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REVIEW ARTICLE

A Review of the Effects of Anthropomorphic Design on Consumer Emotions

Yuyang Tian[1], Siti Farhana Zakaria[2*], Jun Wang[3], Ye Qiu[4]

[1]Faculty of Creative Arts, Universiti Technologi Mara (Uitm), 40450 Shah Alam, Selangor, Malaysia
Email: 2022790015@student.uitm.edu.my
[2]Faculty of Creative Arts, Universiti Technologi Mara (Uitm), 40450 Shah Alam, Selangor, Malaysia
Email: farha981@uitm.edu.my
[3]Faculty of Creative Arts, Universiti Technologi Mara (Uitm), 40450 Shah Alam, Selangor, Malaysia
Email: 2021684716@student.uitm.edu.my
[4]Faculty of Arts and Media, Nanning College of Technology, 530007 Nanning, Guangxi, China
Email: 1344155411@qq.com

CORRESPONDING AUTHOR (*):
Siti Farhana Zakaria
(farha981@uitm.edu.my)

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ABSTRACT

Anthropomorphic design, which attributes human-like characteristics to non-human objects, has become a focal point in marketing and artificial intelligence. While this strategy is recognized for fostering emotional connections and influencing consumer behavior, existing research presents mixed findings, often due to variations in individual traits and situational factors. This review aims to systematically analyze the evolution and impact of anthropomorphic design on consumer emotions. Through a synthesis of key studies, the review identifies gaps in the literature and explores the mechanisms through which anthropomorphic design shapes emotional responses. The findings reveal that anthropomorphic design generally enhances consumer engagement but its effectiveness is contingent upon contextual and individual differences. The review concludes by offering recommendations for optimizing anthropomorphic strategies in branding and product design, while suggesting avenues for future research to expand the theoretical framework in emerging fields such as AI and digital marketing.

Contribution/Originality: This study contributes to the literature on anthropomorphic design by reviewing how it affects consumer emotions. It highlights the role of individual and situational factors in its effectiveness, offering insights for optimizing anthropomorphic strategies in branding and product design, while identifying research gaps and suggesting future directions.

1. Introduction

Anthropomorphism, defined as "seeing the human in non-human forms" (Aggarwal & McGill, 2007), has deep roots in ancient human culture, where it was applied to nature, flora, fauna, deities, and other non-human entities. Scholarly interest in the psychomechanical processes and boundary effects of anthropomorphism has seen

significant growth only in recent decades (Khan et al., 2023). More recently, the scope of anthropomorphism has broadened beyond its role as a marketing communication strategy, evolving into a manipulable and quantifiable construct that influences consumer emotions, perceptions, attitudes, and behaviors (Sharma & Rahman, 2022). Through visual design, verbal interaction, and the integration of human-like traits such as personality and responsiveness, brands and products are increasingly transformed into anthropomorphic entities (Ma et al., 2023). Examples include facial features in automobile headlights and grilles, the iconic curves of Coke bottles, and brand mascots such as M&M candies and Mr. Clean.

Prior research has shown that brands and products with anthropomorphic design elements, such as visual and verbal cues, are more likely to elicit positive emotions in consumers compared to non-anthropomorphic ones (De Bondt et al., 2018). These designs also enhance product favorability (Shirai, 2023), improve brand attitudes (Hudson et al., 2016), and increase consumer engagement through anthropomorphic artificial intelligence agents leveraging voice cues (Moussawi et al., 2021). Similarly, anthropomorphic social robots have been found to alleviate loneliness (Li & Sung, 2021).

Moreover, anthropomorphic design has demonstrated the ability to foster prosocial behavior by influencing consumers' emotional perceptions (Chen et al., 2021), and mitigating feelings of social exclusion (Mourey et al., 2017). According to Kim et al. (2020), anthropomorphism creates a sense of comfort for audiences, as if they were in a real social environment, thereby reducing communication stress and resistance.

However, as research intensifies and new applications emerge, the adoption of anthropomorphic design does not always guarantee favorable outcomes (Barney et al., 2022). For instance, Chang et al. (2023) observed that in medical contexts, the use of anthropomorphic elements in products, packaging, or advertising can adversely affect consumers' evaluations. Similarly, prior studies have revealed that the inappropriate use of anthropomorphism can provoke negative reactions (Ding et al., 2022), lead to resistance in consumer behavior (Niemyjska et al., 2021), and harm brand image (Puzakova et al., 2013).

Furthermore, excessive anthropomorphism, particularly in artificial intelligence, has been linked to the “Uncanny Valley” phenomenon, where designs perceived as overly human-like evoke discomfort and aversion (Blut et al., 2021). The lack of extensive empirical research on the boundary conditions of anthropomorphic design in consumer contexts has further contributed to an ambiguous understanding of its effects, resulting in a range of conflicting findings (Khan et al., 2023). Therefore, exploring the boundary conditions and contextual applicability of anthropomorphic design has become a critical research priority. Particularly, a deeper understanding of its effectiveness in influencing consumer emotions across diverse scenarios can provide valuable and actionable insights to enhance its practical implementation.

1.1. Research Objectives

The study aims to analyze the evolution of anthropomorphic design and explore its impact on consumer emotional responses, particularly how individual and contextual factors influence its effectiveness, with the goal of providing recommendations for optimizing anthropomorphic strategies in branding and product design.

2. Literature Review

2.1. The Concept of Anthropomorphism

Anthropomorphism is both a universal cognitive process and a rhetorical device, often serving as a specific metaphor in the evolution of human language. When conceptualized as a psychological construct that can be measured and manipulated, it refers to the attribution of human characteristics, motives, intentions, or mental states to non-human entities (Epley et al., 2007). Anthropomorphism can be understood as a process, a predisposition, or the extent to which non-human objects are perceived to exhibit human-like attributes (Gursoy et al., 2019).

Originally rooted in religious theology, the application of anthropomorphism has significantly expanded into diverse fields, including environmental science (Ding et al., 2022), artificial intelligence (Xie et al., 2023), consumer behavior (Khan et al., 2023), branding (Ma et al., 2023), and product design (Aggarwal & McGill, 2007). Despite its broad applicability, anthropomorphism has been defined and operationalized in various ways depending on the specific context, as summarized in Table 1.

Table 1: The Concept of Anthropomorphism

Context	Definitions	Author(s) (year)
Social Psychology	"*The tendency to imbue the real or imagined behaviour of non-human agents with human-like characteristics, motivations, intentions, or emotions*" (p. 864)	(Epley et al., 2007)
Marketing	"*Anthropomorphism, or imbuing nonhuman entities with human traits*". (p. 1)	(Yang et al., 2020)
Artificial Intelligence (AI)	"*Anthropomorphism is the extent to which a character has the appearance or behavioural attributes of a human being*". (p. 787)	(Murphy et al., 2019)
Product Design	"*Anthropomorphism is "seeing the human in non-human forms*"	(Aggarwal & McGill, 2007)

Anthropomorphism is inherently an interdisciplinary field of study that draws insights from multiple perspectives (Sharma & Rahman, 2022). It transcends the mere description of appearance, behavior, or personality, involving the attribution of uniquely human traits to non-human entities. These traits encompass consciousness, emotions, and higher-order cognitive abilities, such as reasoning and imagination (Epley et al., 2007).

Anthropomorphic design, as a specific application, focuses on imbuing non-human objects, including brands and products, with human-like characteristics, behaviors, and emotions. This approach enables consumers to engage with these entities as if they were human counterparts (Aggarwal & McGill, 2007). Anthropomorphic design spans a broad spectrum, incorporating natural attributes (e.g., appearance, expressions, decorative elements, and verbal communication), spiritual attributes (e.g., emotions, thoughts, and intentions), and social attributes (e.g., personality, communication, and interaction).

2.2. Mechanisms and Tendencies of Anthropomorphism

Humans possess a natural tendency to attribute human traits to the objects around them (Epley et al., 2007). Building on this premise, Epley et al. (2007) proposed the SEEK

model, which outlines a specific cognitive process driven by three psychological factors that motivate anthropomorphic phenomena.

First, accessibility of anthropocentric knowledge, posits that when individuals encounter unfamiliar or ambiguous entities, they rely on existing human knowledge to interpret and explain these entities, thereby triggering anthropomorphism. For instance, a smiling cartoon character on product packaging may evoke associations with human friendliness, eliciting a positive emotional response from consumers.

Second, effectance motivation, emphasizes the innate human desire to understand and exert control over their environment. Anthropomorphic designs that incorporate human-like personality traits can instill a sense of confidence and control in consumers, reducing uncertainty and enhancing their willingness to engage with the product.

Finally, sociality motivation, addresses the fundamental human need for social interaction and belonging. Research indicates that individuals experiencing loneliness are more likely to anthropomorphize and respond favorably to anthropomorphic designs (Epley et al., 2007). Furthermore, Tam et al. (2013) argued that fostering a connection with nature can enhance well-being by fulfilling social interaction needs. Individuals with heightened needs for belonging and social connection are more inclined to seek anthropomorphic cues, using anthropomorphism as a compensatory mechanism for social deficiencies (Feng, 2016).

Anthropomorphism, therefore, operates as an automatic mental process driven by three core human needs: the need to interpret the world, establish social connections, and maintain a sense of belonging (Yang et al., 2020). Building on these mechanisms, Aggarwal and McGill (2007) proposed the cognitive schema congruence theory, which explains how anthropomorphic design leverages consumers' prior human experiences. When a product's characteristics align with these activated schemas, it elicits positive emotional responses. Feng (2016) further demonstrated that socially marginalized consumers are particularly drawn to anthropomorphic products, as their pro-social attributes foster emotional connections and generate positive affect. As a result, these consumers often perceive anthropomorphic brands or products as "friends" or "partners," rather than mere transactional objects.

In addition, individual differences in anthropomorphic tendencies can be influenced by factors such as cultural background, cognitive needs, and self-esteem (Epley et al., 2007). Thus, the essence of anthropomorphic design lies in its ability to influence consumer emotions, perceptions, and behaviors by strategically addressing these tendencies (Khan et al., 2023).

2.3. Dimensions of Anthropomorphic Design

The dimensional division of anthropomorphic design has garnered significant research interest across domains such as marketing, artificial intelligence, and pro-social behavior (see Table 2). For example, Adam et al. (2021) demonstrated that anthropomorphic verbal cues employed by AI systems can evoke positive emotional responses in consumers. Similarly, Verhagen et al. (2014) found that anthropomorphic visual cues in virtual customer service environments simulate real social interactions, enhancing personalization and increasing user satisfaction. However, the limitations of single-dimensional approaches have prompted a growing focus on two-dimensional and multi-

dimensional anthropomorphic manipulations. Research suggests that combining multiple anthropomorphic design cues, such as visual, verbal, auditory, and emotional elements, generates more favorable consumer responses compared to non-anthropomorphic or low-level anthropomorphic designs (Khan et al., 2023).

Building on these foundational dimensions, the literature offers a variety of classifications for anthropomorphism. These include distinctions such as anthropomorphism vs. non-anthropomorphism (Kim et al., 2020), high anthropomorphism vs. low anthropomorphism (Chen et al., 2024), visual vs. verbal anthropomorphism (Sah & Peng, 2015), visual vs. cognitive anthropomorphism (Barney et al., 2022), physical vs. psychological anthropomorphism (Niemyjska et al., 2021), internal vs. external anthropomorphism (Chu et al., 2019), and abstract vs. present anthropomorphism (Newton et al., 2017).

Table 2: Dimensions of Anthropomorphic Design

Level	The dimension	Author(s) (year)
Single-dimension	Anthropomorphism	(Adam et al., 2021); (Verhagen et al., 2014)
	Anthropomorphism vs. Non-Anthropomorphism	(Kim et al., 2020); (Ma et al., 2023); (Shirai, 2023)
Two-dimension	Anthropomorphism (high vs. low)	(Chen et al., 2024)
	Anthropomorphic cues (visual vs. verbal)	(Sah & Peng, 2015)
	Anthropomorphism (visual vs. cognitive)	(Barney et al., 2022)
	Anthropomorphism (physical vs. psychological)	(Niemyjska et al., 2021)
	Anthropomorphism (internal vs. external)	(Chu et al., 2019)
	Anthropomorphic cues (present vs. absent)	(Newton et al., 2017)
	Visual cues; Identity cues; emotional cues; auditory cues	(Xie et al., 2023)
Multi-dimension	Visual cues; Auditory cues; Visual x Auditory cues	(Yuan & Dennis, 2019)
	Physical; Emotional; Personality	(Alabed et al., 2022)
	Visual; Moral; Cognitive; Emotion	(Golossenko et al., 2020); (Dabiran et al., 2024)

Recent research has categorized anthropomorphic design across multiple dimensions, highlighting its diverse applications and effects. For instance, Yuan and Dennis (2019) found that anthropomorphic product displays in online auction contexts influence consumers' purchase intentions through visual, auditory, and combined cues, with visual anthropomorphic design exerting the most significant impact. Similarly, artificial intelligence agents have been classified into physical, emotional, and personality dimensions for anthropomorphic manipulation, linking these dimensions to self-consistency and self-artificial intelligence integration (Alabed et al., 2022).

Expanding on these classifications, Xie et al. (2023) categorized anthropomorphic cues for smart home assistants into visual, identity, emotional, and auditory dimensions. A dual-path model was proposed to evaluate the impact of anthropomorphic design on user interaction satisfaction, offering a nuanced understanding of consumer engagement with such devices. Additionally, Dabiran et al. (2024) explored the role of virtual influencers on social media, categorizing them into anthropomorphic dimensions such as appearance, moral virtues, cognitive experiences, and conscious emotions. This study

demonstrated how these dimensions influence followers' perceptions of trustworthiness, quasi-social relationships, and purchase intentions.

However, it is important to acknowledge that while multidimensional scales of anthropomorphic design provide a richer framework for analysis, they have not been empirically validated as extensively as single-dimensional scales. Further research is needed to establish the reliability and applicability of these multidimensional frameworks across diverse contexts.

3. Methodology

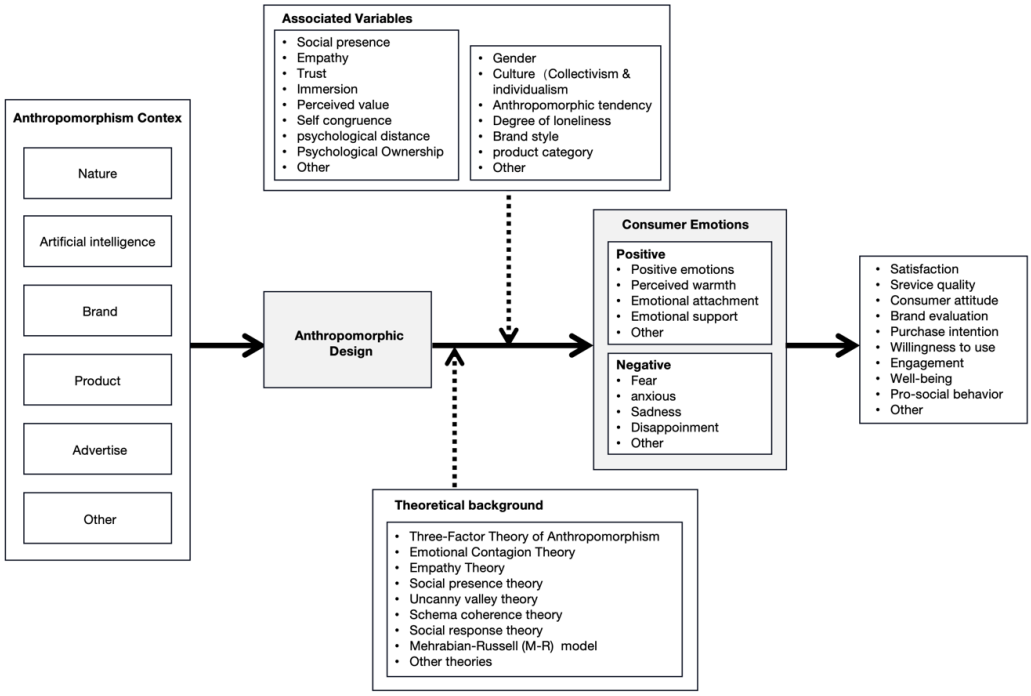
This study employs a systematic review methodology to synthesize existing literature on the intersection of anthropomorphic design and consumer emotions, drawing from sources such as WoS, Scopus, and ScienceDirect. Data extraction highlights key themes, methods, and impacts related to the influence of anthropomorphic design on consumer emotions and behavior. By identifying patterns and gaps in the literature, the study provides actionable insights for policymakers and industry stakeholders on effectively leveraging anthropomorphic design in marketing.

4. Findings

4.1. The Effect of Anthropomorphic Design on Consumer Emotions

The process by which anthropomorphic design influences consumer mood is complex and multidimensional, shaped by factors such as the context of the anthropomorphic stimuli and the mediating variables linking anthropomorphism to consumer emotions (see Figure 1).

Figure 1: The effect of anthropomorphic design on consumer emotions



Source: Created by the authors

Anthropomorphic design involves nonhuman objects. Such as brands, products, advertisements, natural environments, and artificially intelligent agents, engaging in social interactions with consumers (Khan et al., 2023).

In marketing, anthropomorphic design replicates human external features, internal perceptions, and social behaviors, thereby enhancing consumers' perceptions of authentic interpersonal emotional communication (Golossenko et al., 2020). These perceptions are cultivated through anthropomorphic design cues embedded within the marketing mix, including product design attributes, brand imagery, pricing strategies, packaging, celebrity endorsements, and even the conversational style of personnel (Chen et al., 2024). Yuan and Dennis (2019) demonstrated that endowing products with human-like attributes, such as appearance or voice, enhances perceived value and evokes positive emotional responses.

Anthropomorphizing a brand, product image, or advertisement encourages consumers to attribute human qualities to these objects, fostering emotional intimacy (Chu et al., 2019). This effect extends to perceptions of social interaction, which can lead to positive consumer responses (Kim et al., 2020). For instance, incorporating anthropomorphic imagery or scenarios in advertisements captures attention, evokes warmth (Jeong & Kim, 2021), builds trust, and creates psychological closeness (Chen et al., 2024). These emotionally positive responses strengthen brand favorability and, in turn, stimulate consumption behavior (Jeong & Kim, 2021).

Moreover, anthropomorphic product design has been shown to evoke empathetic responses from consumers. For instance, Chen et al. (2021) study demonstrated that incorporating anthropomorphic elements into product design can enhance emotional engagement, potentially leading to positive behavioral outcomes such as reducing food waste.

Research suggests that incorporating anthropomorphic design cues in nature can foster emotional connections between consumers and the environment, thereby enhancing their willingness to engage in pro-environmental behaviors (Tam et al., 2013). Similarly, anthropomorphic design can improve consumers' emotional experiences by making non-human objects more comprehensible and user-friendly. For example, anthropomorphic cues such as friendly voices, humanlike expressions, or anthropomorphic interfaces in AI agents and smart home products have been found to reduce technological anxiety and enhance user comfort and satisfaction (Xie et al., 2023).

In the context of artificial intelligence, anthropomorphic design not only reduces cognitive load and aligns with users' self-consistency with AI, but also triggers positive emotional responses (Alabed et al., 2022), and enhances the overall user experience (Chiang et al., 2022). However, the impact of anthropomorphic design on consumer emotions is influenced by cultural context. For example, Baskentli et al. (2023) demonstrated that collectivist consumers exhibit a stronger preference for anthropomorphic products compared to non-collectivist consumers. This preference is shaped not only by individual anthropomorphic tendencies but also by the nature of the product. Feng (2016) revealed that hedonic products are more suitable for anthropomorphic communication than utilitarian products.

Nevertheless, anthropomorphic design does not always yield positive outcomes. In some cases, excessive or inappropriate anthropomorphism can evoke negative emotions such

as fear, embarrassment, discomfort, or skepticism (Ding et al., 2022). These adverse reactions may arise when anthropomorphic objects fail to meet consumer expectations or violate social norms, leading to consumer resistance toward the product or brand. Thus, the mechanisms and boundary effects of anthropomorphic design on consumer emotions are multifaceted. While it can foster emotional connections, improve user experience, alleviate loneliness, and enhance overall well-being, thereby encouraging positive consumer behaviors, it also has the potential to provoke negative reactions. These adverse outcomes may arise from poorly executed anthropomorphic designs, overly pronounced levels of anthropomorphism, or cultural differences that influence consumer expectations.

5. Conclusion

This study reviews the effects of anthropomorphic design on consumer emotions by examining its underlying concepts, mechanisms, and variable dimensions. Anthropomorphic design has been shown to enhance emotional responses by eliciting empathy, emotional resonance, intimacy, and the perception of social presence across diverse contexts. However, its effectiveness is significantly influenced by individual consumer differences and contextual factors. Excessive or inappropriate anthropomorphism may evoke negative emotions such as fear, embarrassment, discomfort, or skepticism, ultimately leading to consumer resistance toward brands or products.

Despite growing interest in this field, the existing literature remains fragmented, highlighting the need for future research to address critical gaps. These include understanding how anthropomorphic design can mitigate negative effects, exploring its boundary conditions, and identifying the contexts and characteristics under which it is most effective. Current studies often rely on two-dimensional comparisons, with limited validation of multi-dimensional approaches. Future research should integrate visual, verbal, emotional, and interactive design elements to develop more refined multi-dimensional strategies and uncover the mechanisms underlying consumers' emotional responses.

Moreover, the application of anthropomorphic design should expand to a wider range of contexts, such as online education, human-computer interaction, environmental protection, virtual reality, and pro-social behavior. In the fields of Artificial Intelligence (AI), anthropomorphic design has the potential to revolutionize human-computer interaction, aligning technological products more closely with human needs. This advancement could not only enhance user experience but also create new business opportunities.

Future studies must also explore cross-cultural differences to understand how cultural contexts shape consumer responses to anthropomorphic design. Additionally, analyzing personality traits could reveal new boundary conditions, further clarifying the scope of its application. For businesses and designers, it is essential to balance the functional attributes of products with consumers' psychological expectations to avoid triggering negative emotions due to excessive anthropomorphism. As privacy and data security concerns grow, future anthropomorphic designs should prioritize personalized and emotionally engaging interactions while safeguarding user privacy. Finally, most existing research in this domain has been qualitative. Future studies should incorporate robust empirical methods and develop comprehensive theoretical frameworks to better predict

and explain how anthropomorphic design influences consumer emotions. These efforts will not only advance academic understanding but also provide actionable insights for practitioners.

Ethics Approval and Consent to Participate

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Conflict of Interest

The authors declare no conflicts of interest in this review paper.

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