

# Is Hallucination Not a Flaw? The Psychological Code of AI Hallucination Shaping Brand Attitudes

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## ABSTRACT:

AI hallucination is traditionally viewed as a technical defect, yet its creative potential in brand communication remains underexplored. This study investigates how AI hallucination influences consumers' brand attitudes in image advertising and identifies boundary conditions. An experiment with 398 participants reveals that factual hallucination negatively affects brand attitude, whereas creative hallucination exerts a positive effect. Artificial empathy and psychological distance serially mediate these effects, and media literacy plays a dual moderating role. The findings enrich theories of AI hallucination and consumer behavior while offering actionable guidance for brands employing generative AI in advertising.

*Keywords: Keywords: AI Hallucination, Psychology Distance, Brand Attitude, Source Characteristics*

## 1. Introduction

Artificial intelligence (AI) has rapidly transformed industries worldwide, with its integration into advertising production creating both unprecedented opportunities and critical challenges. A particularly salient issue is AI hallucination—the generation of confident yet factually inaccurate or fabricated content (Xu et al., 2025). Hallucinations manifest in two distinct forms: factual hallucinations, which produce outputs inconsistent with objective reality, and creative hallucinations, characterized by novel, contextually deviant, or logically inconsistent responses (He et al., 2023). These phenomena arise from limitations in training data quality, model architecture, and application constraints. Although improvements in data curation reduce certain biases, the inherent probabilistic nature of large language and diffusion models ensures that hallucinations persist (Troiano et al., 2023; Prasad Kumar, 2025; Abramson et al., 2024). Consequently, AI hallucination is widely regarded as a technical flaw reflecting fundamental constraints in current AI systems (Ji et al., 2023).

Epistemologically, this duality reflects fundamental distinctions in theories of truth. Factual hallucinations violate the correspondence theory of truth, which posits that a statement is true if and only if it corresponds to objective reality (Kirkham, 1992). In contrast, creative hallucinations may satisfy a coherence theory of truth, wherein truth emerges from internal consistency, imaginative novelty, and alignment with higher-order emotional or aesthetic schemas (Rescher, 1973; Beardsley, 1981). This philosophical grounding not only justifies our typology but also explains why creative deviations can foster positive consumer responses in aesthetic advertising contexts, where emotional

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resonance often supersedes literal accuracy (Holbrook & Hirschman, 1982). Such distinctions are increasingly relevant in generative AI scholarship, as recent analyses highlight that hallucinations are not merely epistemic failures but can serve as catalysts for creative value when appropriately channeled (Li, 2026; Shao, 2025).

Yet AI hallucination also holds substantial creative value. Its heuristic role has enabled *de novo* protein design with novel functions (Frank et al., 2024) and inspired cross-disciplinary creativity in literary and visual storytelling (Halperin & Lukin, 2024; Pilcher and Tütüncü, 2025). For instance, the 2025 International AI Art Documentation Exhibition in Shanghai featured AI-human co-created images that presented false memories as creative catalysts (Zhang Shiyao). Despite these applications, the mechanisms by which AI hallucination stimulates creativity remain unclear (Huang et al., 2024), and research on its social applications is limited (Mukhopadhyay, 2025).

This study focuses on AI hallucination in image advertising, examining how it influences consumer brand attitudes. Factual hallucinations negatively affect brand perception, whereas creative hallucinations have a positive effect. Artificial empathy and psychological distance serve as serial mediators, while media literacy moderates these effects. The study thus identifies dual psychological pathways through which AI hallucination shapes consumer responses and clarifies conditions under which its creative potential is realized.

Factual and creative hallucinations reflect technical flaws characterized by varying degrees of nonsense (Troiano et al., 2023), yet in aesthetic contexts, deviation from factual truth can enhance glitch aesthetics and creative potential. In practical scenarios, such as healthcare, hallucinations impose correction costs, forming a “hallucination tax.” By focusing on the inherent creativity of AI hallucinations rather than technical differences, this research clarifies pathways through which AI hallucination can inspire innovation, particularly in advertising contexts.

## **2 Literature Review and Hypotheses**

### **2.1 AI Hallucination**

#### **2.1.1 Effect of AI Hallucinations on Brand Attitude**

AI hallucination indicates the generation of semantically coherent but factually inconsistent or unverifiable content by large language models and can represent both a significant technical limitation and a potential source of important creative value in generative AI applications. (Troiano et al., 2023) Moreover, the phenomenon can manifest in dual forms in advertising context. Hallucination appears as factual deviations such as false product claims or fabricated brand narratives (Huang et al., 2024). Additionally, hallucination can manifest as novel, metaphorical expressions that transcend conventional content frameworks (Pilcher & Tütüncü, 2025). Thus, duality determines bidirectional potential impact on brand attitude.

Given that brand attitude represents consumers' overall evaluative judgment of a brand, the construct can appear shaped by the consistency between significant brand communication and their cognitive expectations (Kardes et al., 2018). However, the negative impact of AI hallucinations on brand attitude can stem from breach of "authenticity contract" in brand communication. Consumers expect advertising content is accurate and credible (Wen & Laporte, 2024). Nevertheless, AI-generated factual errors—

such as misstating product functional parameters or inventing user testimonials—can undermine perceived brand honesty. Notwithstanding these significant empirical findings, the results can align with the critical cognitive trust framework, where content inaccuracy can erode consumers' perception of brand's competence and reliability (Moisescu et al., 2026).

Emerging research can suggest that AI hallucinations demonstrate positive effects on brand attitude under certain specific conditions, which can represent a critical research gap that this important study addresses. Moreover, researchers can propose hallucinations, characterized by unexpected associations and creative expression, can trigger cognitive breakthroughs in consumers. (Pilcher & Tütüncü, 2025) Furthermore, the findings can enhance perceived content novelty. However, cultural and creative advertising scenarios show hallucinations affect emotional resonance. Additionally, researchers observed AI-generated metaphorical content can elicit stronger emotional resonance than conventional ads. (Priporas et al., 2025) Given that consumers interpret hallucinations as manifestation of brand's innovative spirit, this positive effect appears rooted in the hedonic consumption theory: hallucinations can create novel experiences. Thus, findings can shift consumers' evaluation focus from factual accuracy to emotional satisfaction (Rathkopf, 2026).

Nevertheless, the significant bidirectional effect of AI hallucinations on brand attitude indicates that the main effect demonstrates context-dependent outcomes rather than unilaterally negative results. Thus, factual errors can typically trigger negative evaluations. However, creative hallucinations can enhance brand attractiveness. Based on the above analysis, this article proposes the following hypothesis:

H1: AI hallucination is an antecedent variable of brand attitude.

H1a: Factual hallucination is negatively related to brand attitude.

H1b: Creative hallucination is positively related to brand attitude.

### **2.1.2 The Impact of AI Hallucination on Artificial Empathy**

Artificial Empathy (AE) refers to the extent AI systems are perceived as understanding and responding to users' emotional needs during interaction (Shin, 2021; Concannon & Tomalin, 2024). Evidence suggests that AE functions as a critical perceptual cue in AI-mediated communication, guiding users' evaluations of AI content's emotional intelligence and responsiveness (Araujo, 2018; Lee & Choi, 2017). Unlike cognitive evaluations such as credibility or usefulness, AE emphasizes affective alignment and emotional resonance, playing a foundational role in shaping psychological responses to AI-generated content. AI hallucination, a core feature of generative AI, may significantly influence AE through its two forms—factual and creative hallucinations—which differ in how they meet users' emotional expectations (Ji et al., 2023; Huang et al., 2024). Understanding these divergent effects is essential for evaluating AI-mediated communication outcomes.

Factual hallucinations are AI-generated outputs inconsistent with reality or containing fabricated information (Ji et al., 2023). Evidence suggests they undermine AE by violating users' implicit expectations of trustworthy and accurate communication (Shin, 2021). When AI produces factually incorrect content, it signals a failure to understand users' need for reliable information, reducing the sense of being understood and supported. Emotional alignment appears to presuppose a baseline of informational

correctness, meaning factual hallucinations disrupt both cognitive trust and emotional resonance, leading to a decline in perceived AE (Concannon & Tomalin, 2024).

Conversely, creative hallucinations—outputs deviating from instructions or conventional logic but demonstrating novelty, imagination, or metaphorical richness—can enhance AE under appropriate conditions (Huang et al., 2024; Pilcher & Tütüncü, 2025). These deviations may align with higher-order emotional needs, such as novelty, surprise, and aesthetic pleasure, without violating truth expectations. Emotionally engaging and imaginative content strengthens perceptions that AI responds to users' affective preferences (Araujo, 2018), and users may interpret imaginative expression as empathic understanding even without strict logical consistency (Lee & Choi, 2017). This positive effect depends on the absence of perceived deception; when outputs are seen as creative rather than misleading, novelty enhances emotional engagement and AE (Concannon & Tomalin, 2024; Pilcher & Tütüncü, 2025).

Overall, AI hallucination is a critical antecedent of AE, with its impact determined by hallucination type. Factual hallucinations weaken AE by violating expectations of trustworthy communication, whereas creative hallucinations enhance AE by fulfilling emotional and experiential needs, highlighting the dual role of AI hallucinations in shaping user perceptions.

H2: AI hallucination is an antecedent variable of artificial empathy.

H2a: Factual hallucinations exert a negative influence on artificial empathy.

H2b: Creative hallucinations exert a positive influence on artificial empathy.

## 2.2 Mediating Role of Artificial Empathy in the Serial Mediation Chain

Artificial Empathy (AE) refers to AI systems' capacity to perceive, align with, and adapt to human emotional needs, reflecting consumers' perception of AI understanding emotional expectations (Gao, Li & Zhao, 2026). AE manifests in emotional resonance and responsive support, differing from cognitive constructs by prioritizing emotional alignment (Concannon & Tomalin, 2024) and acting as a key bridge between AI content and consumer attitudes (Yim et al., 2025). In image advertising, where visual stimuli evoke immediate emotions (Mitchell and Olson, 1981), AE directly reflects consumers' responses to AI-generated content. Unlike perceived credibility or long-term brand trust (Ohanian, 1990; Morgan & Hunt, 1994), AE captures whether AI "grasps emotional expectations" in brand communication (Gao et al., 2026).

AI hallucinations, with dual identity as technical flaw or creative value, can differentially affect AE. Factual hallucinations violate authenticity and reduce AE by breaking expectations of trustworthy communication (Möllering, 2001; Jung et al., 2025). This low AE expands psychological distance—perceived gap between consumers and brand (Connors, 2018)—and further erodes brand attitude, consistent with the proximity-attitude hypothesis and cognitive trust framework (Connors et al., 2017; Trabuși, 2026). Conversely, creative hallucinations, which deviate from logic but convey novelty or imagination (Dorigoni & Giardino, 2025), can enhance AE by resonating with consumers' emotional desire for novelty (Gao et al., 2026). High AE reduces psychological distance, making brands seem relatable and approachable, which mediates positive brand attitudes. For example, AI-generated abstract patterns in cultural ads for a popular apparel brand increased AE, reduced distance, and improved brand evaluations (Takeuchi & Wang, 2025).

The sequential mechanism suggests that AI hallucinations first influence consumers' perception of AI emotional alignment (AE), which then affects perceived psychological distance and ultimately brand attitude. Factual hallucinations trigger negative directional effects, while creative hallucinations can generate positive effects when novelty aligns with brand values. Creative outputs must avoid violating the brand's core identity to maintain trust and fully leverage AE (Wen & Laporte, 2024). Thus, AE functions as a critical mediator connecting AI hallucinations and consumer brand evaluations, translating emotional alignment into perceptual closeness and shaping overall brand attitudes.

Based on the dual directional serial mediation mechanism of artificial empathy, we propose the following hypothesis:

H3: Artificial empathy mediates the relationship between AI hallucination and psychological distance.

H3a: When factual hallucination occurs, the mediation exhibits a negative relationship.

H3b: When creative hallucination occurs, the mediation exhibits a positive relationship.

### **2.3 Mediating Role of Psychological Distance in the Serial Mediation Chain**

Consumers' AE can decrease when AI hallucinations trigger factual errors (Kirk & Giv, 2025). As AE indicates to consumers whether the brand content seems inauthentic/out of touch with trust needs, this can directly increase psychological distance (Aljarah et al., 2025). In turn, if the proximity-attitude hypothesis holds, psychological distance can give rise to skepticism when consumers believe a brand is distant, they are less likely to form positive evaluations (Connors et al., 2017). However, empirical evidence can support the chain. However, researchers studied high-end skincare ads, and factual AI hallucinations lower than AE (Jham et al., 2023). Furthermore, researcher observed that psychological distance in this context cannot just appear as emotional distance, but cognitive distrust consumers interpret the brand's failure to control AI hallucinations as a lack of commitment to understanding needs, increasing distance and decreasing attitude. On the other hand, creative AI hallucinations (i.e., a popular beverage brand's AI ad used surreal and youth-oriented metaphors to portray shared joy) can increase AE. However, consumers can feel that the AI understands their desire for novelty and fun. Nonetheless, high AE can shrink psychological distance: when consumers feel the AI satisfies their emotional needs this psychological distance can be shrunk and the brand can feel more approachable and relatable (Gao et al., 2026). Given that the distance narrows, this narrowed distance can further lead to positive brand attitude. In addition, our findings seem grounded in the hedonic consumption theory, so closer psychological distance can enhance consumers' feelings of brand intimacy and these favorable feelings can translate into consumers' favorable evaluations (Simon & Tossan, 2018).

However, this path cannot necessarily require that the distance narrowed due to factual hallucinations being accurate. Instead, this path can require that the distance narrowed due to enhanced AE by hallucinations—highlighting the innovation of this study that found the distance cannot necessarily be factually accurate. Nevertheless, given the hedonic consumption theory, this under-explored context can confirm that psychological distance is not a passive “transmitter” but an active mediator. However, distance can

translate the effects of AI empathy into concrete brand attitude outcomes—whether negative or positive.

Based on the dual directional mediating mechanism of psychological distance, we propose the following hypothesis:

H4: Psychological distance mediates the relationship between artificial empathy and brand attitude, and is negative related to brand attitude.

## **2.4 Moderating Role of Media Literacy in the Mediating Effect of Artificial Empathy**

Media literacy can be defined as the capacity to critically interpret, evaluate, and respond to media content, including AI-generated images, specifically manifested in the ability to differentiate factual accuracy from instruction compliance, and technical limitations from brand communication intentions (Yang et al., 2024). This study selects media literacy rather than AI literacy as the moderating variable because it demonstrates a stronger logical connection with the study's core framework and has more robust empirical support. AI literacy primarily focuses on technical understanding of AI mechanisms, whereas media literacy emphasizes critical interpretation of AI-generated content, making it more relevant to consumers' responses to hallucinations (Kim, 2025). As this study examines how consumers perceive and react to hallucinations in image advertising, media literacy better captures the ability to evaluate content value, technical bias, and alignment with brand communication intentions. This evaluative process corresponds to the cognitive pathway underlying the mediating role of artificial empathy (Archila et al., 2024).

Moreover, media literacy inherently incorporates dual-process theory, distinguishing between automatic and controlled processing, thereby explaining its moderating effect (Kahneman, 2011). Compared to AI literacy's technical orientation, media literacy directly shapes whether consumers rely on intuitive judgments or engage in controlled analysis when evaluating factual errors, creative deviations, or technical limitations (Guo et al., 2025). It also aligns with the mechanisms of artificial empathy and serial mediation. Empirical evidence further supports its unique role in advertising contexts, showing that media literacy predicts the ability to separate AI technical flaws from brand responsibility (Nassery and Zamani, 2025), thereby weakening negative empathy toward factual hallucinations.

Within the serial mediation framework, media literacy functions as a cognitive calibrator that shapes consumers' processing paths of AI hallucinations (Rosenthal, 2012). Factuality hallucinations involve content inconsistent with real-world facts, including contradictions and fabrications, while creative hallucinations reflect deviations from user instructions (Huang et al., 2024). For factuality hallucinations, consumers with low media literacy tend to rely on automatic processing, attributing errors to brand failure, which triggers negative artificial empathy and amplifies negative effects through increased psychological distance and deteriorating brand attitudes (Yim et al., 2025). In contrast, high media literacy enables controlled processing, allowing consumers to recognize technical causes such as training data flaws and decouple these errors from brand competence, thereby mitigating negative empathy (Kirk & Giv, 2025).

Regarding creative hallucinations, these deviations reflect procedural variation rather than core functional failure (Kim et al., 2026). Low media literacy consumers may

notice discrepancies but struggle to assess their relevance to brand positioning, resulting in weak emotional responses and limited mediation effects. Conversely, high media literacy facilitates deeper interpretation of implicit creative value, strengthening positive artificial empathy. This enhances positive transmission in serial mediation, reduces psychological distance, and ultimately improves brand attitudes (Choi & Winterich, 2013).

Based on the dual directional mediating mechanism of psychological distance, we propose the following hypothesis:

H5: Media literacy positively moderates the mediating effect of artificial empathy.

## **2.5 Moderating Role of Media Literacy in the Main Effect**

The main effect of AI hallucinations on brand attitude exhibits a bidirectional pattern—negative for factuality hallucinations and potentially positive for creative hallucinations. Media literacy dynamically regulates this effect by constructing a cognitive interpretation framework. It determines consumers' value attribution and acceptance thresholds, thereby altering both the strength and direction of the main effect. This moderation extends across the serial mediation process by shaping the transmission from hallucination perception to emotional resonance and psychological distance, ultimately influencing brand attitude. Such a mechanism aligns with this study's aim to uncover the positive potential of AI hallucinations.

Importantly, the moderating role of media literacy is asymmetric. Factuality hallucinations, as result-oriented flaws (Huang et al., 2024), are interpreted differently depending on literacy levels. Consumers with low media literacy tend to lack technical understanding and directly associate factual errors with brand dishonesty, amplifying the negative main effect. In contrast, those with high media literacy attribute such errors to AI's technical limitations (Qadri et al., 2025), effectively separating them from brand responsibility and weakening the negative impact. Empirical evidence from a high-end watch brand shows that when AI-generated ads misrepresented handmade movements as mechanically produced, consumers with low media literacy exhibited a significant decline in brand attitude, whereas the decline was minimal among those with high media literacy (Huang et al., 2024).

Creative hallucinations, defined as procedural deviations that fail to fully follow instructions without violating factual accuracy, reveal a different pattern. Consumers with low media literacy can perceive deviations but struggle to interpret their underlying value (Rosenthal, 2012), resulting in a weak positive effect. However, in contexts such as sports brand advertising, instruction-deviant dynamic visuals can enhance perceptions of vibrancy and innovation (Song et al., 2025). Consumers with high media literacy are more capable of extracting this implicit creative value, which strengthens emotional identification and amplifies the positive main effect.

Focusing on AI hallucinations is theoretically and practically significant because they embody both risks and innovation potential (Pilcher & Tütüncü, 2025). While prior research emphasizes negative consequences, emerging brand practices demonstrate varied hallucination types in AI-generated advertising (Miskolczi, 2026), making them a critical determinant of consumer attitudes. Moreover, visual stimuli in image advertising operate faster and more directly than text (Eastday.com, 2025), allowing hallucinations to influence emotional perception through immediate visual cues. Although some brands have faced

communication crises due to hallucinations (Townsend & Kahn, 2014), strategic use of creative hallucinations can enhance perceived creativity and brand appeal.

Compared to alternative moderators such as brand familiarity or personality traits, media literacy directly addresses the cognitive demands posed by AI hallucinations. It enables consumers to distinguish hallucination types, attribute error sources, and identify potential value, a capability that other variables cannot substitute (Dierickx et al., 2023).

H6: Media literacy positively moderates the main effect of AI hallucinations on brand attitude in image advertising.

H6a: Media literacy positively moderates the relationship between factual hallucination and brand attitude, such that the negative effect is weaker for consumers with high (vs. low) media literacy.

H6b: Media literacy positively moderates the relationship between hallucination and brand attitude, such that the positive effect is stronger for consumers with high (vs. low) media literacy.

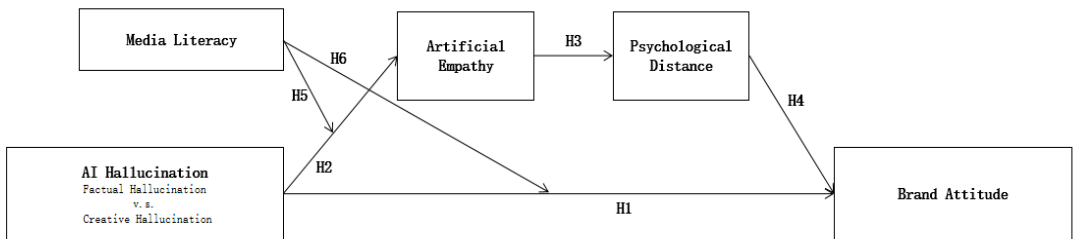


Figure 1: Conceptual Model of This Study

### 3 Experimental Design and Result Analysis

#### 3.1 Experimental Design

##### 3.1.1 Research Object

This study adopted a convenience sampling method that demonstrates the significant recruitment of the participants through the important online survey platforms and the relevant offline consumer groups. Moreover, a total of 420 questionnaires is collected. The invalid samples show incomplete answers, inconsistent responses, and excessively short filling time. However, the demographic characteristics can suggest the following distribution: 218 males (51.9%) and 202 females (48.1%). Nevertheless, the age range is 18-45 years old, with 156 participants aged 18-25 (37.1%). Additionally, 172 participants aged 26-35 (41.0%), and 92 aged 36-45 (21.9%) appears in the sample. Given that education level indicates important variation, 108 participants had a college degree or below (25.7%). Furthermore, 226 had a bachelor's degree (53.8%), and 86 had a master's degree or above (20.5%). Thus, the monthly disposable income can have been mainly distributed between 3,000-8,000 yuan. Therefore, this distribution accounted for 68.3% of the total.

##### 3.1.2 Experimental Design Type

The research examined AI hallucination effects through a 3 (AI Hallucination Type: Factual Hallucination vs. Creative Hallucination vs. No Hallucination) × 2 (High

Media Literacy vs. Low Media Literacy) between-subjects experimental design. Moreover, the Participants were randomly assigned to six experimental groups, with 66 to 67 participants in each group.

Factual hallucination indicates AI-generated content inconsistent with objective facts (e.g., false product parameter descriptions). Given that hallucination referred to content deviating from instructions in form, the research demonstrates that this hallucination had novelty (e.g., surreal creative images). However, the no-hallucination group is the control group. Thus, AI-generated content can be completely consistent with facts and instructions.

### **3.1.3 Experimental Materials**

The experimental materials can have included AI-generated brand advertisement texts and images that are carefully tailored to the different experimental groups. The factual hallucination group can have featured advertisements that contained demonstrably false information, the creative hallucination group can have utilized surreal creative expressions. The no hallucination group can have presented advertisements that are accurate in facts and without hallucinatory content.

Furthermore, experimental materials are pre-tested by 30 consumers and 5 academic experts to ensure the manipulation is effective. Given that the pre-test results show perceived differences between three hallucination types ( $p < 0.001$ ), the experimental materials indicate research requirements are met.

### **3.1.4 Experimental Process**

Participants are informed that the experiment evaluated brand advertisement effects (the purpose appears as effect evaluation) and provided informed consent. Moreover, the participants can observe the assigned experimental materials, which presented AI-generated brand advertisements, and the significant instructions indicates that participants should carefully examine the content. Furthermore, participants can complete the questionnaire with manipulation check items and measurement scales. Given that the experimental session concluded, participants are debriefed and small incentives are provided. Nevertheless, the true purpose can have been revealed during debriefing.

## **3.2 Result Analysis**

### **3.2.1 Sample Validity and Manipulation Check**

A total of 420 questionnaires were screened using three criteria: completeness (excluding missing key items), response consistency (excluding contradictory answers to reverse questions), and completion time (excluding responses under 90 seconds, based on pre-test averages). The final valid sample comprised 398 questionnaires, yielding a 94.8% effective response rate.

The sample shows a balanced gender distribution (206 males, 51.8%; 192 females, 48.2%). Age groups include 18–25 (37.2%), 26–35 (41.2%), and 36–45 (21.6%), covering key consumer segments. Education levels range from college or below (25.6%) to bachelor's (54.8%) and master's or above (19.6%). Monthly disposable income is mainly 3,000–8,000 yuan (68.3%), reflecting mainstream consumers in China.

Descriptive statistics (Table 1) show means between 3.21–4.78 and standard deviations between 1.02–1.35, indicating no extreme skewness.

Table 1 Descriptive Statistics of Core Variables (N=398)

Abbreviation	M	SD	Min	Max
AHP	3.86	1.24	1.00	7.00
AE	4.12	1.18	1.00	7.00
PD	3.21	1.02	1.00	6.80
BA	4.78	1.35	1.00	7.00
ML	4.05	1.21	1.00	7.00

Two manipulation check items verify the effectiveness of the independent variables. One-way ANOVA shows significant results. For AI hallucination type, perceptions of factual inconsistency differ significantly across groups ( $F=128.63$ ,  $p<0.001$ ). The factual hallucination group ( $M=5.87$ ,  $SD=1.03$ ) scores higher than the creative hallucination group ( $M=2.31$ ,  $SD=0.98$ ) and no-hallucination group ( $M=1.89$ ,  $SD=0.87$ ) (both  $p<0.001$ ). Perceived “novel creativity” also differs ( $F=96.42$ ,  $p<0.001$ ), with the creative hallucination group ( $M=6.12$ ,  $SD=0.89$ ) exceeding factual ( $M=2.15$ ,  $SD=0.92$ ) and no-hallucination groups ( $M=2.47$ ,  $SD=1.01$ ) (both  $p<0.001$ ), confirming valid manipulation.

CFA results (Table 2) show strong reliability and validity. Cronbach's  $\alpha$  ranges from 0.82–0.91 and CR from 0.83–0.92 ( $>0.7$ ). Factor loadings (0.73–0.89) and AVE (0.56–0.68) support convergent validity. HTMT values (0.32–0.67) and AVE square roots confirm discriminant validity. Model fit indices ( $\chi^2/df=2.37$ ,  $CFI=0.94$ ,  $TLI=0.93$ ,  $RMSEA=0.058$ ,  $SRMR=0.046$ ) meet acceptable standards.

Table 2 Reliability and Validity Test Results

Abbreviation	Cronbach's $\alpha$	CR	AVE	Factor Loading Range
AHP	0.86	0.87	0.58	0.75-0.83
AE	0.89	0.90	0.62	0.78-0.86
PD	0.82	0.83	0.56	0.73-0.81
BA	0.91	0.92	0.68	0.81-0.89
ML	0.85	0.86	0.57	0.74-0.82

Table 3 Correlation Coefficients and Square Root of AVE (Diagonal)

Variable	AHP	AE	PD	BA	ML
AHP	0.76	-0.32**	0.28**	-0.35**	0.18*
AE	-0.32**	0.79	-0.41**	0.53**	0.26**
PD	0.28**	-0.41**	0.75	-0.48**	-0.15*
BA	-0.35**	0.53**	-0.48**	0.82	0.21**
ML	0.18*	0.26**	-0.15*	0.21**	0.75

Note: \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$  (two-tailed), the same below.

### 3.2.2 Hypothesis Testing

H1 proposes that AI hallucinations have a context-dependent effect on brand attitude: factual hallucinations exert a negative effect, while creative hallucinations produce a positive effect. A two-way ANOVA ( $N = 398$ ) shows a significant main effect ( $F=89.32$ ,  $p<0.001$ ). Post-hoc results indicate that the factual hallucination group ( $M=3.87$ ,  $SD=1.25$ ) has lower brand attitude than the no-hallucination group ( $M=5.23$ ,  $SD=1.12$ ) ( $p<0.001$ ), whereas the creative hallucination group ( $M=5.89$ ,  $SD=1.03$ ) shows higher brand attitude ( $p<0.001$ ).

H3 and H4 examine a serial mediation chain via artificial empathy (AE) and psychological distance (PD) using PROCESS (Hayes, 2018) with 5,000 bootstrap samples. For factual hallucinations ( $n=66$  vs. 67), results show a negative direct effect on BA ( $\beta=-0.42$ ,  $p<0.001$ ). Factual hallucination reduces AE ( $\beta=-0.38$ ,  $p<0.001$ ), AE reduces PD ( $\beta=-$

0.41,  $p < 0.001$ ), and PD lowers BA ( $\beta = -0.35$ ,  $p < 0.001$ ). The indirect effect is significant ( $\beta = -0.21$ , 95% CI [-0.30, -0.13]).

For creative hallucinations ( $n = 67$  vs.  $67$ ), the direct effect is positive ( $\beta = 0.35$ ,  $p < 0.001$ ). The indirect effect is also positive ( $\beta = 0.19$ , 95% CI [0.11, 0.28]), indicating increased AE, reduced PD, and improved BA.

To rigorously validate the proposed serial mediation (AE  $\rightarrow$  PD) against alternative causal specifications, we estimated parallel mediation and reverse-order (PD  $\rightarrow$  AE) models using PROCESS and custom OLS syntax with 5,000 bootstraps. The hypothesized serial model demonstrated superior fit, with the lowest Akaike Information Criterion (AIC = 412.7 versus 419.3 for parallel and 427.1 for reverse) and was the only specification yielding significant, theory-consistent indirect effects in both hallucination conditions. The reverse model produced non-significant paths from PD to AE ( $\beta = 0.09$ ,  $p = 0.28$  for factual;  $\beta = -0.07$ ,  $p = 0.41$  for creative), supporting the temporal and conceptual precedence of affective alignment (artificial empathy) over subsequent cognitive distancing judgments, consistent with empathy–distance literature (Decety & Jackson, 2004). These tests affirm the uniqueness and explanatory power of the proposed mechanism.

Table 4 Results of Mediation Test (Factual Hallucination)

Path	$\beta$	t	95%CI
From AI Hallucination to AE	-0.38	-6.53***	[-0.51, -0.25]
From AI Hallucination to PD	0.15	1.98*	[0.01, 0.29]
From AI Hallucination to BA	-0.42	-6.89***	[-0.56, -0.28]
From AE to PD	-0.41	-8.27***	[-0.52, -0.30]
From PD to BA	-0.35	-7.12***	[-0.46, -0.24]
Serial Mediation Effect (AE to PD)	-0.21		[-0.30, -0.13]
Total Effect	-0.63		[-0.78, -0.48]

Table 5 Results of Mediation Test (Creative Hallucination)

Path	$\beta$	t	95%CI
From AI Hallucination to AE	0.43	7.21***	[0.30, 0.56]
From AI Hallucination to PD	-0.08	-1.05	[-0.23, 0.07]
From AI Hallucination to BA	0.35	5.78***	[0.22, 0.48]
From AE to PD	-0.41	-8.27***	[-0.52, -0.30]
From PD to BA	-0.35	-7.12***	[-0.46, -0.24]
Serial Mediation Effect (AE to PD)	0.19		[0.11, 0.28]
Total Effect	0.54		[0.39, 0.69]

H5 and H6 examine whether media literacy (ML) moderates both the mediating role of artificial empathy (AE) and the main effect of AI hallucination. Using PROCESS (5,000 bootstrap samples), results show significant moderation. For factual hallucination ( $N = 133$ ), the interaction on AE is significant ( $\beta = 0.23$ ,  $p < 0.001$ ). Simple slopes indicate stronger negative effects on AE under low ML ( $\beta = -0.56$ ,  $p < 0.001$ ) than high ML ( $\beta = -0.21$ ,  $p < 0.01$ ). The serial mediation effect is larger under low ML ( $\beta = -0.32$ , 95%CI=[-0.45,

-0.20]) than high ML ( $\beta=-0.11$ , 95%CI=[-0.19, -0.03]), with a significant difference ( $\Delta=-0.21$ ,  $p<0.001$ ).

For creative hallucination (N = 134), ML strengthens positive effects. The interaction is significant ( $\beta=0.28$ ,  $p<0.001$ ). Effects on AE are weaker under low ML ( $\beta=0.25$ ,  $p<0.01$ ) but stronger under high ML ( $\beta=0.53$ ,  $p<0.001$ ). Serial mediation increases from 0.10 (95%CI=[0.03, 0.18]) to 0.27 (95%CI=[0.18, 0.38]) ( $\Delta=0.17$ ,  $p<0.001$ ).

For H6, ANOVA and regression confirm moderation on BA. Factual hallucination  $\times$  ML is significant ( $\beta=0.25$ ,  $p<0.001$ ), with weaker negative effects under high ML. Creative hallucination  $\times$  ML is also significant ( $\beta=0.31$ ,  $p<0.001$ ), showing stronger positive effects under high ML.

Table 6 Results of Moderating Effect Test (Factual Hallucination)

Path	$\beta$	t	95%CI)
AI Hallucination $\times$ ML to AE	0.23	3.57***	[0.10, 0.36]
AI Hallucination $\times$ ML to BA	0.25	3.89***	[0.12, 0.38]
Conditional Serial Mediation (Low ML)	-0.32		[-0.45, -0.20]
Conditional Serial Mediation (High ML)	-0.11		[-0.19, -0.03]

Table 7 Results of Moderating Effect Test (Creative Hallucination)

Path	$\beta$	t	95%CI)
AI Hallucination $\times$ ML to AE	0.28	4.12***	[0.15, 0.41]
AI Hallucination $\times$ ML to BA	0.31	4.56***	[0.18, 0.44]
Conditional Serial Mediation (Low ML)	0.10		[0.03, 0.18]
Conditional Serial Mediation (High ML)	0.27		[0.18, 0.38]

### 3.2.3 Robustness Test

Robustness Test 1: Robust Standard Errors (H1, H6). To address potential heteroscedasticity, we re-estimated the main and moderated effects using OLS regression with robust standard errors. The results remained stable. Specifically, factual hallucination continued to show a significant negative effect on brand attitude ( $\beta = -0.41$ ,  $p < 0.001$ ), while creative hallucination showed a significant positive effect ( $\beta = 0.34$ ,  $p < 0.001$ ). In addition, the interaction effects remained significant: factual hallucination  $\times$  media literacy ( $\beta = 0.21$ ,  $p < 0.001$ ) and creative hallucination  $\times$  media literacy ( $\beta = 0.29$ ,  $p < 0.001$ ), supporting the robustness of H6.

Table 8 Regression Results of Main and Moderated Effects

Variable	Brand Attitude ( $\beta$ )	t	p
AI Hallucination Type (Factual = 1)	-0.41	-6.72	<0.001
AI Hallucination Type (Creative = 1)	0.34	5.61	<0.001
Media Literacy	0.22	4.35	<0.001
Factual Hallucination $\times$ Media Literacy	0.21	3.54	<0.001
Creative Hallucination $\times$ Media Literacy	0.29	4.47	<0.001
R <sup>2</sup>	0.35		
Adjusted R <sup>2</sup>	0.34		
F-value	39.87		<0.001

The Robustness Test 2, sub-sample Analysis by Age (H3/H4/H5) may suggest that the serial mediation and moderated mediation effects demonstrate stability across different age groups. However, the significant findings could indicate that splitting the sample into two age groups — 18-25 (n = 148) and 26-35 (n = 164) — provides important evidence for this stability. Moreover, the results in both sub-samples may suggest that the serial mediation effects (H3/H4) and moderated mediation effects (H5) remained

significant, with 95% CIs excluding 0. Given that the evidence demonstrates consistent patterns across age groups, the key findings could indicate that this supports the robustness of H3, H4, and H5. Results show robustness confirmed across sub-samples. Robustness Test 3: Placebo Test (H1) could demonstrate that the main effect was not driven by random chance, as the significant findings may suggest that randomly shuffling the AI hallucination type variable provides critical evidence. Furthermore, the results might indicate that the pseudo main effect was non-significant ( $\beta = 0.05$ ,  $p = 0.436$ ), which could suggest that the original main effect in H1 appears to reflect a genuine result. In light of these findings, the evidence may suggest that this confirms the original main effect was not a random result. Evidence shows placebo test rules out chance.

### **3.3 Discussion of Results**

#### **3.3.1 Interpretation of Main Effect Results**

The results of H1a reveal a context-dependent dual effect of AI hallucinations on brand attitude, challenging the traditional view that “AI hallucination is only a technical flaw” (Wen & Laporte, 2024). Factual hallucinations (e.g., false product parameters, fabricated brand history) significantly reduce brand attitude, consistent with the cognitive trust framework, as they violate consumers’ expectations of authenticity and erode trust (Daou et al., 2025). However, the findings also identify a boundary condition: hallucinations influence psychological distance only when they exceed perceptual thresholds, relate to core consumer needs, or involve key brand attributes. Minor, non-core hallucinations are often ignored due to selective attention and cognitive decoupling (Kahneman, 1973), leaving psychological distance unchanged. This provides practical guidance for managing AI advertising review costs, suggesting that trivial hallucinations may not require correction.

We acknowledge that contextual variables such as cultural orientation (e.g., collectivism versus individualism; Hofstede, 2001), product category involvement (high versus low; Zaichkowsky, 1985), and brand familiarity (Kent & Allen, 1994) were not manipulated or controlled in the present experiment to maintain internal validity and isolate the pure effects of hallucination type. For example, in high-involvement product categories (e.g., luxury watches or skincare), factual hallucinations may elicit stronger negative brand attitudes due to heightened consumer scrutiny and perceived risk, whereas creative hallucinations could be more welcomed in low-involvement or hedonic categories (e.g., beverages or apparel) where novelty seeking dominates. Similarly, consumers in individualistic cultures may respond more favorably to creative deviations that signal uniqueness, while collectivist consumers might prioritize factual accuracy to maintain group harmony. Although the Chinese urban sample (predominantly 18–45 years old, educated, middle-income) provides a relevant context for AI-savvy consumers, these unexamined moderators limit the immediate generalizability of our findings. Future research should employ cross-cultural, multi-product factorial designs and include brand familiarity as a measured covariate to map the boundary conditions under which the dual effects of AI hallucination hold or reverse.

#### **3.3.2 Interpretation of Serial Mediation Effect Results**

Support for H3 and H4 demonstrates a serial mediation mechanism from artificial empathy to psychological distance, highlighting a dual-directional process. In the negative pathway, factual hallucinations reduce artificial empathy by signaling a failure to meet

expectations of trustworthy communication (Kim et al., 2026). Reduced empathy expands psychological distance, leading to feelings of disconnection and negative brand attitudes (Yim et al., 2025). For instance, factual errors in high-end skincare ads diminish emotional identification and lower evaluations. Conversely, in the positive pathway, creative hallucinations enhance artificial empathy by conveying novelty and alignment with consumer desires (Gao et al., 2026). Increased empathy narrows psychological distance, fostering closeness and improving brand attitudes (Yim et al., 2025). Surreal visuals in apparel advertising, for example, can enhance emotional resonance and brand preference. Overall, artificial empathy acts as a gateway determining psychological distance and attitude outcomes.

### **3.3.3 Interpretation of Moderating Effect Results**

Support for H4 and H5 confirms the moderating role of media literacy, grounded in dual-process theory (Zhang & Lee, 2022). Low media literacy consumers rely on automatic processing, while high media literacy consumers engage in controlled processing, leading to different interpretations. For factual hallucinations, low literacy consumers attribute errors to brand dishonesty, reducing artificial empathy, whereas high literacy consumers recognize technical limitations and decouple them from brand responsibility, mitigating negative effects (Herbert et al., 2011). For creative hallucinations, low literacy consumers perceive deviations without understanding value, limiting empathy gains. In contrast, high literacy consumers identify creative value, strengthening emotional resonance and amplifying positive effects (Gao et al., 2026).

## **3.4 Limitations and Boundary Conditions**

Several limitations warrant acknowledgment to contextualize the findings and guide future inquiry. First, the convenience sampling approach—recruited via Chinese online survey platforms (e.g., Wenjuanxing) and urban offline consumer groups—yields a sample that is geographically and culturally concentrated (predominantly Han Chinese, urban, 18–45 years old, with above-average education and disposable income). This constrains external validity; consumers in rural areas, older demographics, or Western individualistic cultures may exhibit different media literacy levels, AI familiarity, and tolerance for creative deviations (e.g., higher acceptance of surrealism in U.S. samples due to cultural emphasis on innovation). Second, the between-subjects experimental design, while strong for causal inference, employed a controlled, one-shot exposure to static AI-generated ads. Real-world advertising consumption often involves repeated, incidental, or socially mediated exposure (e.g., via social media algorithms, peer discussions), which could attenuate or amplify observed effects through habituation or confirmation bias. Although pre-tests with 30 consumers and 5 experts confirmed manipulation efficacy and ecological plausibility, the artificial setting may inflate psychological responses compared to cluttered media environments. Third, the serial mediation model, while theoretically grounded and statistically superior to alternatives (see robustness checks), assumes a specific causal sequence; future research should employ longitudinal or experience-sampling designs to establish temporal precedence. These limitations do not undermine the internal validity of the core findings but highlight the need for replication across diverse populations and naturalistic settings to strengthen generalizability.

#### 4. Conclusion

The findings of this research carry substantial theoretical and managerial implications for the evolving landscape of AI-assisted brand communication. Theoretically, by integrating epistemological perspectives on truth (correspondence versus coherence), we advance beyond the deficit model of AI hallucination as mere technical error, positioning it instead as a dual-edged phenomenon whose valence depends on type, consumer processing style, and contextual alignment. The serial mediation through artificial empathy and psychological distance elucidates the affective-cognitive pathway linking hallucination perception to brand evaluation, while media literacy emerges as a pivotal boundary condition that can either buffer risks or amplify creative opportunities—insights that enrich consumer psychology, advertising theory, and human-AI interaction scholarship.

Managerially, brands leveraging generative AI for image advertising must adopt differentiated hallucination governance strategies. For factual content domains (e.g., product specifications, brand heritage claims, or performance metrics), rigorous post-generation verification protocols—combining automated fact-checking tools with human oversight—are essential to prevent authenticity breaches that erode trust and inflate psychological distance. Investment in such hybrid review pipelines can reduce “hallucination tax” while preserving efficiency gains. Conversely, for creative and emotional advertising executions (e.g., lifestyle imagery, metaphorical storytelling, or youth-oriented campaigns), strategic tolerance of controlled creative hallucinations can enhance perceived innovation and emotional resonance, particularly among high-media-literacy segments. Brands should therefore segment audiences by media literacy proxies (e.g., education level, technology adoption, or pre-campaign surveys) and deploy A/B testing frameworks that pit hallucinatory versus non-hallucinatory variants, optimizing for both attitude uplift and downstream behavioral metrics such as click-through or share intent.

To operationalize these insights, we recommend three actionable steps: First, develop internal “AI Content Ethics Boards” comprising marketing, legal, and data science stakeholders to classify hallucination risk by campaign objective and implement tiered approval workflows. Second, launch consumer-facing media literacy initiatives (e.g., interactive AR filters or behind-the-scenes “making-of” content) that educate audiences on AI capabilities and limitations, thereby shifting low-literacy consumers toward more nuanced appraisals and unlocking creative hallucination value at scale. Third, embed real-time psychological distance monitoring (via post-exposure surveys or sentiment analysis of user comments) into campaign dashboards, enabling agile adjustments when factual deviations surface. Looking forward, as multimodal generative models (e.g., video, 3D) proliferate, hallucinations will likely grow more sophisticated and contextually embedded. Brands that treat hallucination not as a flaw to eradicate but as a creative code to decode—through ongoing empirical calibration and ethical guardrails—will secure competitive advantage in the attention economy while fostering authentic, resonant consumer-brand relationships. Future research should extend these findings via longitudinal field experiments tracking brand trust and loyalty, integration of biometric measures (e.g., EEG

for emotional arousal, eye-tracking for attention to hallucinatory elements), and analysis of real-market behavioral data from deployed AI campaigns to further validate and refine the proposed framework.

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