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Virtual Brand Endorser Attributes and Consumer Responses: Perceived Credibility and Acceptance among Middle-Aged Consumers

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Abstract

This study examines how perceived age similarity, lifelike endorsement scenario fit, visual identity fit, and cultural value fit relate to VBE acceptance and perceived credibility among middle-aged Chinese consumers. An online questionnaire yielded 318 valid responses, which were analysed using Pearson correlation, linear regression, and one-way ANOVA. The results showed that perceived age similarity was positively associated with VBE acceptance. Lifelike endorsement scenario fit and cultural value fit were also positively associated with perceived credibility. For visual identity fit, perceived credibility differed significantly between the low-fit group and both the middle- and high-fit groups, whereas the difference between the middle- and high-fit groups was not statistically significant. The findings therefore point to different patterns in how consumers evaluate VBEs: age similarity was associated with acceptance, while scenario fit, visual identity fit, and cultural value fit were examined in relation to credibility. The study adds evidence on VBE evaluation among middle-aged Chinese consumers and offers considerations for brands designing virtual endorsers for this audience.

Keywords

Virtual Brand Endorsers, Perceived Credibility, Perceived Age Similarity, Consumer Acceptance, Middle-Aged Consumers

1. Introduction

Virtual brand endorsers (VBEs) have become an increasingly visible element of digital brand communication, allowing firms to create and manage virtual char-

acters to represent brands in online environments. Unlike human endorsers, whose credibility can be informed by their personal identities, social experiences, and established public reputations, VBEs are digitally constructed and their appearance, behavior, and communication can be designed and controlled by the brand. This distinction changes how consumers may evaluate a virtual endorser, as judgments cannot rely on the same personal and social cues that are available when evaluating a human endorser. Instead, consumers may draw on cues embedded in the VBE's appearance, presentation, and interaction context when forming evaluations of the endorser and the endorsement. In this background, this study examines four VBE design attributes—perceived age similarity, lifelike endorsement scenario fit, visual identity fit, and cultural value fit—and their relationships with consumer responses among middle-aged Chinese consumers. Specifically, the study examines whether perceived age similarity is associated with VBE acceptance and whether lifelike endorsement scenario fit, visual identity fit, and cultural value fit are associated with perceived credibility. The distinction between these attributes allows the study to consider whether different types of VBE-related fit are associated with credibility and acceptance in different ways.

This paper focuses on middle-aged consumers, a demographic that has received relatively limited attention in brand digital transformation research. We argue that consumer responses to VBEs are not unidimensional, and rather than treating VBE evaluation as a single outcome, this study distinguishes between perceived credibility and VBE acceptance, and examines how each relates to different VBE attributes. Thus, the study may also offer practical guidance for brands when considering age representation, endorsement context, visual identity, and cultural fit in the design of virtual brand endorsers, particularly when these elements are intended to correspond with the characteristics and positioning of the promoted product or brand.

2. The Literature Review

2.1. Perceptions of Online Credibility and Information Attributes

Flanagin and Metzger (2000) conceptualized perceived credibility as a recipient's subjective evaluation of the trustworthiness and reliability of an information source, content, or communicator. Such evaluations are based on how recipients process available cues and infer the veracity and reliability of the information rather than on the objective characteristics of the underlying facts. In online environments, perceived credibility similarly reflects the extent to which individuals regard information sources, content, or communicators as trustworthy and reliable. Research on online credibility has traditionally emphasized information quality, including accuracy and timeliness (Qalati et al., 2021). Later research has extended this focus by considering the influence of visual presentation, interface design, and other contextual cues on credibility judgments. Khan et al. (2024) show that platform characteristics and users' social identities can influence evaluations of online information credibility. Moriuchi and Moriyoshi (2024) further identified per-

ceived credibility as an important factor in how consumers respond to eWOM and marketing communications, while Anderson et al. (2024) noted that individual motivations and forms of social interaction can shape credibility perceptions in emerging digital environments. To sum up, this research suggests that online credibility depends not only on the quality of information but also on the cues and circumstances through which it is presented and experienced. This perspective provides a basis for examining how the visual and contextual characteristics of VBEs may relate to consumers' perceptions of their credibility.

2.2. VBE Design Attributes and Consumer Evaluations

As an increasingly visible form of digital communication, virtual humans have been adopted by brands to communicate brand identity and values through social media and other online environments (de Brito Silva & de Oliveira Campos, 2024). Existing research suggests that consumers' evaluations of virtual representatives can be shaped by design attributes such as appearance, gender, age, and behavioural presentation (Audrezet & Koles, 2023). These design characteristics may also inform consumers' judgments of an endorser and the credibility of its endorsement (Bai et al., 2025). At the same time, Guo et al. (2023) found that greater perceived credibility of virtual images was associated with lower perceived risk and stronger brand loyalty. Also, for the virtual image aspect, Gu and Duan (2024) further argued that human-like characteristics, combined with qualities such as innovativeness and trustworthiness, can contribute to consumer engagement with virtual influencers. Collectively, these discussion viewpoints indicate that consumers draw on both the design of virtual representatives and the impressions they convey when evaluating virtual endorsers.

However, consumers may not respond to VBE design characteristics simply according to the degree of realism or human-likeness. Han et al. (2024) suggested that anthropomorphic design can reach a point where virtual characters no longer align well with consumers' expectations of natural human appearance or behaviour, so additional human-like cues may create discomfort rather than improve responses. Shen (2024) likewise found that stronger awareness of the commercial intent or non-human nature of a VBE can be accompanied by greater psychological resistance and less favourable evaluations. These findings suggest that the relevance of a VBE's design may depend on how its characteristics correspond with consumers' expectations, rather than on realism alone. For VBEs, this may include how consumers perceive the endorser's age, appearance, behaviour, and endorsement setting in relation to their own expectations.

2.3. The SIT and FET Theories and Online Experience

Middle-aged consumers are defined in this study as those aged 45 - 59 and represent an important consumer group in online markets. This group's engagement with digital technologies can be shaped by factors such as cultural values, financial circumstances, and prior experience with technology (Girish & Pallavi Kumar,

2025). Online shopping has also become increasingly common among middle-aged Chinese consumers, although their engagement with more complex or innovative digital technologies may differ from that of younger consumers (Feng & Ivanov, 2023; Efendioğlu, 2024). These characteristics make middle-aged consumers a relevant group for examining responses to the design and presentation of virtual brand endorsers.

Social Identity Theory (SIT) and Flow Experience Theory (FET) approach the issue from different angles, yet both help explain how consumers respond to social presence. Research within the SIT tradition shows that consumers are drawn to a virtual being (VBE) when its personality, age representation, or cultural values echo their own identity and background (Jang & Kim, 2022). From the above, these research viewpoints help explain why perceived age similarity, visual identity fit, and cultural value fit may represent distinct forms of correspondence between consumers and VBEs. FET, in contrast, draws attention to the role of the endorsement context. Previous studies have pointed out that immersive experiences involving virtual characters can support more favorable evaluations of virtual brand-related content (Hyun et al., 2022; Wang & Wang, 2020). Silva et al. (2023) also linked flow experiences involving virtual characters to greater perceived identity congruence among target audiences. These findings highlight the importance of the experience in which a VBE is encountered and suggest that the endorsement context may also shape consumers' evaluations.

The literature reviewed above points to two complementary perspectives on VBE evaluation. SIT is particularly relevant to the correspondence between consumer characteristics and the VBE's identity-related cues, whereas FET draws attention to the experiential context surrounding an endorsement. These two perspectives provide the conceptual basis for examining the proposed relationships between VBE design attributes and consumer responses in this study.

2.4. Research Gaps and the Focus of Present Study

Although previous studies have advanced understanding of online credibility and virtual human design, evidence remains limited regarding how different VBE design attributes relate to consumer responses, particularly among middle-aged consumers. Existing research on virtual representatives has focused on younger consumers, with relatively less attention given to middle-aged consumers and to how age-related similarity between consumers and VBEs may relate to VBE acceptance. In addition, although visual and contextual characteristics have been recognized as relevant to evaluations of virtual representatives, relatively little attention has been given to the relationships between lifelike endorsement scenario fit, visual identity fit, and perceived credibility within this consumer group. Less attention has also been given to the relationship between cultural value fit and consumers' perceptions of VBE credibility in online endorsement contexts.

Given these gaps, this study focuses on middle-aged Chinese consumers as a specific consumer group of case, and examines four VBE design attributes: per-

ceived age similarity, lifelike endorsement scenario fit, visual identity fit, and cultural value fit. Specifically, perceived age similarity is examined in relation to VBE acceptance, while lifelike endorsement scenario fit, visual identity fit, and cultural value fit are examined in relation to perceived credibility.

3. Hypotheses Development

The above literature review provides the theoretical basis for examining how four VBE design attributes are associated with middle-aged consumers' responses in an online endorsement context. Based on these theoretical perspectives, a conceptual framework is developed to specify the proposed relationships between VBE design attributes and two consumer responses: VBE acceptance and perceived credibility (Figure 1).

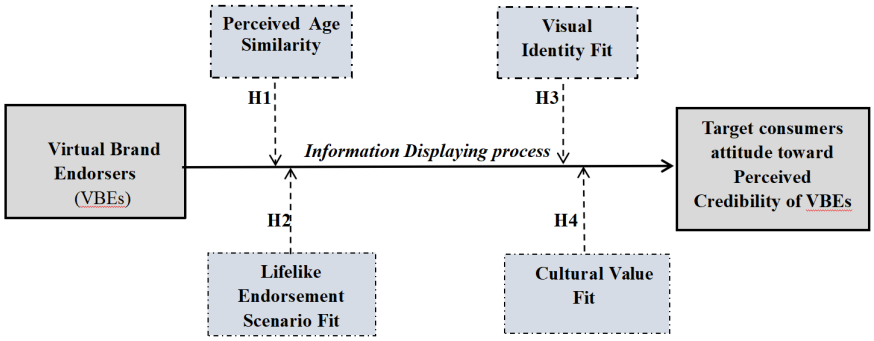


Figure 1. A Conceptual model of VBE design attributes and consumer responses.

3.1. Perceived Age Similarity

Social Identity Theory (SIT) proposes that perceived similarities between individuals and social targets can inform how those targets are evaluated (Tajfel & Turner, 1986). In virtual influencer marketing, this issue has been examined through the concept of perceived homophily (Dondapati & Dehury, 2024). Jin and Shi (2026) further considered demographic homophily and showed that age congruence can shape consumers' responses to virtual influencers. Together, these studies provide a basis for considering age similarity in the evaluation of virtual brand endorsers. For middle-aged consumers, a VBE perceived as similar in age may be seen as more familiar or relevant to their own social experience, potentially making the endorser more acceptable. Accordingly, the following hypothesis is proposed:

H1: Perceived age similarity between the VBE and middle-aged consumers is positively associated with VBE acceptance.

3.2. Lifelike Endorsement Scenario Fit

Flow Experience Theory (FET) draws attention to the role of the interaction context in shaping users' experiences with digital content. Research has applied this perspective to interactions with virtual agents and AI-powered chatbots, examining the experience of focused attention and involvement during these interactions

(Baabdullah et al., 2022). In virtual influencer marketing, Kim and Park (2024) also examined flow and credibility in relation to human-like virtual influencer content. Although these studies address different aspects of digital interaction, they provide a basis for considering how the setting in which a virtual brand endorser appears may relate to consumers' evaluations of an endorsement. In this study, lifelike endorsement scenario fit concerns the extent to which the endorsement setting is appropriate to the VBE and its endorsed product.

In VBE-based endorsement, a lifelike and contextually appropriate presentation may make the endorsement appear more coherent and consistent with the situation in which it is presented. Recent research on virtual influencer marketing similarly argued that congruence between virtual influencer content and the surrounding brand or communication context is relevant to source credibility (Shao, 2026). When an endorsement scenario is perceived as lifelike and appropriate to the endorsement situation, consumers may therefore find the presentation more coherent and easier to evaluate. Perceived credibility may be one such evaluation, as the appropriateness and consistency of the endorsement context can contribute to how credible the endorsement is perceived to be. Taking aspects to take into account lead to the following hypothesis:

H2: Lifelike endorsement scenario fit is positively associated with perceived credibility of the VBE.

3.3. Visual Identity Fit

Based on SIT, identity-related cues conveyed through a virtual representative's appearance and presentation may shape how consumers evaluate the representative. In the context of virtual humans, Małecka et al. (2022) applied SIT to explain how social identity can shape consumers' relationships with digitally mediated entities. For virtual brand endorsers, visual design, personality, and behavioural presentation can communicate aspects of the endorser's identity and provide cues through which consumers form evaluations (Ma & Li, 2024). Chen and Ren (2024) further showed that consumers may respond more favourably to influencer personas when the projected image corresponds with aspects of their own values, interests, and social identity. These findings discussed that identity-related correspondence may be relevant to how consumers evaluate a VBE and its endorsement.

Visual identity fit refers to the extent to which the VBE's visual presentation is perceived as consistent with consumers' own aesthetic preferences and identity-related expectations. Previous research has suggested that virtual representations that resonate with their intended audiences can support more positive interactions and stronger consumer responses (Palomba, 2020). Kim and Park (2024) found that congruence between a virtual representative's image and consumers' social identity was associated with stronger feelings of belonging, greater satisfaction, and higher perceived credibility. In a VBE endorsement context, a visually appropriate and identity-consistent representation may therefore provide consumers

with cues that make the endorser easier to relate to and evaluate positively. Perceived credibility represents one such evaluation, as consumers may regard a VBE as more credible when its visual identity is perceived as fitting with their expectations and preferences. Based on these theoretical arguments, H3 is proposed as follows:

H3: Visual identity fit between the VBE and middle-aged consumers' aesthetic preferences is positively associated with perceived credibility of the VBE.

3.4. Cultural Value Fit

Cultural values represent an important aspect of social identity because individuals' evaluations of social and commercial stimuli can be shaped by the values and norms embedded in their cultural environments (Jang & Kim, 2022). For middle-aged Chinese consumers, cultural background and accumulated social experience may provide an important context through which virtual brand endorsers are interpreted. Research on older consumers has also emphasized the relevance of cultural and social contexts to their engagement with digital technologies (Franco, 2023). In addition, Jin et al. (2023) similarly discussed how internet use has shaped the digital experiences of older Chinese adults, providing further context for understanding how this consumer group engages with digitally mediated environments. These studies provided an explanation for why culturally meaningful cues form part of the broader context in which middle-aged consumers may interpret and evaluate virtual brand endorsers. Taking these considerations into account leads to the following hypothesis:

H4: Cultural value fit between the VBE's representation and middle-aged consumers' cultural background is positively associated with perceived credibility of the VBE.

4. Methodology

4.1. Questionnaire Design

The questionnaire was administered online through Wenjuanxing, a widely used survey platform in China, and covered three areas: participant background, VBE stimuli, and construct measurement. The first part collected demographic information, including age and purchasing behaviour. Participants were recruited through a snowball sampling approach, with the questionnaire distributed through social networks targeting middle-aged and older adults.

For the stimulus section, participants were presented with four static images of virtual brand endorsers (VBEs), including two middle-aged male and two middle-aged female endorsers, depicted in an interactive virtual shopping environment. The images were designed to represent middle-aged Chinese adults, with facial features reflecting Chinese characteristics to align with the target consumer group. The same unbranded skincare product appeared in each image to maintain consistency in product information across the four stimuli.

The last part focused on participants' evaluations of the VBE stimuli. The four

constructs examined in H1 - H4 were perceived age similarity, Lifelike Endorsement Scenario Fit, Visual Identity Fit, and Cultural Value Fit. Responses to all items were recorded on a five-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). It needs to be noted, following the pilot test involving 86 respondents, the questionnaire was further administered for the main study. The 86 pilot-test responses were included from the main-study dataset, resulting in a final main-study sample of 318 respondents.

4.2. Data Preparation

Data were processed and analyzed by SPSS Statistics 26.0. The analysis consisted of three stages, beginning with a pilot assessment of the measurement instrument and ending with the preparation of the final dataset for hypothesis testing.

- **Stage 1: Pilot Reliability Assessment**

An initial pilot test was conducted with 89 middle-aged participants to assess the internal consistency of the measurement instrument. After incomplete questionnaires were excluded, 86 valid responses remained for analysis. As shown in Table 1, the instrument yielded a Cronbach's alpha of 0.919, with a standardized alpha of 0.895. These results indicated a good internal consistency of the pilot instrument.

Table 1. Reliability of the pilot measurement instrument.

Scale/Dimension	Cronbach's α	Standardized α	Items	Valid Cases (*N*)
Overall instrument	0.919	0.895	19	86

- **Stage 2:** Reliability Assessment

The reliability of each construct was assessed separately, as shown in Table 2. All four constructs exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency within the pilot sample. Specifically, the Cronbach's α values were 0.885 for Perceived Age Similarity, 0.854 for Lifelike Endorsement Scenario Fit, 0.935 for Visual Identity Fit, and 0.862 for Cultural Value Fit.

Table 2. Reliability analysis of pilot measurement constructs.

Measurement Construct	Cronbach's α	Standardized α	Items	Valid Cases
Perceived Age similarity	0.885	0.885	Q7, Q8	86
Lifelike Endorsement Scenario Fit	0.854	0.856	Q9, Q10, Q17	86
Visual identity Fit	0.935	0.935	Q11, Q12, Q13	86
Cultural value Fit	0.862	0.865	Q14, Q15, Q16	86

Note: Reliability analysis was conducted using the pilot sample (N = 86) in SPSS 26.0.

- **Stage 3:** Main Data Collection and Sample Screening

Data collection took four months and yielded 337 responses in total. The collected responses were then screened to ensure data quality, and the screening steps

are as follows: First, responses were deleted based on response time; for responses with extremely short completion times (less than 60 seconds) or unusually long completion times (more than 30 minutes) were excluded (9 responses), as these patterns may indicate insufficient engagement with the questionnaire or interruptions during completion. Second, we attention-check items were used to identify invalid responses, and 10 responses that failed the validity checks were removed from the dataset. And then, the screening process, the final sample consisted of 318 valid responses (N = 318), which were used for subsequent hypothesis testing.

The measurement constructs and corresponding questionnaire items, together with their theoretical sources, are summarized in Table 3.

Table 3. Measurement constructs, questionnaire items, and literature resource.

Measurement Construct	Cronbach's α	Standardized α	Items	Valid Cases
Perceived Age similarity	0.885	0.885	Q7, Q8	86
Lifelike Endorsement Scenario Fit	0.854	0.856	Q9, Q10, Q17	86
Visual identity Fit	0.935	0.935	Q11, Q12, Q13	86
Cultural value Fit	0.862	0.865	Q14, Q15, Q16	86

Following the measurement-construct definitions presented in Table 3, the internal consistency of each construct was assessed using the main sample (N = 318). The Cronbach's alpha coefficients are reported in Table 4. These results provide an assessment of the reliability of the measurement scales in the main sample before hypothesis testing.

Table 4. Reliability analysis of measurement constructs in the main sample.

Measurement Construct	Items	Cronbach's α	Valid Cases
Perceived Age similarity	Q7, Q8	0.879	318
Lifelike Endorsement Scenario Fit	Q9, Q10, Q17	0.853	318
Visual identity Fit	Q11, Q12, Q13	0.929	318
Cultural value Fit	Q14, Q15, Q16	0.863	318

Note. Reliability analysis was conducted using the main sample (N = 318) in SPSS 26.0.

5. Results

5.1. Perceived Age Similarity and VBE Evaluation (H1)

To test H1, a Pearson correlation analysis was conducted to examine the relationships between perceived age similarity (Q7 and Q8), VBE acceptance (Q17), and the comparative attractiveness of the VBE relative to human endorsers (Q18). As shown in Table 4, the two perceived age similarity items were strongly correlated with each other ($r = 0.730$, $p < 0.001$), indicating consistency in respondents' perceptions of age similarity.

Perceived age similarity was significantly correlated with VBE acceptance (Q17),

with Q7 and Q8 showing correlation coefficients of 0.553 and 0.543, respectively (both $p < 0.001$). The two items were also significantly correlated with the comparative attractiveness of the VBE relative to human endorsers (Q18), with coefficients of 0.418 and 0.413, respectively ($p < 0.001$).

The above findings indicate that when middle-aged consumers perceive greater age similarity with a VBE, they tend to report higher acceptance of the virtual endorser and more favourable evaluations of its attractiveness as a brand representative. Therefore, the results provide support for H1.

Table 5. Correlation analysis of perceived age similarity and VBE evaluation.

	1	2	3	4
1. Perceived Age similarity **(Q7)**	1	0.730**	0.553**	0.418**
2. Perceived age similarity**(Q8)**	0.730**	1	0.543**	0.413**
3. VBE Acceptance **(Q17)**	0.553**	0.543**	1	0.541**
4. Comparison of the attractiveness of VBE and Human endorsers **(Q18)**	0.418**	0.413**	0.541**	1

Note: N = 318; ** $p < 0.001$. (two-tailed).

5.2. Lifelike Endorsement Scenario Fit and Perceived Credibility (H2)

Table 5 shows the regression results for the relationship between lifelike endorsement scenario fit and perceived credibility. Before conducting the regression analysis, the reliability and factorability of the measurement items were assessed. The Cronbach's α value for the construct was 0.854, indicating satisfactory internal consistency. The KMO value was 0.76, and Bartlett's test of sphericity was significant ($\chi^2(3) = 85.30$, $p < 0.001$), indicating that the correlation matrix was suitable for factor analysis.

A simple linear regression was then conducted to examine the relationship between lifelike endorsement scenario fit and respondents' perceived credibility of the VBE. As shown in Table 6, lifelike endorsement scenario fit was positively associated with perceived credibility ($B = 0.500$, $SE = 0.037$, $\beta = 0.605$, $t = 13.51$, $p < 0.001$). The model explained 36.6% of the variance in perceived credibility ($R^2 = 0.366$).

Table 6. Regression results for lifelike endorsement scenario fit.

Predictor	*B* (*SE*)	β	*t*	*p*	95% CI
Constant	3.352 (0.037)	-	90.70	<0.001	[3.28, 3.42]
Lifelike Endorsement Scenario Fit	0.500 (0.037)	0.605	13.51	<0.001	[0.43, 0.57]

Notes: B = unstandardized coefficient; β = standardized coefficient; SE = standard error; CI = confidence interval; $R^2 = 0.366$; N = 318.

As such, respondents who reported a higher level of lifelike endorsement scenario fit also tended to perceive the VBE as more credible. This indicates that the

way a VBE is presented may be relevant to how consumers evaluate its credibility. The results therefore provide support for H2.

5.3. Visual Identity Fit and Perceived Credibility (H3)

Table 7 shows the results of a one-way ANOVA conducted to examine whether perceived credibility differed across levels of visual identity fit. Visual identity fit was categorized into low, middle, and high groups. The analysis showed a significant difference in perceived credibility across the three groups, $F(2, 315) = 11.438$, $p < 0.001$.

Tukey HSD post-hoc tests further showed that the low visual identity fit group reported significantly lower perceived credibility than both the middle group (MD = −0.458, SE = 0.114, $p = 0.0001$) and the high group (MD = −0.615, SE = 0.166, $p = 0.001$). Yet, the difference between the middle and high visual identity fit groups was not statistically significant (MD = −0.157, SE = 0.170, $p = 0.626$).

These analyses indicate that respondents in the middle and high visual identity fit groups reported higher perceived credibility than those in the low-fit group. However, the difference between the middle- and high-fit groups was not statistically significant. The results therefore provide support for H3.

Table 7. One-Way ANOVA results for perceived credibility.

Source	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	20.362	2	10.181	11.438	<0.001
Within Groups	280.380	315	0.890	--	--
Total	300.742	317	--	--	--

5.4. Cultural Value Fit and Perceived Credibility (H4)

The regression results in Table 8 indicate that cultural value fit was positively associated with perceived credibility (β = 0.613, $p < 0.001$). The unstandardized coefficient indicated that, for each one-unit increase in cultural value fit, perceived credibility increased by an average of 0.607 units (95% CI [0.520, 0.693]). The model yielded an R^2 of 0.375, indicating that cultural value fit explained 37.5% of the variance in perceived credibility. Overall, the findings support H4.

Table 8. Regression results for cultural value fit.

Variable	*B*	*SE*	β	*t*	*p*	95% CI
Constant	1.135	0.165	--	6.879	<0.001	[0.810, 1.460]
Cultural Value Fit	0.607	0.044	0.613	13.784	<0.001	[0.520, 0.693]

5.5. Summary of Hypothesis Testing

Table 9 summarizes the results of the four hypothesis tests. Both measures of perceived age similarity were positively associated with VBE acceptance ($r = 0.553$ and 0.543, $p < 0.001$), supporting H1. Lifelike endorsement scenario fit was posi-

tively associated with perceived credibility (β = 0.605, $p < 0.001$), supporting H2. The one-way ANOVA showed significant differences in perceived credibility across the three visual identity fit groups, $F(2, 315) = 11.438$, $p < 0.001$, supporting H3. Cultural value fit was also positively associated with perceived credibility (β =.613, $p < 0.001$), supporting H4. Overall, the findings support H1-H4 among the middle-aged respondents.

Table 9. Summary of hypothesis testing results.

Hypothesis & Path	Test	Statistic	*p*	Decision
Age Similarity --VBE Acceptance	Pearson Correlation	$r = 0.553$ and 0.543	<0.001	Supported
Lifelike Endorsement Scenario Fit -- Perceived Credibility	Linear Regression	β = 0.605	<0.001	Supported
Visual Identity Fit -- Perceived Credibility	One-Way ANOVA	$F(2, 315) =$ 11.438	<0.001	Supported
Cultural Value Fit -- Perceived Credibility	Linear Regression	β = 0.613	<0.001	Supported

6. Discussion

6.1. VBE Congruence and Consumer Responses

The findings point to a consistent pattern across the four VBE attributes examined in this study: consumer responses were more favourable when the VBE was perceived as fitting the consumer or the endorsement context. Perceived age similarity was positively associated with VBE acceptance, whereas lifelike endorsement scenario fit and cultural value fit were positively associated with perceived credibility. Visual identity fit was also related to credibility, although the relationship was not simply incremental across the three fit levels. Taken together, these results suggest that consumers do not evaluate a VBE only in terms of how realistic or technologically sophisticated it appears. Fit matters. What matters, more specifically, is how the VBE's characteristics correspond to the consumer and to the situation in which the endorsement takes place.

The finding for perceived age similarity suggests that age-related correspondence may be relevant to how middle-aged consumers evaluate VBEs. Perceived age similarity was positively associated with VBE acceptance, and the observed correlations also indicated a positive association with comparative attractiveness. These findings suggest that age similarity may be relevant to consumers' evaluations of a VBE beyond its visual appearance alone. One possible interpretation is that an age representation perceived as familiar or socially relevant may contribute to consumers' acceptance of the endorser. An age-similar VBE may not necessarily be perceived as more attractive simply because it resembles the consumer's age group. Instead, its age representation may make the character appear more familiar and socially relevant, which could make it easier for consumers to accept the VBE as an appropriate endorser. However, the present analyses do not estab-

lish the psychological processes underlying this relationship or demonstrate that the association with acceptance is statistically stronger than the association with comparative attractiveness.

Lifelike endorsement scenario fit points to another aspect of VBE evaluation from the respondents. Its positive association with perceived credibility indicates that the surrounding endorsement situation matters alongside the virtual character itself. A visually convincing VBE may still appear inappropriate if the setting, product use, or behaviour does not fit the consumption context, whereas a presentation that feels familiar and plausible can make the endorsement easier to understand as a whole. Thus, contextual coherence may help consumers reconcile the VBE, the product, and the situation in which the endorsement occurs. This may be especially relevant when consumers encounter virtual endorsers as part of an ordinary online shopping experience rather than simply as novel digital characters. The result shifts attention from the realism of the VBE alone to the realism of the endorsement setting. The study did not, however, measure flow experience directly, so flow remains a possible explanation rather than a tested mechanism.

The visual identity aspect further qualifies the assumption that better visual similitude produces more favourable respondents' responses. The low-fit group reported significantly lower perceived credibility than both the middle- and high-fit groups, while the difference between the middle- and high-fit groups was not significant. This pattern suggests that differences in perceived credibility were not uniform across the three fit groups. However, the non-significant difference between the middle-fit and high-fit groups does not establish that the relationship had reached a threshold or plateau. Once the VBE reached a more acceptable level of visual fit, further increases were not accompanied by a statistically significant difference in perceived credibility. This observed pattern may warrant further investigation into whether visual identity fit has a nonlinear relationship with perceived credibility. Nevertheless, the present group comparisons do not establish such a relationship or demonstrate an uncanny-valley effect. They show, more specifically, that higher visual identity fit did not automatically correspond to higher perceived credibility at every level examined. A further analysis treating visual identity fit as a continuous predictor would be needed to examine the direction and form of this relationship more directly.

Cultural value fit showed the strongest standardized association among the two regression models, which draws attention to the role of cultural congruence in credibility evaluation. When a VBE incorporates values, behavioural cues, or symbolic elements that consumers recognize within their cultural frame of reference, the representation may be easier to interpret as appropriate and coherent. The finding does not imply that the mere presence of cultural elements creates credibility. Rather, their relevance appears to depend on whether they form a representation that fits consumers' existing expectations and points of reference.

From the above views, the four elements provide evidence of associations between the four VBE attributes and the consumer responses examined in this study.

Age similarity was associated with acceptance, while scenario fit, visual identity fit, and cultural value fit were associated with perceived credibility. These findings highlight the relevance of perceived correspondence between the VBE, the consumer, and the endorsement context. However, because the proposed relationships were examined separately rather than through direct comparisons of their relative strengths, the results do not establish that these attributes have statistically distinct evaluative functions. The study therefore considered treating VBE evaluation as a single realism continuum, and different aspects of the VBE appear to become relevant at different points in consumer evaluation.

6.2. Theoretical Implications

This study using VBE research as its context, extends the boundaries of research on brand digital transformation in three respects. First, it moves the discussion beyond a primary focus on younger consumers by examining how middle-aged consumers, as a consumer group in China that has received case, respond to virtual brand endorsers, and this group that has received less attention in this area., respond to VBE Second, it extends the understanding of VBE attribute evaluation by distinguishing different forms of congruence and relating them to different consumer responses, rather than treating VBE evaluation as a single outcome of human-like or realistic design. The findings show that age similarity is associated with VBE acceptance, whereas scenario fit, visual identity fit, and cultural value fit are associated with perceived credibility. Third, the study brings cultural context more directly into the discussion of consumer and VBE congruence. By examining cultural value fit among middle-aged Chinese consumers, it suggests that the relevance of a VBE's values, behavioural cues, and symbolic representation depends partly on the cultural reference points of the consumers for whom the endorsement is intended. Over all, these findings broaden the scope of VBE research by connecting consumer characteristics, VBE attributes, and cultural context within the broader discussion of brand digital transformation.

6.3. Practical Implications

The finding provide several practical considerations for brands developing and deploying VBEs for the various age stage of consumers. First, perceived age similarity should be considered as part of VBE positioning rather than treated as a purely visual design choice. Brands do not necessarily need to reproduce the physical appearance of their target consumers. Instead, they can consider whether the VBE conveys recognisable lifestyle cues, communication styles, and social characteristics that are relevant to the intended audience. Second, the positive association between lifelike endorsement scenario fit and perceived credibility suggests that brands should design the VBE together with the context in which the endorsement takes place. Product demonstrations and promotional interactions may be more effective when they are situated in familiar and plausible consumption settings. The virtual scenario is therefore not simply a backdrop. It forms part

of how the endorsement is interpreted. Third, the visual identity findings suggest that brands may need to take a more measured approach to visual refinement. The significant difference between the low-fit group and both the middle- and high-fit groups, together with the absence of a significant difference between the middle- and high-fit groups, indicates that achieving an appropriate level of visual fit may be more important than continually increasing visual complexity. Design resources can therefore be directed towards maintaining consistency among the VBE's appearance, behavioural presentation, product category, and intended consumer identity.

Last one, but it is important that cultural value fit should be considered as part of the overall VBE representation when the VBE is presented to the intended audience. Adding only recognisable cultural symbols alone may not be sufficient. What matters is whether the VBE's visual presentation, behavioural cues, lifestyle characteristics, and represented values form a coherent whole that fits the audience and the product. In this respect, VBE development involves more than creating an attractive virtual character. It requires brands to bring the character, product, endorsement context, and intended consumer together in a coherent design.

7. Conclusion

This study examines VBE evaluation from the perspective of middle-aged Chinese consumers and identifies several forms of congruence between consumers and virtual brand endorsers. The findings show that these forms of congruence are associated with different aspects of consumer response. Perceived age similarity was positively associated with VBE acceptance, whereas lifelike endorsement scenario fit and cultural value fit were positively associated with perceived credibility. Visual identity fit showed a different pattern: perceived credibility was lower in the low-fit group than in the middle- and high-fit groups, while the difference between the latter two groups was not significant. These findings suggest that VBE evaluation cannot be understood simply in terms of how human-like or technologically realistic a virtual endorser appears. What matters is also how its characteristics correspond with the consumer and the context in which the endorsement is presented.

Last but not least, the findings point to a more contextual understanding of VBE evaluation. Different VBE attributes may serve different functions in consumer evaluation, with age-related similarity relating more closely to acceptance and contextual, visual, and cultural fit relating to perceived credibility. Therefore, creating a VBE involves more than creating a convincing virtual character for a brand's target audience. It also requires considering who the VBE is intended to represent, how the character is presented, and whether its identity and values fit the consumers and consumption context for which it is designed. In this sense, consumer and VBE congruence provides a useful perspective for understanding how VBEs are evaluated in contemporary brand communication.

This paper has several limitations that should be considered when interpreting its results. The first limitation concerns the scope of the sample. The study used middle-aged Chinese consumers as the sample, so these results cannot be applied to younger or older consumer groups and may not be applicable to consumers from different cultural backgrounds. This limitation is particularly relevant to cultural value fit, as consumers from different cultural backgrounds may draw on different reference points when evaluating a VBE. A second limitation concerns the interpretation of the cross-sectional results. Although the results identify statistically significant associations, they do not establish causal relationships or explain the psychological processes underlying these associations. For example, the relationship between perceived age similarity and VBE acceptance does not indicate whether familiarity, social identification, psychological distance, or another factor accounts for the observed association, while the observed association involving cultural value fit does not identify which particular cultural cues contribute most to perceived credibility. Finally, the scope of the consumer responses examined also places a boundary on the interpretation of the results. The study examined VBE acceptance and perceived credibility as the primary consumer responses and therefore does not establish whether the four VBE attributes are also associated with downstream brand-related outcomes, such as brand memory or purchase intention. The empirical results should consequently be understood as evidence concerning consumers' immediate evaluations of the VBE rather than as evidence of broader marketing outcomes.

Based upon these limitations, future research could examine VBE-related congruence across different consumer groups and cultural backgrounds, as well as its potential links to broader consumer and brand-related outcomes. Such research could help clarify whether the relevance of VBE congruence varies across consumer and cultural contexts and whether its effects extend beyond immediate evaluations of the virtual endorser to subsequent consumer responses and brand-related outcomes.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Anderson, K. C., Albinsson, P. A., & Ducarroz, C. (2024). Peer-to-Peer Community on Social Media: An Exploratory Cross-Cultural Study. *Journal of Consumer Behaviour, 23,* 1285-1306. https://doi.org/10.1002/cb.2276

Audrezet, A., & Koles, B. (2023). Virtual Influencer as a Brand Avatar in Interactive Marketing. In C. L. Wang (Ed.), *The Palgrave Handbook of Interactive Marketing* (pp. 353-376). Springer International Publishing. https://doi.org/10.1007/978-3-031-14961-0_16

Baabdullah, A. M., Alalwan, A. A., Algharabat, R. S., Metri, B., & Rana, N. P. (2022). Virtual Agents and Flow Experience: An Empirical Examination of AI-Powered Chatbots. *Technological Forecasting and Social Change, 181,* Article ID: 121772. https://doi.org/10.1016/j.techfore.2022.121772

Bai, S., Cao, L., & Zhou, J. (2025). Is the Anthropomorphic Virtual Anchor Its Optimal Form? An Exploration of the Impact of Virtual Anchors' Appearance on Consumers' Emotions and Purchase Intention. *Journal of Theoretical and Applied Electronic Commerce Research, 20,* Article No. 110. https://doi.org/10.3390/jtaer20020110

Chen, H., & Ren, J. (2024). Can Influencer Persona Increase the Effectiveness of Social Media Video Ads? The Mediating Effect of Consumer Perceptions of Self. *Journal of Theoretical and Applied Electronic Commerce Research, 19,* 2451-2475. https://doi.org/10.3390/jtaer19030118

de Brito Silva, M. J., & de Oliveira Campos, P. (2024). Past, Present, and Future of Avatar Marketing: A Systematic Literature Review and Future Research Agenda. *Computers in Human Behavior: Artificial Humans, 2,* Article ID: 100045. https://doi.org/10.1016/j.chbah.2024.100045

Dondapati, A., & Dehury, R. K. (2024). Virtual vs. Human Influencers: The Battle for Consumer Hearts and Minds. *Computers in Human Behavior: Artificial Humans, 2,* Article ID: 100059. https://doi.org/10.1016/j.chbah.2024.100059

Efendioğlu, B. H. (2024). Digital Consumer Behavior: A Systematic Literature Review. *Prizren Social Science Journal, 8,* 67-80. https://doi.org/10.32936/pssj.v8i1.479

Feng, R., & Ivanov, A. (2023). Does a Generational Gap Exist in Online Shopping Attitudes? A Comparison of Chinese Consumer Generations from the Media System Dependency Perspective. *Telematics and Informatics Reports, 12,* Article ID: 100106. https://doi.org/10.1016/j.teler.2023.100106

Flanagin, A. J., & Metzger, M. J. (2000). Perceptions of Internet Information Credibility. *Journalism & Mass Communication Quarterly, 77,* 515-540. https://doi.org/10.1177/107769900007700304

Franco, P. (2023). Older Consumers and Technology: A Critical Systematic Literature Review. *AMS Review, 13,* 92-121. https://doi.org/10.1007/s13162-023-00256-4

Girish, V., & Pallavi Kumar, S. (2025). Click, Shop, Engage—The Impact of Digital Transformation on FMCG Consumer Behaviour. *International Journal for Multidisciplinary Research, 7,* 1-14. https://doi.org/10.36948/ijfmr.2025.v07i02.42207

Gu, C., & Duan, Q. (2024). Exploring the Dynamics of Consumer Engagement in Social Media Influencer Marketing: From the Self-Determination Theory Perspective. *Humanities and Social Sciences Communications, 11,* Article 587. https://doi.org/10.1057/s41599-024-03127-w

Guo, Y. M., Ng, W. L., Hao, F., Zhang, C., Liu, S.-X., & Aman, A. M. (2023). Trust in Virtual Interaction: The Role of Avatars in Sustainable Customer Relationships. *Sustainability, 15,* Article No. 14026. https://doi.org/10.3390/su151814026

Han, Y., Miao, Y., Sha, H., & Liu, Y. (2024). Exploring Influences of Appearance and Voice Realism of Virtual Humans on Communication Effectiveness in Social Virtual Reality. In *2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)* (pp. 721-722). IEEE. https://doi.org/10.1109/vrw62533.2024.00157

Hyun, H., Thavisay, T., & Lee, S. H. (2022). Enhancing the Role of Flow Experience in Social Media Usage and Its Impact on Shopping. *Journal of Retailing and Consumer Services, 65,* Article ID: 102492. https://doi.org/10.1016/j.jretconser.2021.102492

Jang, Y. J., & Kim, E. (2022). How Self-Identity and Social Identity Grow Environmentally Sustainable Restaurants' Brand Communities via Social Rewards. *Journal of Hospitality & Tourism Research, 48,* 516-532. https://doi.org/10.1177/10963480221140019

Jin, H., & Shi, H. (2026). Can Demographic Homophily Enhance the Effectiveness of Virtual Influencer Marketing? An Experimental Study of Age, Race, and Gender Congru-

ence in Pro-Environmental Campaigns. *International Journal of Human-Computer Interaction*. https://doi.org/10.1080/10447318.2026.2651348

Jin, L., Zhang, Z., & Jing, F. (2023). The Impact of Internet Use in the Digital Age on the Subjective Well-Being of Older Adults—An Empirical Study Based on CGSS2021 Data. *Heliyon, 9,* e21528. https://doi.org/10.1016/j.heliyon.2023.e21528

Khan, A. M., Soroya, S. H., & Mahmood, K. (2024). Impact of Information Credibility on Social Media Information Adoption Behavior: A Systematic Literature Review. *Library Hi Tech, 42,* 261-283. https://doi.org/10.1108/lht-03-2022-0165

Kim, H., & Park, M. (2024). When Digital Celebrity Talks to You: How Human-Like Virtual Influencers Satisfy Consumer's Experience through Social Presence on Social Media Endorsements. *Journal of Retailing and Consumer Services, 76,* Article ID: 103581. https://doi.org/10.1016/j.jretconser.2023.103581

Ma, Y., & Li, J. (2024). How Humanlike Is Enough? Uncover the Underlying Mechanism of Virtual Influencer Endorsement. *Computers in Human Behavior: Artificial Humans, 2,* Article ID: 100037. https://doi.org/10.1016/j.chbah.2023.100037

Małecka, A., Mitręga, M., & Pfajfar, G. (2022). Segmentation of Collaborative Consumption Consumers: Social Identity Theory Perspective. *International Journal of Consumer Studies, 46,* 2445-2465. https://doi.org/10.1111/ijcs.12798

Moriuchi, E., & Moriyoshi, N. (2024). A Cross-Cultural Study on Online Reviews and Decision Making: An Eye-Tracking Approach. *Journal of Consumer Behaviour, 23,* 156-170. https://doi.org/10.1002/cb.2165

Palomba, A. (2020). How High Brand Loyalty Consumers Achieve Relationships with Virtual Worlds and Its Elements through Presence. *Journal of Media Business Studies, 17,* 243-260. https://doi.org/10.1080/16522354.2020.1768637

Qalati, S. A., Vela, E. G., Li, W., Dakhan, S. A., Hong Thuy, T. T., & Merani, S. H. (2021). Effects of Perceived Service Quality, Website Quality, and Reputation on Purchase Intention: The Mediating and Moderating Roles of Trust and Perceived Risk in Online Shopping. *Cogent Business & Management, 8,* Article ID: 1869363. https://doi.org/10.1080/23311975.2020.1869363

Shao, Z. (2026). Dual Congruence in Live-Streaming Commerce: A Mixed-Method to Examine the Role of Virtual Influencers and Live Content on Consumer Purchase Behavior. *Journal of Retailing and Consumer Services, 88,* Article ID: 104546. https://doi.org/10.1016/j.jretconser.2025.104546

Shen, Z. (2024). Shall Brands Create Their Own Virtual Influencers? A Comprehensive Study of 33 Virtual Influencers on Instagram. *Humanities and Social Sciences Communications, 11,* Article No. 177. https://doi.org/10.1057/s41599-024-02698-y

Silva, S. C., De Cicco, R., Vlačić, B., & Elmashhara, M. G. (2023). Using Chatbots in E-Retailing—How to Mitigate Perceived Risk and Enhance the Flow Experience. *International Journal of Retail & Distribution Management, 51,* 285-305. https://doi.org/10.1108/ijrdm-05-2022-0163

Tajfel, H., & Turner, J. C. (1986). The Social Identity Theory of Intergroup Behaviour. In S. Worchel, & W. G. Austin (Eds.), *Psychology of Intergroup Relations* (2nd ed., pp. 7-24). Nelson-Hall.

Wang, L., & Wang, S. (2020). The Influence of Flow Experience on Online Consumers' Information Searching Behavior: An Empirical Study of Chinese College Students. *Data and Information Management, 4,* 250-257. https://doi.org/10.2478/dim-2020-0043