

Can Computer Virtual Influencers Replace Human Influencers in the Future? An Empirical Investigation in the Age of Digital Transformation

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ABSTRACT

Marketers often face challenges when pursuing and working with social-media influencers. However, these challenges can be bypassed when choosing virtual influencers. This paper investigates computer-generated virtual influencers' impact on a new fashion brand associations and buying intentions. Drawing on virtual humans' literature and human influencer marketing literature, this study utilizes a fictional fashion brand and manipulates this brand using a popular Instagram virtual influencer.

To understand the effect of virtual influencers' characteristics on brand associations and buying intentions, 225 survey forms were distributed using a random-sampling method. Structural equation modeling was used to examine the virtual influencer attributes' effects on brand attitudes and buying intentions. The study concluded that replacing human influencers in the fashion context, especially for new brands to establish a proper brand positioning, is integral to success. The study contributes to influencers' marketing literature by integrating the virtual influencer concept into a celebrity endorsement discourse. Furthermore, the study offers a blueprint for marketing managers who are keen to understand virtual influencers' attributes required to have an effective endorsement.

Keywords: Virtual influencers, Fashion influencers, Digital transformation, Virtual influencer Meaning transfer, Fashion marketing, Brand associations.

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هل يمكن للمؤثرين الافتراضيين للكمبيوتر الحلول محل المؤثرين البشريين في المستقبل؟ تحقيق تجريبي في عصر التحول الرقمي

يزيد المصري¹، سامر حمادنة²، رند الضمور³، ومناف العقيلي⁴

ملخص

إن العلامات التجارية في الوقت الحاضر تواجه تحديات عديدة عند استخدام المؤثرين البشريين والعمل معهم على وسائل التواصل الاجتماعي، ولكن مع تطور تقنيات الذكاء الاصطناعي، يمكن تجاوز هذه التحديات عند اختيار مؤثرين افتراضيين (virtual influencers). لذلك تهدف هذه الدراسة إلى اكتشاف سمات المؤثرين الافتراضيين وقدرتهم على التأثير في ارتباطات العلامات التجارية ونوايا الشراء. ولبناء نموذج لتأثير خصائص المؤثرين الافتراضيين على العلامات التجارية، تم توزيع 225 استبانة باستخدام طريقة أخذ العينات العشوائية، وتم استخدام نمذجة المعادلة الهيكلية (SEM) لفحص تأثير خصائص المؤثر الافتراضي في العلامة التجارية ونوايا الشراء. وخلصت الدراسة إلى جدوى الاستعاضة عن المؤثرين البشريين في سياق الأزياء، خاصة بالنسبة للعلامات التجارية الجديدة التي ترغب في تأسيس تموقع مناسب للعلامة التجارية في أذهان المستهلكين، حيث من الممكن مطابقة المؤثرين الافتراضيين مع أي متطلبات مسبقة للعلامة التجارية من قبل المسوقين. وتسهم الدراسة في فهم أثر خصائص المؤثرين الافتراضيين عند استخدامهم في منصة التواصل الاجتماعي انستغرام. علاوة على ذلك، تقدم الدراسة إرشادات لمديري التسويق الراغبين في معرفة سمات المؤثرين الافتراضيين المطلوبة للحصول على تسويق مؤثر وفعال.

الكلمات الدالة: المؤثر البشري، المؤثر الافتراضي، التحول الرقمي، نية الشراء، تسويق اللباس العصري، ارتباطات العلامة التجارية.

1،2،3 الجامعة الأردنية.

4 جامعة جدارا.

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1. INTRODUCTION

The rise of social media nowadays has created new opportunities for marketers, not only to create brand awareness and elevate sales (Marzouk, 2016), but also to create positive attitudes, enhancing brand image and influencing buying intentions (Djarafova & Rushworth, 2017; Wiedmann & Mettenheim, 2020; Al-Haddad, Ayesha, Al Hassan, Taleb & Al Otaibi 2021). One aspect of social-media marketing that has gained exponential growth is influencer marketing, which is expected to exceed US\$373 million by 2027 worldwide (Statista, 2021). It has become an integral part of the marketers' communication arsenal, as one-fifth of all advertisements utilize it (Knoll & Matthes, 2017) due to its effectiveness in reaching target online audiences (Belanche, Casaló, Flavián & Ibáñez-Sánchez, 2021). According to Klear (2020), fashion and accessories industry had the biggest shares of using fashion influencers on Instagram in 2020, measured by the number of posts.

However, using human influencers is more challenging to marketers, especially in situations like pandemics (e.g. COVID-19), when firms' marketing activities and events are likely to be halted because of social-distancing requirements or travel restrictions (Ong, 2020). Furthermore, not only human influencers may sometimes deceive companies by purchasing followers or engaging in misbehaviors that can adversely affect brands (Um, 2013; Thomas & Fowler, 2020; Harrigan, Daly, Coussement, Soutar & Evers, 2021), but what is more crucial is finding the perfect fit between a brand and a human influencer, which may hinder influencer marketing effectiveness (Kamins, 1990; Park & Lin, 2020). Such challenges make virtual influencers (Vis) as a viable alternative to human influencers.

To overcome these challenges, it has been argued that many brands will be inclined to use virtual influencers (Vis), since they are less costly and have a completely malleable model (Rebecca, 2020). Indeed, VIs are expected to shape the future of influencer marketing (Kádekóvá &

Holienčinová, 2018). For example, luxury-fashion marketers- like Chanel and Prada- have already started experimenting with Vis, such as Lil Miquela on Instagram (Moustakas, Lamba, Mahmoud & Ranganathan, 2020).

While previous research has provided valuable insights into influencers' effectiveness (e.g. Halder, Pradhan & Chaudhuri, 2021), there has been limited academic research that has been devoted to understanding the impact of virtual influences on the behavior of consumers. Hence, exploring this issue is significant, as VI trend has begun to gain attention from media and market research firms.

However, the fact that VIs are not real persons (Ong, 2020) would require examining how consumers perceive the meaning transmitted by VIs to brands. Therefore, building on influencer marketing and virtual humans' effectiveness literature (Halder, Pradhan & Chaudhuri, 2021), this study aims to build a model for VI effectiveness by examining specific attributes that influence brand associations and consequently, purchase intentions.

Hence, this research intends to bridge the knowledge gap in the literature on VIs, by answering the following research questions:

- Which characteristics of virtual influencers affect fashion consumers' brand attitudes and associations?
- Do brand associations with virtual influencers affect fashion consumers' purchase intentions?

2. Development of Hypotheses

2.1 Virtual Influencer (VI) Effectiveness Model

A virtual human (*virtual influencer* is considered as a sub-category) is defined as an online personality generated by computers (Schroeder, Yang, Banerjee, Romine & Craig, 2018) which influences followers on social-media platforms (Shin & Lee, 2020). Therefore, in this study, we define social-media

virtual influencers as “digitally created characters and avatars that can be used by businesses to promote their brands to a certain group of followers”. The limited previous literature on virtual humans has attempted to examine the effectiveness of virtual humans through understanding their physical traits. One key attribute found is virtual human attractiveness, which facilitates forming positive attitudes and purchase intentions at low-to-moderate involvement levels of buying situations (Holzwarth, Janiszewski & Neumann, 2006; Luo, McGoldrick, Beatty & Keeling, 2006). Moreover, likeability of the virtual human was associated with its attractiveness and found to affect persuasion as a moderating factor (Holzwarth, Janiszewski & Neumann, 2006).

Furthermore, expertise was found to play a vital role in high-involvement products among consumers, which in turn affected the virtual human credibility (Holzwarth, Janiszewski & Neumann, 2006). However, virtual humans’ trustworthiness was found to have negative perceptions (Riedl, Mohr, Kenning, Davis & Heekeren, 2014). Also, another key attribute is the similarity of the virtual entity to human-being, and the extent of resembling them was found to be vital for effectiveness in parasocial interactions and the acceptance of such interactions (Tinwell, Grimshaw & Williams, 2011; Van Doorn, Mende, Noble, Hulland, Ostrom, Grewal & Petersen, 2017; Schroeder, Yang, Banerjee, Romine & Craig, 2018). However, according to uncanny valley theory (Mori, 1970; Kim, Schmitt & Thalmann, 2019), if artificial entities were perceived to be too similar to humans, this will have adverse effects on humans interacting with such artificial entities.

Prior literature on virtual humans’ attributes for effectiveness had shared similar views with literature on human influencers’ requirements for effectiveness. For instance, previous studies on celebrity and influencers’ marketing utilized source credibility and attractiveness models (Ohanion 1990; 1991) that originated from (Hovland & Weiss, 1951; McGuire, 1985), focusing on

effective endorsers’ perceived characteristics such as expertise, trustworthiness and attractiveness for endorser persuasiveness (e.g. Erdogan, 1999; Goldsmith, Lafferty & Newell, 2000; Usitalo & Toivonen, 2016; Balabanis & Chatzopoulou, 2019; Lou & Yuan, 2019; Wiedmann & Mettenheim, 2020). Similarity was considered as a further requirement for effectiveness (Munnukka, Uusitalo & Toivonen, 2016), while Martensen, Brockenhuus-Schack & Zahid (2018) combined McGuire’s (1985) source attractiveness, particularly likability, similarity and familiarity, with Hovland & Weiss (1951) source-credibility model.

However, extant research revealed mixed findings on the effectiveness of celebrity perceived characteristics for endorsement effectiveness. For instance, Wiedmann & Mettenheim (2020) found that trustworthiness and attractiveness lead to an enhanced brand image and purchase intentions, while others found source credibility, attractiveness and similarity to be important (Munnukka, Uusitalo & Toivonen, 2016). Accordingly, due to previous mixed findings and to have a better insight when testing our research model, borrowing from reviewed virtual humans’ limited literature and influencer marketing literature, there are two main themes utilized by scholars for human endorsers’ effectiveness that can be integrated with VI literature. The first model is the source credibility theory (Hovland & Weiss, 1951), which is defined as the extent to which a “source is perceived as possessing expertise relevant to the communication topic and can be trusted to give an objective opinion on the subject” (Goldsmith, Lafferty & Newell, 2000:43). The other model of source attractiveness by McGuire (1985) posits that attractiveness is not only confined to physical attractiveness, but also includes qualities like “likeableness, pleasantness, beauty, familiarity and similarity” (McGuire, Rice & Atkin, 2001: 24).

2.2 Brand Associations

Brand associations are defined as anything linked in memory to a brand (Aaker, 1991). According to Keller (1993), brand associations consist of brand image, attributes and attitudes perceived by the consumer. Another important dimension to brand associations is uniqueness which is defined as “the degree to which customers feel that a brand is different from competing brands” (Netemeyer, Krishnan, Pullig, Wang, Yagci, Dean & Wirth, 2004).

Earlier research has investigated the impact of celebrity endorsement on brand associations. This research has largely drawn on associative learning principles to explain the underlying process of Celebrity-brand associations preceding meaning transfer (e.g. Till & Shimp, 1998). Celebrity and brand represent individual nodes, where by repeated pairings of the brand and the endorser, the brand and the endorser become part of each-other association set *via* associative networks, then are transferred to the consumer memory to form a brand image (Keller, 1993; Till & Shimp, 1998) *via* meaning transfer.

This is particularly prominent when the influencer endorses an unfamiliar brand, as this may facilitate forming brand associations (Ilicic & Webster, 2013; Pitz & Köhler, 2018), and creating certain brand perceptions *via* meaning transfer from celebrity to brand effectively (Miller & Allen, 2012). Also, previous research suggests that the personality of the influencer impacts unfamiliar brands (Ambroise, Pantin-Sohier, Valette-Florence & Albert, 2014).

Furthermore, some product categories facilitate the meaning transfer process as in the fashion-product category (McCracken, 1986).

2.3 Buying Intentions

Purchase intention is defined as “the conscious decision of someone to buy a particular brand” (Spears & Singh, 2004). According to the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), a person’s purchase intention depends on two factors; one is

related to the person’s attitude toward a certain object or brand whether positive or negative, while the other factor is the social pressure placed on the individual to perform a particular behavior. Previous research on advertising effectiveness indicated that buying intentions are the outcome of the attitude formed toward brands (MacKenzie, Lutz & Belch, 1986; Homer, 1990). Similarly, Goldsmith, Lafferty & Newell (2000) found that the consumers’ attitudes toward brands influence purchase intentions. Various research indicated the impact of using a positively perceived celebrity endorser on purchase intention (e.g. Ilicic & Webster, 2011). A popular purchase intention measure that is often used for measuring new-product purchase intentions with high predictive accuracy is the one developed by Jamieson & Bass (1989). Therefore, this measure was used in this study to examine consumer buying intentions toward hypothetical new fashion brands.

2.4 Study Framework

Previous research has provided valuable insights into human endorsement effectiveness. Yet, there has been no academic research that sought to understand the impact of VIs on brand associations and buying intentions. Therefore, the conceptual model of this study is set to determine the impact of VI attributes by building on virtual humans’ literature (e.g. Holzwarth, Janiszewski & Neumann, 2006; Tinwell, Grimshaw & Williams, 2011; Van Doorn, Mende, Noble, Hulland, Ostrom, Grewal & Petersen, 2017; Schroeder, Yang, Banerjee, Romine & Craig, 2018) and on the most cited literature for celebrity endorsement effectiveness; 1-source attractiveness model, 2-source credibility model (e.g. Hovland & Weiss, 1951; McGuire, 1985; McCracken, 1986; Ohanian, 1990, 1991; Goldsmith, Lafferty & Newell, 2000; Martensen, Brockenhuus-Schack & Zahid, 2018).

The following hypotheses are proposed:

H1: VI attractiveness positively affects brand associations and purchase intentions.

H2: VI likeability positively affects brand associations and purchase intentions.

H3: VI similarity positively affects brand associations and

purchase intentions.

H4: VI trustworthiness positively affects brand associations and purchase intentions.

H5: VI expertise positively affects brand associations and purchase intentions.

H6: Brand associations affect purchase intentions.

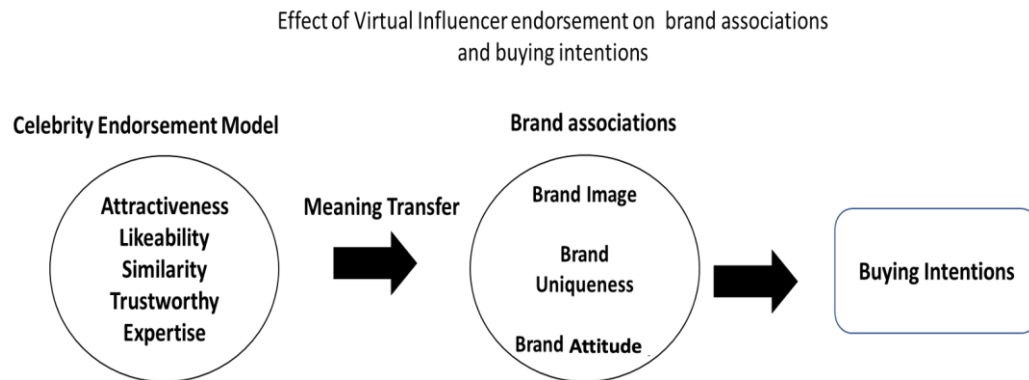


Figure (1)
Study framework

3. Methodology

3.1 Research Design

A quantitative method was conducted utilizing a questionnaire as a data-collection tool. The study utilized a VI Instagram account related to fashion called *lil miquela*. The selection of this VI is based on a number of factors: human-like characteristics, being a successful virtual influencer, which was determined from the large number of followers (3 Million followers), post-engagement rates, VI popularity being selected by a large number of luxury fashion brands, like Chanel and Prada (Moustakas, Lamba, Mahmoud & Ranganathan, 2020) and finally because choosing a specific experiment subject is proper when exploring a new phenomenon (Yin, 1994).

Thereafter, to test the research model and examine VI characteristics' meaning transfer to hypothetical fashion brands, female respondents were exposed to different Instagram fashion posts manipulated as if they were created by the VI. Fashion context was selected in this study, because it is considered a strong vehicle for expressing self-

concept (Evans, 1989) and consequently allows examining meaning transfer (McCracken, 1989).

3.2 Research Instrument

The survey questions are based on constructs validated from previous literature on influencer endorsement effectiveness factors and the impact of VIs on brands, as well as attitudes and intentions to buy. Prior to data collection, a pilot study was conducted to examine the internal reliability of the questionnaire items by selecting 30 female respondents randomly from the University of Jordan. Cronbach's alpha indices were found to exceed (0.70) in value. Hence, measures are internally reliable (Hair, Anderson, Babin & Black, 2010). The research variables were measured by using a five-point Likert scale (from 1 "strongly disagree" to 5 "strongly agree"). The semantic scale was used to measure attitude and likeability constructs. The questions' wording was modified to fit the VI context by using

for instance “Felt the VI as similar to me” instead of “Felt the digital human as similar to me”. VI effectiveness (independent variable) was measured by using five constructs; similarity (three items; $\alpha = 0.693$), influencer attractiveness (three items; $\alpha = 0.785$), expertise (two items; $\alpha = 0.839$), trustworthiness (two items; $\alpha = 0.764$) and likeability (4 items; $\alpha = 0.875$) adapted from validated literature (Spears & Singh, 2004; Ohanian, 1990; McGuire, 1985).

Brand associations (dependent variable) were measured by using three constructs: brand image (four items; $\alpha = 0.804$), brand affective attitude (four items; $\alpha = 0.929$) and brand uniqueness (three items; $\alpha = 0.918$) adapted from (Low & Lamb, 2000; Netemeyer, Krishnan, Pullig, Wang, Yagci, Dean & Wirth, 2004; Spears and Singh, 2004) and finally, the intention to buy (two items; $\alpha = 0.848$) was adapted from (Jamieson and Bass, 1989). See Table (1).

Table (1)
Study constructs

Variable	Construct	No. of Items	Reference
VI	Similarity	3	Adapted from McGuire (1985).
	Expertise	2	Adapted from Ohanian (1990)
	Trustworthiness	3	Adapted from Ohanian (1990)
	Influencer attractiveness	3	Adapted from Ohanian (1990)
	Likeability (affective dimension)	4	Spears & Singh (2004)
Brand Associations	Brand uniqueness	3	Adapted from Netemeyer et al. (2004)
	Brand image	3	Fowler et al. (2017) Low & Lamb Jr. (2000)
	Brand attitude (affective dimension)	4	Spears & Singh (2004)
Buying Intention	Intention to buy (conative dimension)	2	Jamieson & Bass (1989)

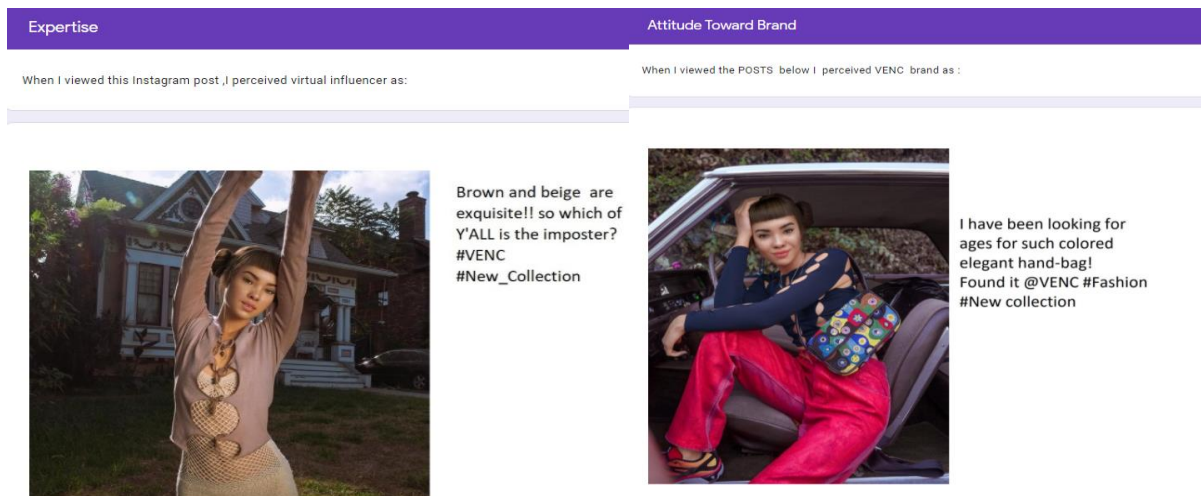


Figure (2)
Sample questions from the survey:
Image source: Instagram.com/lilmiquela

3.3 Findings and Analysis

Since fashion was the targeted domain in this study, 225 questionnaire forms were distributed to female consumers in Jordan using the random-sampling method, while 196 responses were considered for further analysis. Data was analyzed using SPSS (version 23.0) and Smart-PLS 3.3, respectively. Descriptive statistics were calculated to summarize data. In order to evaluate the research model, Structural Equation Modeling (S.E.M.) was used to test the research hypotheses. The final sample size ($n=196$) is appropriate for S.E.M., as it complies with 10 times the largest number of structural paths directed at a particular construct rule (Hair, Ringle & Sarstedt, 2013).

Based on the descriptive statistics analyzed results, the study revealed that most female respondents (64.9%) were at the age of 20 - 29 years, 55.1% were daily users of Instagram and (12.5%) had identified the stated VI in this study; hence, they were removed from further analysis to

eliminate any confounds that might arise from such identification.

As precedent to proceeding with testing the model hypotheses, factor loading, validity and reliability of variables in each construct were examined. All items had high factor loadings and composite reliabilities that surpassed the recommended value of (>0.70) (Hair, Ringle & Sarstedt, 2013). Furthermore, average variance extracted (AVE) surpassed the recommended value of (>0.50) (Hair, Ringle & Sarstedt, 2013). See Table (3). For discriminant validity analysis, the square root of average variance extracted (AVE) was larger than the corresponding correlation coefficients between constructs (Fornell & Larcker, 1981). See Table 4). Therefore, the analysis demonstrated a robust rigor model to proceed further with testing research model.

Table (2)
Validity, reliability and factors loadings

Construct	Variable	Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Brand Associations	BrandImage1	0.787	0.932	0.579
	BrandImage2	0.718		
	BrandImage3	0.83		
	BrandImage4	0.799		
	BrandUniqueness2	0.736		
	BrandUniqueness3	0.758		
	Brand_Attitude1	0.734		
	Brand_Attitude2	0.767		
	Brand_Attitude3	0.738		
	Brand_Attitude4	0.735		
Purchase Intention	Buy1	0.941	0.923	0.857
	Buy2	0.909		
VI_Attractiveness	VI_Attractiveness1	0.929	0.928	0.813
	VI_Attractiveness2	0.94		
	VI_Attractiveness3	0.831		
VI_Expertise	VI_Expertise1	0.939	0.921	0.854
	VI_Expertise2	0.909		
VI_Likeability	VI_Likeability1	0.846	0.942	0.804
	VI_Likeability2	0.932		
	VI_Likeability3	0.924		
	VI_Likeability4	0.882		

VI_Similarity	VI_Similarity1	0.872	0.869	0.69
	VI_Similarity2	0.833		
	VI_Similarity3	0.784		
VI_Trustworthiness	VI_Trustworthy1	0.946	0.932	0.873
	VI_Trustworthy2	0.923		

Table (3)
Discriminant validity analysis

	Var1	Var2	Var3	Var4	Var5	Var6	Var7
Brand Associations	0.761						
Purchase Intention	0.527	0.926					
VI_Attractiveness	0.708	0.538	0.901				
VI_Expertise	0.581	0.371	0.538	0.924			
VI_Likeability	0.6	0.376	0.563	0.348	0.897		
VI_Similarity	0.59	0.364	0.622	0.44	0.422	0.831	
VI_Trustworthiness	0.538	0.362	0.474	0.398	0.528	0.47	0.934

For investigating the model significance, the researchers identified the beta coefficients, the corresponding t-values and the effect size (f-squared), as well as the R-squared values, as per Cohen's (1988) guidelines. Details are shown in Table (4).

Accordingly, the bootstrapping method was conducted for 5,000 iterations. The results showed that attractiveness impacted brand associations the most ($b=0.318$; $p \leq 0.01$) with a nearly medium effect ($f^2=0.124$) and indirectly impacted the buying intentions ($b=0.168$; $p < 0.01$). In addition, the likeability of the VI also significantly impacted brand associations ($b=0.221$; $p < 0.05$) with a small effect ($f^2=0.08$) and indirectly affected the buying intentions ($b=0.116$; $p < 0.05$). Expertise also impacted brand associations ($b=0.223$; $p < 0.01$) with a small effect

($f^2=0.092$) and affected indirectly the buying intentions ($b=0.118$; $p < 0.01$).

Furthermore, brand associations were found to have a positive effect on the buying intentions ($b=0.527$; $p \leq 0.01$) with a strong effect ($f^2=0.384$).

Neither similarity nor trustworthiness impacted brand associations and buying intentions.

As for the model predictive power, the VI model factors explained 63.5% of the variance (R-squared=0.635) in brand associations, whereas the buying intentions explained 27.7% of the variance (R-squared=0.277). Hence, the model fit is accepted (Chin, 1998).

Accordingly, only hypotheses H1, H2, H5 and H6 were supported. See Table (4).

Table (4)
Research model hypotheses analysis

Hypotheses	Beta	T Statistics	f-squared	P-values	Decision
VI_Attractiveness -> Brand Associations	0.318	3.337	0.124	0.001	H1 supported
VI_Attractiveness -> Purchase Intention	0.168	2.794	Indirect Effect	0.005	H1 supported
VI_Likeability -> Brand Associations	0.221	2.419	0.08	0.016	H2 supported
VI_Likeability -> Purchase Intention	0.116	2.298	Indirect Effect	0.022	H2 supported
VI_Similarity -> Brand Associations	0.147	1.599	0.033	0.11	H3 not supported
VI_Similarity -> Purchase Intention	0.077	1.546	Indirect Effect	0.122	H3 not supported
VI_Trustworthiness -> Brand Associations	0.113	1.403	0.022	0.161	H4 not supported
VI_Trustworthiness -> Purchase Intention	0.059	1.348	Indirect Effect	0.178	H4 not supported
VI_Expertise -> Brand Associations	0.223	3.038	0.092	0.002	H5 supported
VI_Expertise -> Purchase Intention	0.118	2.73	Indirect Effect	0.006	H5 supported
Brand Associations -> Purchase Intention	0.527	6.606	0.384	0	H6 supported

4. Discussion

The focus of this study was to examine the impact of the VIs on brand associations and buying intentions, since finding a perfect fit between an influencer and a brand is sometimes not feasible. Such challenges can be bypassed when adopting a VI by customizing its persona to meet any given requirement by marketers.

Findings suggested that the VI attributes in terms of attractiveness, likability and expertise were transferred to the fictional unfamiliar fashion brand. This can be explained when using the associative learning and match up principles, since the fashion VI was associated with unfamiliar fashion brands *via* meaning transfer. This was further indicated in the human endorser literature findings on meaning transfer (e.g. Miller & Allen, 2012; Ilicic & Webster, 2013; Pitz & Köhler, 2018).

Research findings also suggested that the most effective attribute of VI is attractiveness, followed by expertise and likeability. Such findings may be attributed to the consumer' identification process with attractive endorsers. This further corresponds with Holzwarth, Janiszewski & Neumann (2006) study on digital avatars, who found that

artificial entity attractiveness was vital for positive attitudes and purchase intentions at low -to- moderate involvement levels. Such findings on attractiveness are also consistent with human endorsers' marketing literature (e.g. Till & Busler, 2000; Jin & Muqaddam, 2019; Kamin, 1990). For instance, Jin and Muqaddam (2019) found that the influencer's attractiveness enhances endorsed luxury fashion product appeal. Kamins (1990) also revealed that attractive endorsers are more effective in impacting the brand attitude and purchase intention in products used for enhancing attractiveness.

A related factor to attractiveness was likeability, which was also found to impact consumers' attitudes. These findings are in line with Holzwarth, Janiszewski & Neumann (2006), but they contradict the uncanny valley principle (Mori, 1970; Kim, Schmitt & Thalmann, 2019), which states that human-like artificial life could have an adverse effect on human attitudes (Mori, 1970; Kim, Schmitt & Thalmann, 2019). The second factor that affected brand perception is expertise. It can be inferred that

VI attractiveness that is in harmony with fashion products related to physical appearance provides credibility for posts according to the match up principle (Kamins,1990; Belanche, Casaló, Flavián & Ibáñez-Sánchez, 2021). This is further indicated in human endorsers' literature (e.g. Martensen, Brockenhuus-Schack & Zahid, 2018).

Such findings contrast with Wiedmann & Mettenheim (2020), who found that trust is the most important attribute, followed by attractiveness in affecting the brand image and purchase behavior in luxury fashion, while expertise was not significant. Furthermore, positive brand associations and attitudes were found to have a strong effect on purchase intentions, which aligns with previous literature (e.g. Goldsmith, Lafferty & Newell, 2000; Spears & Singh, 2004). This suggests that when a consumer is exposed to a VI, a meaning transfer from the influencer to the brand occurs, affecting the brand perceptions and causing a change in the cognitive and affective dimensions, which leads to positively affecting buying intentions (conative dimension).

Surprisingly, VI similarity did not impact attitudes and behavior, which contradicts with Munnukka, Uusitalo & Toivonen (2016) on beauty-related products, which may be due to VI perceived differences by respondents as artificial entity. However, such findings need further analysis and research. Trustworthiness was also found to have no impact on behavior, which might be inferred from the VI authenticity issue, as virtual humans were less trustworthy than humans when having social interaction according to (Riedl, Mohr, Kenning, Davis & Heekeren, 2014).

However, this research found that such shortcoming did not hinder VI effectiveness in impacting brand perception and purchase intention. It was further indicated in literature that trustworthiness did not have any positive effect on purchase intention in beauty products (Wu and Lee, 2012), aligning with the match up hypotheses principle.

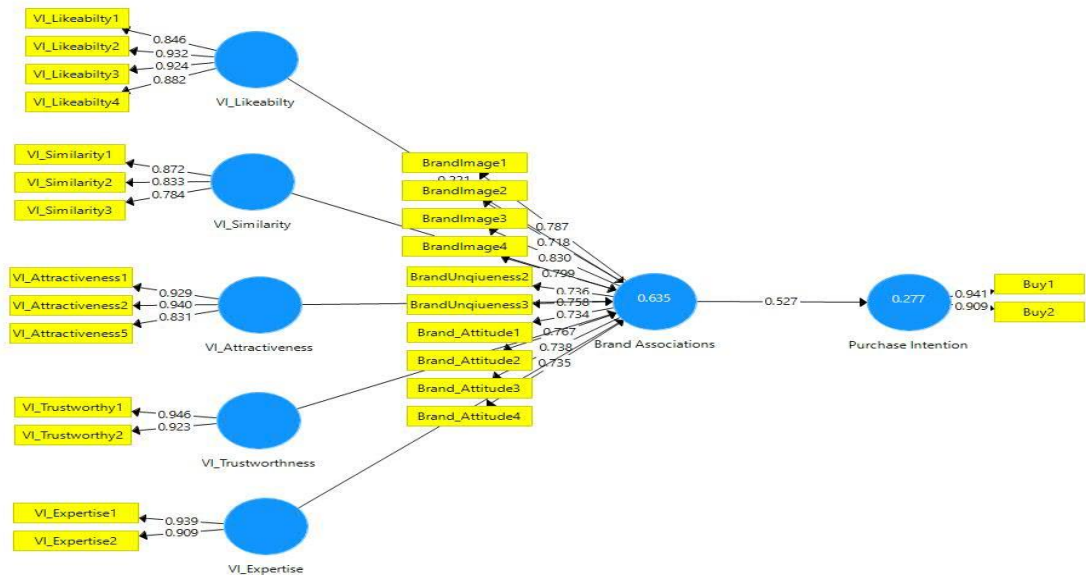


Figure (3)
Research findings

5. Theoretical and Managerial Implications

This is among the first studies that empirically addressed the VI effectiveness. It contributes to understanding the VI endorsement's effect on brands in fashion context. The current research has bridged the gap in VI literature by identifying characteristics that influence brand associations and fashion consumers' buying intentions in Jordan.

Furthermore, the main findings of this research have novel theoretical and managerial implications for researchers and marketers. The study makes a theoretical contribution to the celebrity endorsement effectiveness literature by integrating the VI concept into celebrity endorsement discourse and validating the celebrity endorsement models when utilizing VIs. However, the results of this study have suggested that previous insights from the uncanny valley theory may not necessarily apply on VIs.

Similarly, the study also contributes to practice by demonstrating that certain VIs can be used as surrogates to human influencers. Also, this study offers practical guidance to marketing managers who plan to use VIs to form certain brand associations. For instance, this study indicates that VI attributes may transfer to brands. Therefore, marketers should utilize VIs when the pool of human influencers does not match the desired brand image or brand persona, thus providing marketers with the tools to sculpt brand positioning *via* the VI, particularly when launching new products or brands. Another practical application would be incorporating the VI with brands that seek to give their voice-enabled AI services (e.g. Amazon Alexa) a visual representation with required associations and perceptions, hence a more interactive engaging experience with brands.

Moreover, the study has shown that the VI attractiveness trait had the highest effect on brand

associations and buying intention in the fashion context compared to other attributes, such as expertise or likeability. Therefore, marketers should select or create VIs with human-like attractive features to influence brand perceptions and behaviors positively.

However, marketing managers should also be cautious when choosing ready-made or customized VIs, as their persona might transfer to the endorsed brand.

In conclusion, this research model can be critical for marketers planning to use VIs for marketing communications and positioning efforts. Also, it provides guidance to marketers planning to utilize VIs as surrogates to human influencers. Moreover, it contributes to the limited literature found on VIs.

6. Limitations and Future Research

This study has several limitations. First, the research design was based on a quantitative method that included a small sample size. Therefore, future researchers can enrich the insights obtained by conducting qualitative studies to better understand how consumers perceive VIs compared to human influencers. Another limitation of this study is the sole focus on fashion virtual influencers. Although fashion is a suitable category for understanding virtual influencers' effect on consumer buying intentions, future research may look at the impact of VIs when interacting with consumers in different product categories and across different cultures. Furthermore, this study adopted the consumers' point of view to understand the impact of VIs on brand associations and consumer buying intentions. Finally, further research is needed to understand business best practices when using VIs and their effect on sales based on actual data.

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