classify each figure into either the HVI or AVI category. The test was administered online and involved 30 participants. Results indicated that Laverda Salsabila was most strongly perceived as an HVI (M=4.43, SD=0.86), whereas Mythia Batford was most strongly perceived as an AVI (M=4.40, SD=0.86). Based on these findings, Laverda Salsabila was selected as the HVI stimulus and Mythia Batford as the AVI stimulus for the main experiment.

To ensure consistency and minimize potential confounding factors, both virtual influencers were displayed with a similar Instagram post layout and comparable clothing styles. The final stimuli consisted of screenshot images of each virtual influencer promoting a laptop product through their respective Instagram accounts.

IV.   Data Analysis

Validity and Reliability Test

Prior to hypothesis testing, a pre-test was conducted with 30 respondents to assess the validity and reliability of the measurement items. The results indicated that all items met the assumptions of validity and reliability (Factor Loadings > 0.50; r statistic > r table (0.306); Cronbach's Alpha > 0.50).

Manipulation Test

Before completing the measurement scales, respondents were asked to answer manipulation check questions to ensure alignment of understanding with the researchers. In this manipulation check, respondents were shown a screenshot of a virtual influencer's Instagram post promoting a laptop and were asked to classify which type of virtual influencer was presented. Based on the results of the stimuli development test, participants in the first condition were shown Laverda Salsabila as the HVI, while those in the second condition were shown Mythia Batford as the AVI. Respondents who classified the virtual influencer in accordance with the stimuli development test were considered to have passed the manipulation check. Each experimental condition retained 50 respondents who successfully met this criterion.

Test of Hypothesis

Each experimental condition comprised 50 respondents, resulting in a total sample of 100 participants, of whom 42% were male and 58% were female. Prior to conducting the one-way ANOVA, bootstrapping was performed with 5,000 resamples at a 95% confidence level.

Table I. Test Of Hypothesis Results

Measures	F	p value	VI Type	Mean	SD	Notes
VI→ Congruence	5.882	0.018	HVI	3.2550	1.06963	H1 supported
			AVI	2.7500	1.02270	
VI→ Trust-worthiness	4.700	0.033	HVI	3.2080	0.86563	H2 supported
			AVI	2.8440	0.81244	
VI→ Purchase Intention	8.358	0.005	HVI	2.9950	0.95229	H3 partially supported
			AVI	3.5050	0.80574	

The results indicate a significant difference in the effect of virtual influencer type on perceived congruence (F (3.20) <5.88; p<0.05), with participants exposed to the HVI reporting higher levels of congruence compared to those in the AVI (MHVI=3.26; SD=1.07 vs. MAVI=2.75; SD=1.02). Thus, H1 is supported. Similarly, a significant difference emerged for trustworthiness (F(3.20)<4,70; p<0.05), with HVI yielding higher trustworthiness ratings compared to AVI (MHVI=3.20; SD=0.87 vs. MAVI=2.84; SD=0.81). Therefore, H2 is supported. Finally, a significant difference was also observed for purchase intention (F(3.20) <8.36; p<0.05). However, contrary to expectations, participants exposed to the HVI reported lower purchase intention than those in the AVI (MHVI=2.99; SD=0.95 vs. MAVI=3.50; SD=0.81). Hence, H3 is only partially supported.

V.   Discussions And Implications

The hypothesis testing results indicate that H1 is supported, revealing a significant difference between the two types of virtual influencers (HVI vs. AVI) in influencing audience congruence. Specifically,

participants exposed to HVIs reported higher levels of congruence. This finding aligns with prior research suggesting that virtual influencers resembling humans exhibit greater congruence with audiences [21], [31], making them appear more appealing and eliciting more favorable responses [49]. Human-like virtual influencers are capable of masking computational complexity through visual metaphors that resonate with users' prior experiences, thereby fostering a more seamless human–computer interaction [26]. While anthropomorphism can be enhanced, the cartoon-like nature of AVIs in their visual similarity, expressions, and behaviors generally cannot outperform HVIs in achieving congruence [25]. Interestingly, although HVI content may sometimes trigger negative reactions, it can also cultivate intimacy with audiences. When audiences perceive congruence with a virtual influencer, persuasive messages are more likely to be implicitly conveyed, enabling commercial objectives to be achieved without creating resistance [11]. Thus, HVIs are perceived as more relevant to audiences and more effective in subtly embedding persuasive messages, making their promotional content less intrusive.

The hypothesis testing further reveals that H2 is supported, indicating a significant difference between HVI and AVI in influencing audience trustworthiness, with HVIs perceived as more trustworthy due to their human-like appearance. Prior studies have shown that the greater the resemblance of a virtual influencer to a human, the higher the level of audience trust [22], [35], [40]. Trust formation in this toward virtual influencers can be interpreted through the lens of human–computer trust; however, alternative perspectives drawing from the Computers as Social Actors (CASA) paradigm, which posits that anthropomorphic characteristics of human-like virtual influencers, as social entities, play a critical role in fostering relational bonds between human audiences and virtual agents [50], [51]. Attributing human traits to non-human enables audiences to perceive them as socially capable, thereby enhancing trust [52], [53]. Supporting this view, previous studies demonstrate that virtual agents with anthropomorphic features are more effective in building interaction and relationships than those designed with cartoon-like features [54], [55].

The results for H3 are partially supported. While a significant difference was observed between HVI and AVI in influencing purchase intention, the findings revealed that audiences reported higher purchase intentions toward products promoted by AVIs. This outcome contradicts the hypothesized direction, which predicted that HVIs would yield stronger purchase intentions. However, it aligns with observable audience behavior, as greater enthusiasm was noted in the comment sections of AVI posts promoting electronic products. Although several studies have indicated that HVIs exert stronger effects on purchase intention [20], [45], other research suggests that agents with lower levels of anthropomorphism may elicit higher purchase intentions [56]. Moreover, the results can also be interpreted through the lens of the uncanny valley effect may account for why HVIs are not necessarily superior to AVIs in stimulating purchase intentions [2], [7], [57].

In marketing practice, it is crucial for firms to align virtual influencer (VI) strategies with specific campaign objectives. When launching a new product, the primary goal is often to build awareness and foster credibility before stimulating sales. In this stage, HVI can be particularly effective, as their higher congruence with human identity allows persuasive intent to remain implicit, thereby reducing audience resistance to promotional messages [11]. Furthermore, the perceived trustworthiness of HVI ensures that information is regarded as reliable and less likely to be dismissed [38]. Thus, when HVIs are employed to introduce a new product, audiences are less likely to feel disturbed or neglect the promotional posts. For agencies managing HVI, it is recommended to enhance visual realism without triggering uncanny responses. This may include improving graphic resolution, refining texture and detail in complex renderings, and carefully balancing these enhancements with naturalistic movement to avoid the uncanny valley [42], [58], [59]. Such optimization can further strengthen the acceptance of HVI, making them more effective during early-phase campaigns focused on product introduction and brand credibility.

In contrast, purchase intention becomes particularly relevant as a marketing objective when promoting products that are already well-established in the market. In the case of technological products, audiences require rational information as part of their decision-making process [60]. Animated Virtual Influencers (AVIs), by emphasizing functional value, can effectively enhance purchase intention [61]. Empirical findings further suggest that when functional aspects are highlighted, audiences tend to focus more on the conveyed message rather than on the appearance of the virtual influencer itself [62]. Moreover, virtual influencers may influence purchase intention when they succeed in providing emotional inspiration [63]. Virtual influencers with a cartoon-like appearance are particularly effective in eliciting such inspiration by creating compelling storytelling and cultivating a strong personal connection, which in turn reinforces purchase intention [62]. Therefore, agencies managing AVIs should ensure that the virtual persona is designed to communicate both functional value and emotional inspiration in electronic product promotions, thereby achieving the marketing goal of enhancing purchase intention.

VI.   Limitation And Future Research

Considering that the majority of the audience in this study were female and that the stimuli also featured a female virtual influencer, it is possible that audience perceptions were shaped by gender congruence. Prior research has shown that female audiences tend to perceive greater similarity with female influencers [64]. Accordingly, future research may further explore audience responses toward virtual influencers of the same versus cross-gender identities.

Moreover, given that emotional and functional aspects appear to shape purchase intention, future studies could examine these mechanisms in greater depth by investigating how utilitarian and hedonic values influence audience responses toward virtual influencers. Another avenue for exploration concerns the type of content format. Since this study relied on Instagram screenshot posts as stimuli, subsequent research could consider alternative formats such as short-form videos or different social media platforms, including TikTok and YouTube, to capture a more comprehensive understanding of audience responses.

Acknowledgment

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