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# *The Influence of Virtual Idol Anthropomorphism on Consumer Purchase Intention*

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***Abstract.*** Virtual idols serve as a mirror of artificial intelligence, dynamic digital mapping, and immersive image synthesis. With the continuous upgrading of virtualised industrial production lines, virtual idols are no longer just "tools that resemble humans" but rather "mirrors that reflect human nature," quietly reshaping the paradigm between consumers and brands. However, existing literature lacks a clear explanation of the underlying mechanisms through which the degree of anthropomorphism of virtual idols affects consumer intentions. Drawing on para-social interaction theory, media equation theory, and other relevant frameworks, this study constructs a communication pathway from anthropomorphism to para-social interaction and then to purchase intention. This research provides a basis for risk control in the marketing process of virtual idols, facilitates the formulation of marketing strategies, and fills gaps in future research on anthropomorphism and human-computer interaction. Furthermore, it points to directions for future exploration in areas such as generational stratification effects among Gen Z and cross-cultural contextual differences.

***Keywords:*** Anthropomorphism, purchase intention, human-computer interaction (HCI), mind perception theory, Gen Z consumers

## 1. Introduction

As an emerging product of the integration of digital technology and cultural creativity, virtual idols have been profoundly reshaping the relational fields and marketing ecosystems of contemporary consumer markets in recent years. According to GII statistics, the global virtual idol market was valued at US2.1 billion in 2025, and is expected to grow to US$6.24 billion by 2033, with a compound annual growth rate (CAGR) of 14.6% during the forecast period. With the iterative upgrading of artificial intelligence, motion capture, and real-time rendering technologies, and the gradual lowering of production barriers, the commercial application of AIGC has expanded into the field of brand endorsement. Current virtual idols are no longer confined to flat, two-dimensional anime-style images; instead, they are expected to exhibit mind, emotion, and value judgment. Accordingly, the anthropomorphism discussed in this paper refers to the degree to which virtual idols approximate human beings across three dimensions: visual presentation, behavioural patterns, and mental perception. Precisely because the anthropomorphic features of virtual idols have evolved from rudimentary to advanced levels, their impact on consumers' psychological mechanisms and behavioural decisions has increasingly become a cutting-edge issue in academic research. Although

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research on the anthropomorphism of virtual idols, consumer purchase intention, and parasocial interaction has increased in recent years, the relevant findings remain rather fragmented. Different theoretical frameworks lack systematic integration, and there is still no consensus on the mechanisms through which anthropomorphism affects consumer behaviour or on its boundary conditions. This paper systematically reviews the core literature from both domestic and international sources in recent years on topics including virtual idol anthropomorphism, consumer purchase intention, para-social relationships, technology trust, and their boundary conditions, in order to map the developmental trajectory of related research and summarise the existing findings.

## 2. Literature review

The existing research primarily centres on the theoretical foundations of anthropomorphic perception, including situational awareness theory, mind perception theory, and meaning-making in human-machine symbiosis. Regarding the mechanisms of action, parasocial interaction is widely regarded as a key psychological pathway connecting anthropomorphic design and consumer behaviour [1]. High anthropomorphism, as one of the extrinsic characteristics of virtual idols, has gradually shifted from the external dimensions of visual and behavioural resemblance to internal dimensions such as mind and personality. Multiple studies indicate that a high degree of anthropomorphism can significantly enhance the parasocial connection between consumers and virtual idols, thereby increasing trust and purchase intention. Luo and Chen empirically confirmed that virtual idol anthropomorphism positively influences purchase intention through parasocial interaction, with moral character and cognitive experience exerting stronger effects than appearance [2]. Consequently, there is a rising demand for greater depth in the persona design of virtual idols. For example, whether they possess vivid life stories, whether their personality traits and values align with contemporary society, and whether they are progressively endowed with empathy toward consumers. At the same time, some scholars point out that this indirect effect is moderated by consumer individual characteristics, such as anthropomorphism tendency [3]. Virtual idols are, in essence, relational media. To this end, this study introduces the parasocial relationship paradigm, treating anthropomorphism as a trigger mechanism for relationship formation, and explores how it transforms into consumer attachment non-linearly through the dual mediation of cognitive trust and emotional attachment.

However, the existing literature still has notable deficiencies. First, although AIGC has facilitated the precise positioning of virtual idol styles, the highly realistic design of their images, and significant improvements in their language systems, there is insufficient research on the magnitude of the effect by which anthropomorphism permeates consumers' daily purchasing behaviour through an "emotional compensation mechanism." The multi-dimensional conceptualisation of anthropomorphism in virtual idols remains inconsistent, and measurement tools require standardisation. Second, Generation Z consumers are gradually becoming the main spending force. In a context where product choices are increasingly diverse, factors influencing purchase intention, such as emotional investment, psychological well-being, and mental health, deserve more attention. In the future, when producing virtual idols, marketers may consider a three-layer alignment approach, namely alignment of values, alignment of intentions, and alignment of emotions. Third, as anthropomorphic technologies for virtual idols evolve rapidly, the impact of anthropomorphic failures in actual practice on consumer responses, whether they shift from promoting purchases to intensifying resistance, or whether the effect size is relatively small, requires further empirical data support. Fourth, current research on virtual idols almost exclusively focuses on young consumers, with the majority of consumption scenarios involving the 17-to-30 age group. Although a study has

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examined how the age of virtual characters influences consumers' preference rating, that study concentrated on the character's own age rather than on differences in consumer age [4]. Thus, stratified investigations in this regard remain relatively scarce.

By identifying the above research gaps, this paper proceeds to review the literature from three interrelated perspectives: (1) how anthropomorphism promotes purchase, (2) how human-like trust enhances purchase, and (3) how anthropomorphic failures inhibit purchase, by successively introducing Para social relationship theory, the technology acceptance model, and the uncanny valley theory, so as to examine the complex behavioral phenomenon through which the degree of virtual idol anthropomorphism shifts consumers' emotional responses toward purchase behavior.

## 3. How anthropomorphism promotes purchase

Under the paradigm shift of the virtual idol industry from "marginal culture" to commercial protagonist, exploring how virtual idols stimulate consumers' compensatory psychology requires clarifying the underlying logical connotation system of human–computer emotional interaction. Through a series of experiments, demonstrates that people subconsciously treat media entities such as computers and televisions as real social actors and automatically apply social rules from interpersonal interaction when engaging with them, even when they explicitly know that these media are not real persons [5]. This theory provides an important epistemological premise for virtual idol research: consumers' emotional responses to virtual idols are not "pretending" or "playing", but rather genuine and automatic psychological processes. On this basis, Social Response Theory further points out that when media present sufficient social cues (such as verbal responses, facial expressions, and personalised interactions) [6], users trigger specific social response patterns, and when users perceive that the other party has given something, they experience an instinctive urge to reciprocate. This chain of "social cues" to "social responses" and then "reciprocal returns" precisely explains how anthropomorphic features activate consumers' emotional compensation mechanisms: the more human-like virtual idols are, the richer the social cues they release, and the more readily consumers treat them as real interaction partners, thereby generating a desire to reciprocate purchase impulse after being responded to and cared for.

However, Media Equation and Social Response theories can only explain "automatic reactions in short-term interactions". To elucidate the sustained emotional connection between virtual idols and consumers and its deep driving force on consumption behaviour, it is necessary to introduce the Para-social Relationship Theory by Horton and Wohl [1]. This theory was originally used to explain the one-sided intimacy audiences develop toward television figures: viewers, though not having real social contact with media personalities, develop friendship-like attachments and trust.

In the context of virtual idols, this theory has gained new extensions: Feng [7], based on an empirical study using the SOR (Stimulus-Organism-Response) framework, found that anthropomorphic features of virtual idols, such as professionalism and attractiveness, significantly and positively influence purchase intention through the mediating variable of consumers' para-social relationships; para-social relationships played a key mediating role in the path from "idol characteristics" to "consumer responses". Li Zi similarly corroborated this logic, finding that the effect of anthropomorphic features on advertising effectiveness must be realised through para-social interaction, and that consumers' familiarity with virtual idols strengthens this conversion efficiency [8].

Synthesising the above theories, this paper proposes the core pathway of the main research question: the degree of anthropomorphism, by activating Media Equation and Social Response

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mechanisms, facilitates the formation of para-social relationships, which in turn translate into consumers' purchase intentions driven by emotional compensation.

## 4. How human-like trust enhances purchase

If "emotional compensation" explains why consumers are willing to spend money, then the supplementary question this paper addresses is another dimension: whether "human-like moral attributes" can alleviate consumers' anxiety about AIGC content being "non-human produced," thereby providing an additional trust guarantee for purchase intention. To answer this question, the Technology Acceptance Model (TAM) and its subsequent trust extension need to be introduced [9]. Classic TAM uses perceived usefulness and perceived ease of use as core variables to explain users' acceptance of information technology. However, in emerging technology scenarios such as algorithmic recommendation and artificial intelligence, scholars have found that "useful/easy to use" alone cannot fully explain user acceptance behaviour. Perceived trust has been incorporated into the model, defined as users' judgment of a technological system's reliability, security, and benevolence [10]. In the context of AIGC content production by virtual idols, consumers' "algorithm anxiety" is particularly prominent: when users realise that virtual idols' responses and interactions are all generated by AI, they may develop resistance due to feeling "manipulated" or "deceived." At this point, virtual idols' human-like moral attributes, namely empathetic responsiveness, value alignment, and "appropriate" performance in ethical contexts, emerge as a signal of trust.

It is worth noting that trust construction is not unconditional. Feng showed that although consumers' perceived credibility is positively influenced by virtual idols' professionalism and attractiveness, its direct effect on purchase intention is mediated by parasocial relationships [7]. In other words, technological trust must be "filtered" through emotional relationships before it can translate into purchase behaviour. This finding suggests that the trust established by human-like moral attributes is more of a "relational trust", and its boundary lies in the fact that if the virtual idol's anthropomorphic performance is inconsistent (e.g., empathetic in one moment but mechanical in the next), trust may rapidly dissolve. This also leads to the topic to be discussed in the third part of this review, the risk boundaries of anthropomorphism.

## 5. Anthropomorphic failures inhibit purchase

The above two sections reveal, from a positive perspective, the facilitating role of anthropomorphism in emotional compensation and trust building. However, the marketing effects of anthropomorphism are not unidirectionally positive. When virtual idols experience "anthropomorphic failures," does a high level of anthropomorphism trigger stronger negative effects than a low level? The primary theoretical framework for addressing this question is the Uncanny Valley hypothesis proposed by Mori [11]. The core logic of this theory is that as an artificial entity becomes increasingly anthropomorphic, human liking does not simply rise linearly; rather, it drops sharply in the range where the entity is highly close to, yet still distinguishable from, a real human. Psychologically, this occurs because high anthropomorphism evokes deep-seated expectations of a "real person" in the observer, and any subtle imperfections, such as stiff or unnatural facial expressions, disharmonious speech, or awkward movements, trigger strong cognitive dissonance and vigilance, eventually leading to aversion and rejection.

Applying the Uncanny Valley theory to the context of virtual idols is particularly illuminating: the higher the degree of anthropomorphism of a virtual idol, the higher consumers' expectations for "flawless performance." Once an anthropomorphic failure occurs, for example, illogical AI dialogue,

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inadequate emotional responses, or technical glitches like motion clipping, the sudden contrast with the "near-human" impression instantly pulls users from "emotional immersion" back to "technical alertness," thereby triggering the discomfort and resistance described by the Uncanny Valley. Chen, Qiu, and Min investigated the effect of anthropomorphism of virtual e-commerce anchors on user experience and found an inverted U-shaped relationship, providing empirical support for the existence of the Uncanny Valley effect in live-streaming e-commerce [12].

However, the intensity of the Uncanny Valley effect is not uniform across all consumers. The strength of parasocial relationships plays a critical moderating role here. Consumers with stronger parasocial relationships have invested more emotion and trust in the virtual idol, and thus their expectation threshold is correspondingly higher. When an anthropomorphic failure occurs, their psychological disappointment and sense of "betrayal" are more intense. This mechanism is summarised in this paper as a "reverse amplification effect": parasocial relationships amplify emotional compensation and purchase intention during normal interactions, but amplify disappointment and resistance in failure situations Luo et al. indirectly corroborate this logic in their study on digital anthropomorphic products: the value creation of such products relies heavily on emotional connections, yet their risk of devaluation is much higher than that of physical products [2]. Once the emotional bond is broken, commercial value may plummet to near zero. Although Li did not directly test the negative effects of anthropomorphic failures, his conclusion that "anthropomorphism is not always better and its effects have boundary conditions" indirectly supports the assertion that "high anthropomorphism entails high risk [8]."

Accordingly, it can be inferred that when encountering an anthropomorphic failure, "casual fans" with weaker parasocial relationships, having low expectations, tend to regard it merely as a "minor technical glitch" and show limited negative responses. In contrast, "devoted fans" with strong parasocial relationships, having invested quasi-real intimate feelings in the virtual idol, experience the failure as an emotional betrayal. They cannot believe that such imperfection would occur with their idol, and thus feel intense disappointment or even anger, leading to a significantly greater decline in purchase intention than that of light users.

## 6. Discussion

Based on an analysis and summary of domestic and international research literature, this paper provides a review from the perspectives of theoretical contributions, practical implications, and research limitations.

This paper draws on concepts from theories such as Medium Equivalence Theory, the CASA Paradigm, Social Response Theory, and the Uncanny Valley Effect. The core focus of these theoretical frameworks centres on "media as agents" and "automated responses in human-computer interaction." Academic research on virtual idols has expanded beyond the humanities, social sciences, and computer science, flourishing across areas like fan culture and emotional bonding, business and marketing models, and technology and content production, yielding abundant results. However, there remains a gap in academic research at the level of anthropomorphism. For instance, theoretically, conclusions regarding anthropomorphism and the Uncanny Valley are still unclear. Methodologically, consumer attitudes and behaviours are complex processes, yet most studies are limited to one-time observations, lacking dynamic data tracking. Thirdly, existing research inadequately examines the moderating mechanisms between virtual idols and purchase intention; for example, the anthropomorphism effect may be influenced by variables such as consumer age and knowledge level. Fourthly, from an ethical perspective, the era of AIGC heralds a call for authenticity. As the anthropomorphisation of virtual idols advances, new ethical concerns will shift

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focus to aspects of idols' daily lives, such as their personality and values. For example, Yan Qing et al. found during their study of the technological orientation in virtual idol worship that fans' psychological factors driving adoration are influenced by appearance, makeup, and hairstyle [13]. Virtual idols with higher perceived attractiveness and technologically intriguing features are more favoured by fans, who gain identity recognition and emotional satisfaction through continuous technological upgrades. The emotional value provided by virtual idols can offer consumers emotional healing [14].

In summary, the Uncanny Valley theory provides cognitive academic support for the 'reverse amplification' of quasi-social relationships, while quasi-social relationship theory offers a relational-level moderating explanation for the inter-individual differences in this effect [11]. Faced with such a situation, both highlight that virtual idol producers must be highly vigilant about the risks and drawbacks brought by high anthropomorphism. Higher levels of anthropomorphism not only imply enhanced potential for empathy and intensified emotional returns, but also the losses incurred from failed anthropomorphism should not be underestimated.

## 7. Conclusion

This paper reviews literature on the anthropomorphism of virtual idols, consumer purchase intentions, and quasi-social interactions, aiming to explore the complex factors through which anthropomorphic design influences consumer behaviour. The core conclusion from this review is that anthropomorphism does not consistently produce a uniform or one-way effect; instead, its impact is bidirectional. On the positive side, higher levels of anthropomorphism can activate the vitality of the medium, promote social relationships, and thereby enhance purchase intentions through emotional compensation and relational trust. On the negative side, when anthropomorphism fails, for example, due to inconsistent responses or technical malfunctions, the same high level of anthropomorphism may instead trigger the "uncanny valley" effect, and strong quasi-social bonds may exacerbate disappointment and resistance, leading to a significant decline in purchase intentions.

The theoretical contribution of this review lies in integrating social response theory, quasi-social interaction theory, and the uncanny valley hypothesis into a coherent explanatory framework. By treating social interaction as a key mediating variable and relationship strength as a key moderating factor, this review gains a more nuanced understanding of when and why anthropomorphism works or backfires. Additionally, by introducing the concept of relational trust, this review extends the model's scope.

Practically, this review provides practical reference directions for virtual idol designers and marketers. It cautions against adopting an overly simplistic "the closer to humans, the better" strategy and instead advocates for a calibrated, context-aware design approach. Particular attention should be paid to maintaining emotional consistency, aligning the idol's values with those of the target audience, and developing comprehensive contingency plans for technical failures to mitigate the negative impacts of anthropomorphic flaws.

Despite these contributions, this review is inherently a narrative synthesis and has not conducted specific empirical research on the proposed propositions. Furthermore, cross-cultural comparisons and generational analyses (e.g., comparing Generation Z with older generations) are necessary to examine the framework's generalizability. Finally, while specific practical measures for restoring trust after anthropomorphic failures have not been sufficiently explored, they may become increasingly important areas of future research. By addressing these gaps, subsequent studies can

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further refine theoretical models and provide more precise guidance for the rapidly evolving field of virtual idol marketing.

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