



# Hey Google, I trust you! The consequences of brand anthropomorphism in voice-based artificial intelligence contexts

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## ABSTRACT

Users' increasing adoption of voice assistant services is fostering the growth of a novel strand of marketing research on the branding implications of brand anthropomorphism (BA). However, the branding outcomes of brand anthropomorphism in this research area remain underinvestigated. Accordingly, in the name-brand voice assistant (NBVA) interaction field, this study tests a model of the consequences of brand anthropomorphism, outlining the relationships among brand anthropomorphism, brand trust, and multidimensional consumer-brand engagement (CBE), i.e., the relevant cognitive, affective, and behavioral dimensions, as well as the moderating role of perceived privacy risk. A survey of young adults shows that brand anthropomorphism positively affects brand trust as well as the affective and behavioral dimensions of CBE. Furthermore, perceived privacy risk positively moderates the relationship between brand anthropomorphism and brand trust. Specifically, the influence of brand anthropomorphism on brand trust is strengthened at higher levels of perceived privacy risk. This article thus enriches the understanding of brand anthropomorphism and user VA response by exploring underresearched branding outcomes of BA in the context of NBVA interaction.

## 1. Introduction

Voice-based artificial intelligence services, such as Alexa, Cortana, Siri, and Google Assistant, have rapidly entered our daily lives. Their adoption figures are increasing, with 4.2 billion conversational assistants (i.e., voice assistants) used globally in 2020 (Statista, 2022a). In Europe, Statista (2022b) reports that 66% of the adult population has conversed at least once with a voice assistant (VA) via devices such as smartphones, smart speakers, or in-car multimedia systems. More encouraging data come from the US market, where two out of three individuals (140 million) use these services monthly on smartphones (Voicebot, 2022a), and 91 million are monthly smart speaker users (Voicebot, 2022b). So-called name-brand VAs (NBVAs) are a particular typology among these voice assistant services characterized by 1) service activation by users via a direct call to the brand name (e.g., “Hey Google”; “Hey BMW”), 2) in-house development and 3) equipment with a unique “brand voice” (Vernuccio et al., 2021). Thus, the brand name of this device coincides with the company's brand name (e.g., “Google”, “BMW”, “Mercedes”) and has developed the NBVA, creating a specific voice for the brand (Vernuccio et al., 2023b). Therefore, the NBVA represents an innovative touchpoint in the brand experience (Homburg

et al., 2017; Vernuccio et al., 2021) whereby companies build direct and dynamic consumer-brand relationships, activated via brand name and based on brand voice (Vernuccio et al., 2023a). For the first time, in the NBVA environment, brands adopt a unique “vocal physique”, i.e., the specific voice of the brand, to be intended as a spoken brand identity sign (Jackson, 2003) developed by companies and then communicated to intended recipients (Vernuccio et al., 2023b). Hence, the brand vocal physique represents an innovative, fundamental component of brand semiotics, contributing to the creation of the central brand meaning system along with other “building blocks” (e.g., logo, colors, slogan) (Kucuk, 2015). This novel “building block” is constructed by marketing practitioners to develop a brand anthropomorphic meaning in consumers' minds (Vernuccio et al., 2023b), as the “physical human voice” enables direct communication between humans and these intelligent “machines”, allowing users to interact as if they were talking with a real person rather than software (Kucuk, 2020a). Indeed, by dialoguing in the NBVA context, consumers can find a salient human brand personality that matches an appropriate vocal physique (Kucuk, 2020b).

The relevance of brand anthropomorphism in voice-based AI environments has been argued in two theoretical contributions (Agrawal et al., 2020; Sharma and Rahman, 2022), which advocate further studies

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on consumers' perception of brand anthropomorphism and the branding consequences thereof to reveal the new frontiers on the branding evolution path. However, despite priority calls for brand anthropomorphism, scholars have focused primarily on the perception of VA humanity (e.g., Fernandes and Oliveira, 2021; Guo and Luo, 2023; Konya-Baumbach et al., 2023) and its influence on outcomes concerning technological interfaces, such as VA trust (e.g., Chérif and Lemoine, 2019; Pitardi and Marriotti, 2021) and VA engagement (e.g., Moriuchi, 2021). To our knowledge, only Vernuccio et al. (2021, 2023a) have thus far investigated the branding consequences of brand anthropomorphism in the interaction context of NBVAs from the managerial perspective. Consequently, in this environment, scholars have not yet addressed how consumers perceive brand anthropomorphism or its ability to influence branding outcomes such as brand trust and consumer-brand engagement. The latter, however, is a priority when investigating voice-based AI services (McLean et al., 2021), as consumers can engage in personalized dialogs similar to those among humans thanks to advances in machine learning and natural language processing (Vernuccio et al., 2023a). Moreover, brand trust is a critical variable in the VA context, where users are not "naïve" of the privacy implications of their interactions with brands through intelligent voice-based services (Pitardi and Marriotti, 2021). Such privacy is subject to major restrictions (e.g., GDPR in Europe), and AI voice-based technologies rely on continuous learning and adaptation algorithms, requiring multiple personal, attitudinal, and behavioral data from consumers (Patrizi et al., 2021). Hence, perceived privacy risk has become central in VA studies (e.g., Pitardi and Marriotti, 2021; Vimalkumar et al., 2021; Jain et al., 2022). In this context, users have expressed fears that their personal information may be collected by a VA without their consent and then misappropriated by third parties (e.g., Pitardi and Marriotti, 2021). Thus, the potential role of perceived privacy risk (i.e., a critical embedded contextual variable) plays in altering consumers' perception of (i.e., brand anthropomorphism perception) and response to a brand (i.e., brand trust) cannot be omitted.

Accordingly, the study analyses the relationships among brand anthropomorphism, brand trust, and multidimensional consumer-brand engagement (cognitive, affective, and behavioral dimensions) by combining the literature on consumer VA response and brand anthropomorphism. Furthermore, this article investigates how perceived privacy risk alters the relationship between brand anthropomorphism and brand trust. Thus, responding to calls in previous studies (i.e., Agrawal et al., 2020; Sharma and Rahman, 2022), this study offers updated insights to the brand anthropomorphism literature that to date has mainly investigated the influence of visual codes, such as human facial and physical traits in logos, thereby neglecting vocal cues among verbal signs (e.g., Aggarwal and McGill, 2007; Guido and Peluso, 2015; Golossenko et al., 2020). In addition, the results provide marketers with insights into the interconnected branding objectives that can be successfully addressed through a new intelligent, anthropomorphic agent, the NBVA, thereby building dynamic and verbal interactions between consumers and brands.

## 2. Conceptual model and hypothesis development

### 2.1. Brand anthropomorphism

In the marketing literature, anthropomorphism has been conceptualized as the process of attributing human traits to nonhuman agents and objects, such as products, brands, and virtual agents (Epley et al., 2007). Human features have been related to both designs (i.e., physical properties) and cognitive characteristics such as mind (e.g., Waytz et al., 2010), intent (e.g., Kim and McGill, 2011), personality (e.g., Aggarwal and McGill, 2012), free will (e.g., Rauschnabel and Ahuvia, 2014), and affective state (e.g., Tuškej and Podnar, 2018; Huang et al., 2020). Adopting the user perspective, this study embraces the following conceptualization of brand anthropomorphism: "brands perceived by

consumers as actual human beings with various emotional states, mind, soul, and conscious behaviors that can act as prominent members of social ties" (Puzakova et al., 2009, pp. 413–414).

Consumers' perceptions of brand anthropomorphism have been studied in relation to both visual (e.g., logo) and verbal codes (e.g., linguistic cues), primarily in traditional broadcasting advertising contexts, such as print ads (e.g., Sela et al., 2012; Golossenko et al., 2020). Regarding visual codes, brands such as KFC, Pringles, and Starbucks have adopted human facial and physical features in their logo, e.g., a nose, eyes, a neck, and a trunk (Guido and Peluso, 2015; Ali et al., 2021; Daryanto et al., 2022). Other brands are depicted as engaging in human activities, such as sunbathing (Golossenko et al., 2020); some also utilize mascots, such as Michelin Bibendum and Mr. Muscle (Chen and Lin, 2021). Concerning verbal codes, on the one hand, brand names are chosen to express family and social bonds (e.g., Uncle Vanya and Uncle Sam). On the other hand, textual ploys have been implemented, such as the first-person singular in brand descriptions (e.g., "Hello! I'm Aquina") (Golossenko et al., 2020) or first-person plural in printed ads for consumer communication (e.g., "we" instead of "the brand and you") (Sela et al., 2012). Concerning the role of brand-associated vocal stimuli in fostering brand anthropomorphism in consumers' minds, the sensory marketing literature is rather limited (e.g., Jackson, 2003). In this research strand, scholars focus on a spokesperson's voice and its effect on the brand-related outcomes of a radio advertisement (e.g., Wiener and Chartrand, 2014). Specifically, the roles of different vocal features—pitch (Wiener and Chartrand, 2014), gender, roughness, and brightness (Zoghaib, 2017, 2019)—have been analyzed in terms of the influence they exert on the perception of warmth and competence (Wiener and Chartrand, 2014; Zoghaib, 2017, 2019). These are two dimensions of brand personality related to brand anthropomorphism (Aaker, 1997).

In today's rapidly evolving technological context, marketing scholars have acknowledged certain powerful opportunities in brand anthropomorphism, triggered by intelligent vocal services (Agrawal et al., 2020). Specifically, via an NBVA, a brand can assume an anthropomorphic vocal physique, oriented by marketers toward the construction of a distinct brand personality, strengthening consumer-brand relationships and enhancing brand loyalty (Vernuccio et al., 2023a). However, how consumers perceive brand anthropomorphism and its ability to influence branding outcomes have not yet been addressed in this innovative environment.

### 2.2. The impact of brand anthropomorphism on brand trust

Brand anthropomorphism drives both positive and negative consumer cognitive, attitudinal, and behavioral responses (e.g., Kucuk, 2020b; Brandão and Popoli, 2023). For instance, consumers can develop negative consumer-brand relationships, culminating in brand hate (Kucuk, 2016/2019), by engaging in antibrand anthropomorphization acts that demonize and "hitlerise" brands (i.e., reverse brand anthropomorphism) (Kucuk, 2020b). Despite its relevant insights into negative consumer-generated brand anthropomorphism, to date, research has mainly focused on the effect of brand anthropomorphism perception on positive branding outcomes such as brand attitude (e.g., Puzakova and Aggarwal, 2018; Zhang et al., 2020), brand attachment (e.g., Chen and Lin, 2021; Ma et al., 2021), brand love (e.g., Delgado-Ballester et al., 2020; Ali et al., 2021), or brand loyalty (e.g., Guido and Peluso, 2015; Golossenko et al., 2020). Nevertheless, the impact of brand humanity perception on brand trust has received far less attention (Golossenko et al., 2020).

Brand trust has been conceptualized as the consumer's willingness to rely on the brand's abilities to achieve its stated goals (Chaudhuri and Holbrook, 2001). Specifically, trust is based on one's perception of the trustee's features, typically perceived as beneficial to oneself, i.e., the trustee seems willing and able to act in one's best interests (McKnight and Chervany, 2001). Thus, brand trust relates to customers' beliefs that

a brand possesses the human traits of warmth and competence, representing friendliness, trustworthiness, and honesty (Doney and Cannon, 1997). When users perceive a brand as human-like in appearance and capable of thoughts, emotions, and moral virtues, they become confident that the brand will not harm them (Golossenko et al., 2020). However, the positive influence of brand anthropomorphism on brand trust has only been investigated in the broadcast advertising context, where a brand can be endowed with visual human-like traits, i.e., eyes, a nose, and a mouth (Golossenko et al., 2020).

Concerning the environment of voice assistants, research has only focused on the effect of perceived VA humanity (i.e., social presence) on trust in technological services (Chérif and Lemoine, 2019; Pitardi and Marriott, 2021). Hence, social presence perception is found to enhance trust in VAs when dialog takes place via a PC (Chérif and Lemoine, 2019) or smart speaker (Pitardi and Marriott, 2021). Consequently, if VA-perceived humanity positively influences VA trust, it follows that the perceived humanity of the brand (brand anthropomorphism) speaking through an NBVA may also amplify brand trust. Accordingly, the following hypothesis is posited.

**H1.** In the NBVA interaction field, brand anthropomorphism positively influences brand trust.

### 2.2.1. The moderating role of perceived privacy risk

In the voice-based AI field, perceived privacy risk is conceptualized as the fear that personal data may be collected by a VA without individual consent and then stolen by third parties (Patrizi et al., 2021). In this interaction context, perceived privacy risk has attracted considerable attention (e.g., Pitardi and Marriott, 2021). Scholars have already investigated its impact on VA trust (e.g., Vimalkumar et al., 2021) and brand trust (Patrizi et al., 2021). Regarding the former, perceived privacy risk has been described as a negative antecedent that reduces consumers' trust in VAs such as Alexa by Amazon (Pitardi and Marriott, 2021), Siri by Apple, and Bixby by Cortana (Vimalkumar et al., 2021). Similarly, the greater the perceived privacy risk is, the greater the distrust toward the brand Google speaks through Google Assistant via a smartphone (Patrizi et al., 2021).

In addition, perceived privacy risk is associated with perceived anthropomorphism; however, mixed and inconclusive results have been obtained (Kim and McGill, 2011; Xie et al., 2020; Ha et al., 2021). On the one hand, anthropomorphism perceptions have been positively associated with perceived privacy risk, e.g., respondents experience a higher risk when playing an objectified slot machine (Kim and McGill, 2011). Similarly, users with a high need for interaction perceive a lower privacy risk when shopping on an anthropomorphic rather than non-anthropomorphic e-commerce website (Xie et al., 2020). These findings indirectly echo the remarks of Kim et al. (2020), i.e., brand anthropomorphism positively strengthens consumer-brand relationship outcomes (e.g., brand attitude), even after a brand transgression. Specifically, when consumers perceive anthropomorphic brand traits, such as warmth and trustworthiness, they seek to preserve their bond with this anthropomorphized brand even after a failure; they actively perform so-called relationship maintenance acts to support this well-functioning and long-term relationship (Kim et al., 2020). Conversely, anthropomorphism has a negative relationship with privacy risk. Users develop greater privacy concerns when an anthropomorphized VA (vs. an objectified VA) requests sensitive information from them, such as payment details or socially sensitive or very intimate information (Ha et al., 2021).

Although the extant findings on the role of perceived privacy risk remain mixed, perceived privacy risk still likely alters the relationship between brand anthropomorphism and brand trust in the NBVA context. Consequently, the following hypothesis is posited.

**H2.** In the NBVA interaction field, perceived privacy risk moderates the direct relationship between brand anthropomorphism and brand

trust.

### 2.3. The impact of brand anthropomorphism on consumer-brand engagement

Consumer-brand engagement (CBE) represents “the level of a customer's cognitive, emotional, and behavioral investment in specific brand interactions” (Hollebeek, 2011, p. 555). In the literature, the prevalent definition of CBE is a multidimensional construct that encompasses the fundamental cognitive, affective, and behavioral dimensions. The cognitive dimension is associated with the interest in, knowledge of, and attention to a brand; the affective dimension addresses users' emotions toward a brand; and the behavioral dimension conveys specific consumer actions (Hollebeek et al., 2014).

Consumer-brand engagement has attracted considerable attention in digital marketing studies in the latest technology fields. Indeed, scholars identify CBE as one of the main outcomes of consumer-brand interactions on mobile applications (e.g., Khan, 2023; Qing and Haiying, 2021; Tran et al., 2023), on social media (e.g., Holiday et al., 2023; Pérez-Vega et al., 2018; Tuškej and Podnar, 2018), in augmented and virtual reality (e.g., McLean and Wilson, 2019; Hollebeek et al., 2020; Rather et al., 2023), across metaverses (e.g., Qayyum et al., 2023), and with voice assistants (e.g., McLean et al., 2021; Vernuccio et al., 2023a).

Thus far, the literature on brand anthropomorphism has primarily investigated the effect of a brand's perceived humanity on CBE on social media (Pérez-Vega et al., 2018; Tuškej and Podnar, 2018). Specifically, the visual anthropomorphic cues of tourism brands (e.g., Booking, Expedia, Trivago) increase user behavioral engagement on Facebook (Pérez-Vega et al., 2018). Furthermore, people voluntarily engage in brand activities (i.e., behavioral dimension) on social media when they recognize themselves in an anthropomorphic brand (Tuškej and Podnar, 2018). However, despite the mostly accepted conceptualization of CBE as a multidimensional construct, this literature suggests that only the behavioral dimension of CBE is a consequence of brand humanity. This limitation as well as researchers' adoption of only a partial empirical perspective (i.e., the social media field) underscore the ongoing need to understand how brand anthropomorphism affects specific CBE dimensions—i.e., the cognitive, affective, and behavioral—in an innovative context: the NBVA environment.

In the voice-based AI context, scholars have focused mainly on engagement with voice-based technology services (i.e., voice assistants) (Moriuchi, 2019, 2021; Mendes Ferreira et al., 2022). Hence, only McLean et al. (2021) and Vernuccio et al. (2021) have considered the consumer-brand engagement developed through these services. Specifically, the perception of Alexa as a human-like conversational agent increases a consumer's cognitive, affective, and behavioral engagement with branded Alexa skills, e.g., Lonely Planet Guide, Uber, or United Airlines (McLean et al., 2021). Moreover, from a managerial point of view, multidimensional CBE represents a key branding objective pursued by companies in brand anthropomorphization strategies (Vernuccio et al., 2021). Specifically, the in-car NBVA brand experience can be oriented toward the pursuit of CBE's cognitive, affective, and behavioral dimensions (Vernuccio et al., 2021).

Consequently, the following hypothesis is formulated.

**H3.** In the NBVA interaction field, brand anthropomorphism positively influences cognitive (H3a), affective (H3b), and behavioral CBE (H3c).

### 2.4. The impact of brand trust on consumer-brand engagement

The branding literature has also emphasized the relationship between brand trust and CBE, focusing especially on social media contexts. Brand trust is thus an antecedent of brand engagement (Van Doorn et al., 2010), affecting branding outcomes and networking activities on social media (Pentina et al., 2013). Specifically, consumers' favorable “pre-disposition” to a brand drives their engagement behaviors (Van Doorn

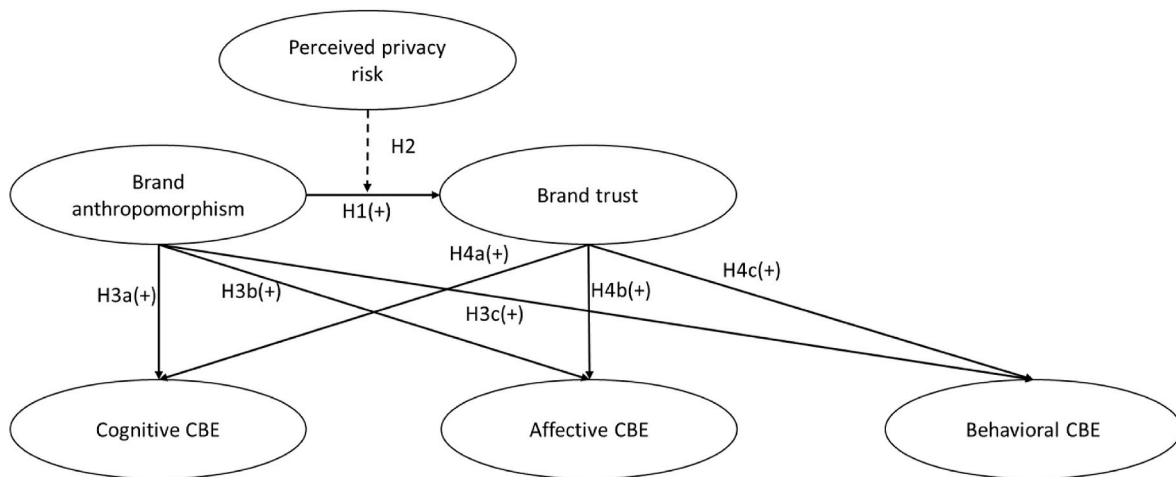


Fig. 1. Research model

Note: CBE=Consumer Brand Engagement.

et al., 2010), such as sharing branding information on social media when they are confident in a brand (Osei-Frimpong et al., 2019). Moreover, brand trust plays a key role in attracting consumers' attention and interest in brands (i.e., cognitive dimension) on social media (Chahal and Rani, 2017). The more users trust social media, the more they cognitively engage and form brand equity via increased brand awareness, perceived quality, brand image, and brand loyalty (Chahal and Rani, 2017). In addition, brand trust can enhance positive emotional responses by consumers to a brand after a positive experience with it (Chaudhuri and Holbrook, 2001).

Although the literature has evaluated the relationship between brand trust and specific CBE dimensions, Nyadzayo et al. (2020) have called for further investigations on whether the role of brand trust is an antecedent of multidimensional CBE, as such findings can vary according to specific brands and contextual/situational factors. To our knowledge, however, prior studies have primarily focused on the social media environment, neglecting innovative and vocal contexts, such as NBVAs. Therefore, the following hypotheses are formulated.

**H4.** In the NBVA interaction field, brand trust positively influences cognitive (H4a), affective (H4b), and behavioral CBE (H4c).

The study's hypotheses are also illustrated in Fig. 1.

### 3. Research method

To test research hypotheses, an empirical survey of young adults (i.e., 18-36-year-old users) with previous experience using VAs (i.e., usage at least once a day) was conducted. This specific cluster has been targeted because it can express important views on the focal issues. First, young adults are typically early adopters of VAs (Capgemini Research Institute, 2018). The penetration of vocal services into this cohort is thus higher than among older age groups, such as Generation X or baby boomers (Insider Intelligence, 2022). Second, young adults are heavy users of voice-based AI technologies and thus the most likely to make advanced use of VA utilitarian actions (e.g., "Hey Google, set an alarm for 10 min!") or playful activities (e.g., "Hey Google, play my favorite song!") (Capgemini Research Institute, 2018) and to employ voice to make purchases (Vixen Labs, 2022). Such advanced use is related to the utilitarian, hedonic, and symbolic benefits that young adults appreciate (Patrizi et al., 2021). Indeed, they consider NBVAs' ability to interact

hands-free without the need to look at a physical screen (e.g., the smartphone or the tablet) an important utilitarian benefit that no other technology can offer (Hoy, 2018). In addition, they feel enjoyment in these interactions and employ these intelligent services to appear more valuable and prestigious among their peers (Patrizi et al., 2021). Finally, concerning the choice to target only individuals who use VAs at least once a day, prior and continuous use of VAs is crucial for collecting reliable data on the focal variables in this study. That is, nonusers or light users may not yet have formed conscious responses to brand dialog through an NBVA.

As the specific interaction context, this research focused on users' conversations with Google Assistant through a smartphone, i.e., the most adopted NBVA and the device with the greatest usage rate for VA dialog (Voicebot, 2022b).

Young adults were recruited in Italy via a market research agency and invited to the study via email. Specifically, they were asked to complete an online, self-administered questionnaire. A total of 372 users agreed to participate in the study (67% response rate); 41 were disqualified because they did not use Google Assistant at least once a day (screening question: "Do you usually use Google Assistant via a smartphone at least once a day?"), and 7 others were eliminated because they failed the attention checks. Thus, the final sample comprised 324 respondents (42% men) whose average age was almost 24 years old (SD = 2.19). Regarding their educational level, approximately 14% of the respondents had a high school education, whereas approximately 70% had a bachelor's degree and 15% had a master's degree. A few others (approximately 1%) held a PhD or had only a primary school education.

The questionnaire was administered through SurveyMonkey® and consisted of five sections. First, brand anthropomorphism perception was detected by adapting the 7-item scale developed by Waytz et al. (2010) to the NBVA experiential context. Brand trust was measured in the second part by adopting the Chaudhuri and Holbrook (2001) four-item scale. In the third section, CBE was measured by adopting the scale of Harrigan et al. (2017) for the cognitive dimension, the measurement scales of Hollebeek et al. (2014) and Harrigan et al. (2017) for the affective element, and the scales of Dessart et al. (2016) for the behavioral dimension. Moreover, perceived privacy risk was measured by employing the four-item scale proposed by McLean and Osei-Frimpong (2019). All the items were assessed with a seven-point Likert-type scale ranging from one (strongly disagree) to seven

(strongly agree). Finally, fixed data were also collected (i.e., age, gender, and educational level).

#### 4. Data analysis and results

##### 4.1. Analytical technique

The hypotheses of the research model were tested through partial least squares-structural equation modeling (PLS-SEM) by using the latest version of SmartPLS 4 software. This method was selected for data processing for the following reasons. First, as a nonparametric method, PLS-SEM does not make assumptions about the distribution of data and is therefore appropriate for analyzing data that do not have a normal distribution (Hair et al., 2022). Prior to running PLS-SEM, normality tests were conducted, and they suggested that the data were not distributed normally. Second, PLS-SEM is a desirable analytical technique for studies that deal with new concepts with the purpose of theory building (Ali et al., 2018a) and in situations when the posited cause-and-effect relationships have not been investigated sufficiently (Ali et al., 2018b). These premises also matched this study, as the proposed model extends the brand anthropomorphism theoretical framework, which thus far has not sufficiently investigated its potential outcomes. Third, one of the strongest points of PLS-SEM is the prediction orientation (Shmueli et al., 2016). In this study, brand anthropomorphism is considered a major predictor within the proposed model, and its impact on different brand-related outcomes is examined. Finally, PLS-SEM handles causal models that have numerous constructs and different relationships very well (Hair et al., 2022), such as the model tested in this research.

##### 4.2. Measurement model assessment

The measurement model was assessed by considering indicator reliability, internal consistency reliability, convergent validity, and, finally, discriminant validity (Hair et al., 2022).

The size of the outer loadings was analyzed for indicator reliability. After removing one item of cognitive consumer-brand engagement with a loading higher than 1, all the items with loadings higher than 0.6 were kept. As Table 1 shows, while the outer loadings were mostly higher than 0.7, some were lower than 0.7 but higher than 0.6. As suggested by Hair et al. (2022), items with outer loadings higher than or equal to 0.4 and lower than 0.7 should be removed only if further analyses of internal consistency reliability and convergent validity of the construct report values that do not reach the recommended thresholds. As no problems were observed in this regard, all the items with loadings higher than 0.6 were retained. The subsequent bootstrapping procedure revealed a high significance of all the indicators (see Table 1).

Cronbach's alpha ( $\alpha$ ) and composite reliability (CR) values were calculated for internal consistency reliability, meeting, in both cases, the threshold of 0.7 (see Table 1).

Convergent validity was examined by employing a common measure of average variance extracted (AVE). All the AVE values were greater than 0.5, indicating that the constructs explained more than half of the variance in their items (see Table 1).

Finally, discriminant validity was tested through the most powerful measure for its evaluation, i.e., the heterotrait-monotrait (HTMT) ratio (Henseler et al., 2015). When a model addresses variables that are conceptually rather similar (such as cognitive, affective, and behavioral consumer-brand engagement), Henseler et al. (2015) recommend using a threshold value of 0.9. As presented in Table 2, all the obtained values met this threshold. To provide additional insights into discriminant validity, bootstrapping was performed to obtain confidence intervals. As these confidence intervals also met the necessary thresholds, the discriminant validity of the measurement tool was confirmed (see Table 2).

**Table 1**  
Measurement tool assessment: Reliability and convergent validity.

	Loadings	t	$\alpha$	CR	AVE
<b>Brand Anthropomorphism (BA)</b>			0.915	0.914	0.606
BA1. Google appears to have a mind of its own	0.745*	8.028			
BA2. Google appears to have intentions	0.913*	11.385			
BA3. Google appears to have free will	0.756*	7.647			
BA4. Google appears to have consciousness	0.807*	12.030			
BA5. Google appears to have desires	0.692*	7.887			
BA6. Google appears to have beliefs	0.785*	10.276			
BA7. Google appears to have the ability to experience emotions	0.730*	8.362			
<b>Brand Trust (BT)</b>			0.836	0.836	0.631
BT1. I trust Google	0.761*	18.940			
BT2. Google is an honest brand	0.784*	19.421			
BT3. Google is safe	0.835*	23.122			
<b>Cognitive Consumer-Brand Engagement (C_CBE)</b>			0.952	0.953	0.871
C_CBE1. I pay a lot of attention to anything about Google	0.927*	17.284			
C_CBE2. Anything related to Google grabs my attention	0.890*	18.313			
C_CBE3. I concentrate a lot on Google	0.980*	18.456			
<b>Affective Consumer-Brand Engagement (A_CBE)</b>			0.897	0.896	0.635
A_CBE1. I am passionate about Google	0.648*	9.271			
A_CBE2. I am enthusiastic about Google	0.793*	12.354			
A_CBE3. I feel excited about Google	0.810*	15.522			
A_CBE4. I love Google	0.791*	15.266			
A_CBE5. Using Google makes me happy	0.918*	19.705			
<b>Behavioral Consumer-Brand Engagement (B_CBE)</b>			0.888	0.882	0.606
B_CBE1. I share my ideas about Google	0.659*	10.724			
B_CBE2. I share interesting content about Google	0.625*	8.160			
B_CBE3. I try to get others interested in Google	0.706*	11.820			
B_CBE4. I actively defend Google from its critics	0.906*	17.945			
B_CBE5. I say positive things about Google to other people	0.941*	16.295			
<b>Perceived Privacy Risk (PPR)</b>			0.832	0.834	0.561
PPR1. I have my doubts over the confidentiality of my interactions with Google Assistant	0.673*	5.941			
PPR2. I am concerned about performing a financial transaction via Google Assistant	0.716*	7.317			
PPR3. I am concerned that my personal details stored with Google Assistant could be stolen	0.919*	11.487			
PPR4. I am concerned that Google Assistant collects too much information about me	0.658*	6.774			

Note: \*p = 0.000.

**Table 2**  
Measurement tool assessment: Discriminant validity.

	BA	A_CBE	B_CBE	C_CBE	PPR
<b>A_CBE</b>	0.360 [0.260; 0.452]				
<b>B_CBE</b>	0.330 [0.227; 0.428]	0.851 [0.801; 0.896]			
<b>C_CBE</b>	0.221 [0.123; 0.319]	0.824 [0.780; 0.862]	0.707 [0.648; 0.763]		
<b>PPR</b>	0.079 [0.071; 0.174]	0.080 [0.063; 0.188]	0.108 [0.076; 0.213]	0.088 [0.052; 0.178]	
<b>BT</b>	0.394 [0.293; 0.484]	0.534 [0.444; 0.619]	0.533 [0.448; 0.614]	0.356 [0.252; 0.455]	0.389 [0.280; 0.494]

Brand Anthropomorphism, A\_CBE = Affective Consumer–Brand Engagement, B\_CBE = Behavioral Consumer–Brand Engagement, C\_CBE = Cognitive Consumer–Brand Engagement, PPR=Perceived Privacy Risk, BT= Brand Trust.

4.3. Structural model assessment

For the structural model evaluation, the collinearity between each set of predictor values was tested, and the relevance and significance of path coefficients were analyzed. The collinearity test was used to determine the potential for common method bias in PLS-SEM, as suggested by Kock (2015). Finally, the explanatory power and predictive relevance of the structural model were examined (Hair et al., 2022).

Collinearity was analyzed by considering the VIF values of the constructs predicting other constructs. The obtained values ranged between 1.012 and 1.184 and were therefore below the threshold of 3, indicating that there were no collinearity problems within the structural model (Hair et al., 2022) and that there was no evidence of common method bias (Kock, 2015).

Bootstrapping was employed to test the relevance and significance of the path coefficients (Hair et al., 2022). As presented in Table 3, the most relevant paths of the structural model were obtained for the influence of brand trust on behavioral and affective consumer-brand engagement, followed by the obtained path for the relationship between brand anthropomorphism and brand trust and the path reflecting the effect of brand trust on cognitive consumer-brand engagement. The significance tests showed that the impact of brand trust on the three dimensions of consumer-brand engagement was strongly significant, as was the influence of brand anthropomorphism on brand trust (in all cases, p values equaled 0.000). Therefore, the results reveal that while brand anthropomorphism is a strong predictor of brand trust, brand trust is a strong driver of cognitive, affective, and behavioral consumer-brand engagement. On the other hand, although brand anthropomorphism is

**Table 3**  
Structural model: Explanatory power and path relevance and significance.

HYPOTHESES	$\beta$	t	p	95% Confidence intervals	Significance (p < 0.05)
BA → BT	0.391**	7.251	0.000	[0.282; 0.492]	Yes
BA → C_CBE	0.098ns	1.450	0.147	[-0.036; 0.230]	No
BA → A_CBE	0.179**	2.756	0.006	[0.053; 0.211]	Yes
BA → B_CBE	0.143*	2.231	0.026	[0.019; 0.211]	Yes
BT → C_CBE	0.318**	4.646	0.000	[0.182; 0.449]	Yes
BT → A_CBE	0.466**	7.682	0.000	[0.346; 0.583]	Yes
BT → B_CBE	0.489**	8.756	0.000	[0.378; 0.597]	Yes
PPR x BA → BT	0.109*	1.993	0.046	[0.004; 0.218]	Yes
PPR → BT	-0.385**	6.197	0.000	[-0.506; -0.263]	Yes

Note: BA=Brand Anthropomorphism, A\_CBE = Affective Consumer–Brand Engagement, B\_CBE = Behavioral Consumer–Brand Engagement, C\_CBE = Cognitive Consumer–Brand Engagement, PPR=Perceived Privacy Risk, BT= Brand Trust. \* Significant at the 0.05 level. \*\* Significant at the 0.01 level. ns = nonsignificant. C\_CBE: R2 = 0.175, A\_CBE: R2 = 0.315; B\_CBE: R2 = 0.314, BT: R2 = 0.310.

**Table 4**  
Structural model: Predictive power.

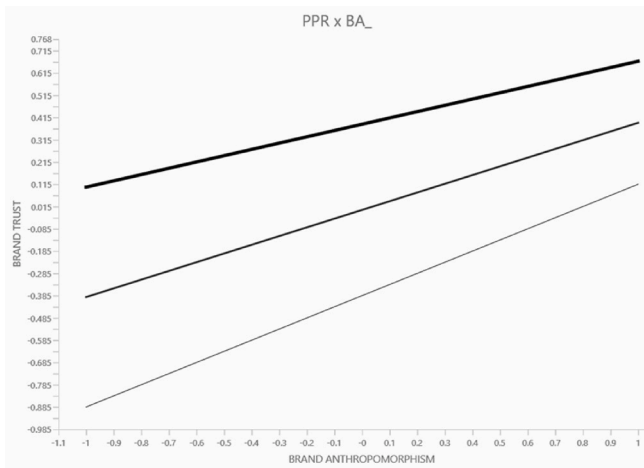
	Q <sup>2</sup> predict	PLS-SEM_RMSE	LM_RMSE
A_CBE1	0.039	1.650	1.672
A_CBE2	0.079	1.569	1.600
A_CBE3	0.063	1.538	1.556
A_CBE4	0.047	1.677	1.718
A_CBE5	0.076	1.543	1.554
B_CBE1	0.029	1.547	1.562
B_CBE2	0.022	1.618	1.618
B_CBE3	0.031	1.616	1.623
B_CBE4	0.087	1.598	1.625
B_CBE5	0.072	1.604	1.639
C_CBE1	0.036	1.656	1.664
C_CBE2	0.015	1.653	1.657
C_CBE3	0.047	1.577	1.582
BT1	0.163	1.420	1.426
BT2	0.122	1.392	1.404
BT3	0.182	1.352	1.379

Note: A\_CBE = Affective Consumer–Brand Engagement, B\_CBE = Behavioral Consumer–Brand Engagement, C\_CBE = Cognitive Consumer–Brand Engagement, BT= Brand Trust.

confirmed as a strong driver of affective consumer-brand engagement (significant at a 0.01 level), its impact on the behavioral dimension of the concept (significant at a 0.05 level) and, especially, on its cognitive component (nonsignificant) is dampened. Finally, the relevance and significance of the moderating role of perceived risk on the relationship between brand anthropomorphism and brand trust are explained in the next section, which reports the results from the moderation analysis.

During the final phase of the structural model assessment, R<sup>2</sup> values were examined to test the model’s explanatory power (Hair et al., 2022). The model is found to have satisfactory explanatory power, as all the obtained R<sup>2</sup> values ranged between 0.135 and 0.315, meeting the threshold of 0.1 (Falk and Miller, 1992).

PLS prediction was employed to evaluate the model’s predictive power (Hair et al., 2022). As suggested by Shmueli et al. (2019), the Q<sup>2</sup> predicted values were examined first, followed by an alternative benchmark, i.e., a linear regression model (LM) benchmark. All positive values were obtained during the first step, meaning that the PLS-SEM-based predictions outperformed the most naïve benchmark. In addition, the RMSE values from the PLS-SEM analysis were compared with the naïve LM benchmark. As reported in Table 4, all the indicators in the PLS-SEM analysis had lower RMSE values than the naïve LM benchmark values, except for one item under behavioral consumer-brand engagement, indicating the satisfactory predictive power of the model.



**Diagram 1.** Moderation analysis: Slope plot

Note: The middle line represents the relationship between BA and BT for an average level of PPR (i.e., PPR at mean), the upper line represents the relationship between BA and BT for lower levels of PPR (i.e., PPR at -1 SD), and the lower line represents the relationship between BA and BT for higher levels of PPR (i.e., PPR at +1 SD). PPR= Perceived Privacy Risk, BA=Brand Anthropomorphism, BT=Brand Trust SD=Standard Deviation. Source: PLS output.

#### 4.4. Moderation analysis

Regarding the moderating role of perceived privacy risk in the impact of brand anthropomorphism on brand trust, the obtained  $p$  value of 0.046 from bootstrapping demonstrated that this effect was significant at the 0.05 level. Because the respective confidence interval did not include zero, the interaction effect was found to be significant, supporting the existence of the moderating role of perceived privacy risk on the relationship between brand anthropomorphism and brand trust (see Table 3).

Moderation analysis was further performed through simple slope analysis (Hair et al., 2022). As suggested in Diagram 1, at higher levels of perceived privacy risk, the positive effect of brand anthropomorphism on brand trust was strengthened.

Finally, Hair et al. (2022) also recommend considering the  $f^2$  effect size of the interaction effect to ensure the completeness of any interpretation of moderation analysis results. Here, the obtained  $f^2$  effect size of 0.023 revealed a rather large effect according to Kenny's (2018) guidelines for assessing the  $f^2$  criterion.

Overall, the findings of the moderation analysis show that perceived privacy risk has a significant moderating effect on the relationship between brand anthropomorphism and brand trust and that the influence of brand anthropomorphism on brand trust is intensified when perceived privacy risk is high.

## 5. Conclusion

### 5.1. Discussion and theoretical implications

This study has proposed a model of the consequences of brand anthropomorphism, outlining its direct effects on brand trust and multidimensional CBE (i.e., cognitive, affective, and behavioral dimensions) as well as the moderating role of perceived privacy risk in the relationship between brand anthropomorphism and brand trust in the NVBA environment. Accordingly, given that this research integrates the brand anthropomorphism literature with the emerging strand of research on consumer VA response, findings contribute to both fields.

First, the results highlight how brand anthropomorphism positively affects brand trust (H1). This finding is in line with the research of Golossenko et al. (2020), who indirectly echoed how brand

anthropomorphism is a driver strengthening brand trust by endowing a brand with visual, human-like traits, e.g., a nose, eyes, and a mouth. While the literature has emphasized the positive influence of VA anthropomorphism perception on VA trust (Chérif and Lemoine, 2019; Pitardi and Marriott, 2021), this study has found that even the relationship between brand anthropomorphism and brand trust in the NVBA interaction context is significant and positive.

Second, the findings identify perceived privacy risk as a boundary condition that magnifies the influence of brand anthropomorphism on brand trust (H2). Specifically, when consumers perceive the context as a low-privacy risk, brand anthropomorphism has a positive but weaker impact on brand trust. On the other hand, the effect of brand anthropomorphism on brand trust intensifies when users are seriously concerned about external privacy threats. In this sense, the brand is regarded by users as a trusted "person" who safeguards their data (e.g., personal data and payment details), when interactions are deemed highly risky (e.g., voice-based shopping operations). Therefore, the findings reveal a novel role of perceived privacy risk, i.e., a contextual variable that alters the influence of brand anthropomorphism perception on brand trust in the NBVA context. Accordingly, these results provide insights into the VA literature, which has hitherto addressed perceived privacy risk as a negative driver of several consumer VA responses, such as VA trust or VA attitude (e.g., Pitardi and Marriott, 2021; Vimalkumar et al., 2021). At the same time, the moderation of perceived privacy risk in the relationship between brand anthropomorphism and brand trust may be indirectly echoed in the advertising and e-commerce literature (Kim and McGill, 2011; Xie et al., 2020).

Third, brand anthropomorphism positively influences the affective (H3b) and behavioral (H3c) dimensions of consumer-brand engagement. These results partially support the qualitative findings proposed by Vernuccio et al. (2023a), who define multidimensional CBE as a branding objective pursued by companies in in-car NBVA brand anthropomorphization strategies from the managerial perspective. In addition, this research extends the findings on technology providers' VA services that have highlighted the positive effect of VA-perceived humanity (i.e., Alexa social presence) on multidimensional CBE by showing that brand anthropomorphism positively influences the affective and behavioral dimensions of engagement with a brand that speaks through an NBVA. While previous research has suggested that only the behavioral dimension of CBE is a consequence of brand humanity (e.g., Pérez-Vega et al., 2018; Tuskej and Podnar, 2018), the findings of this article have revealed its influence on the cognitive and affective dimensions of CBE. Concerning cognitive CBE, this study found that the direct effect of brand anthropomorphism is nonsignificant; consequently, H3a is not supported. This result could be explained by considering studies that note how consumer-brand engagement occurs within peculiar contextual conditions that can generate varying degrees of brand engagement (e.g., Kaltcheva et al., 2014; Chandler and Lusch, 2015).

Fourth, the findings reveal that brand trust is a mediator construct between brand anthropomorphism and consumer-brand engagement. Specifically, following Hair et al.'s (2022) mediation analysis, the data support the indirect-only (full) mediation and complementary (partial) mediation of trust. Specifically, trust fully mediates the relationship between brand anthropomorphism and cognitive consumer-brand engagement, as the indirect effect between the two variables is significant, whereas the direct effect is not. Concerning the relationship between brand anthropomorphism and affective CBE on the one hand and between brand anthropomorphism and behavioral CBE on the other, the findings of this study reveal a complementary (partial) mediation of trust in both cases. That is, the direct and indirect effects are both significant and point in the same direction.

Finally, brand trust positively affects the three fundamental dimensions of CBE, i.e., cognitive (H4a), affective (H4b), and behavioral (H4c). In this regard, Nyadzayo et al. (2020) suggest that brand trust enhances the cognitive and affective dimensions of engagement with

mobile phone brands (e.g., Apple) but not the activation dimension. However, these authors have called for further research on the relationships between brand trust and the dimensions of CBE because results can vary according to specific brands and contexts. Answering this call, this study shows how brand trust positively affects each of the three major dimensions of consumer-brand engagement, i.e., cognitive, affective, and behavioral.

Overall, then, this research extends the marketing literature on consumers' perception of VA services (e.g., [Pitardi and Marriott, 2021](#); [Moriuchi, 2021](#)), which has considered only the effect of VA anthropomorphism perception on outcomes related to this conversational service (i.e., VA trust, VA engagement). In contrast, this study has analyzed the relationships among the perception of brand anthropomorphism and its branding outcomes, such as brand trust and consumer-brand engagement in the NBVA interactional environment. Thus, these findings advanced knowledge in this research field where branding implications have remained thus far underinvestigated.

This study also enriches the literature on brand anthropomorphism (e.g., [Puzakova et al., 2009](#); [Golossenko et al., 2020](#)) by empirically identifying the consequences of a brand that assumes an anthropomorphic vocal physique. Brand vocal physique constitutes an innovative, fundamental component of "brand semiotics"; it contributes to the creation of the central brand meaning system and the salient "building blocks" (e.g., logo, colors, slogan) ([Kucuk, 2015](#)). Hence, consumers' perceptions of brand anthropomorphism in an innovative and vocal interaction context have been illustrated. Moreover, these results respond to the call of [Sharma and Rahman \(2022\)](#) for further research to reveal the branding implications of brand anthropomorphism perception in the VA interaction field.

## 5.2. Managerial implications

This study provides managers with an initial understanding of some interrelated branding outcomes that can be successfully pursued through the use of an NBVA, a new intelligent touch point aimed at direct consumer-brand interactions.

First, in an environment characterized by the absence of visual codes, practitioners must exploit the novel lever of the vocal physique to foster consumers' perception of brand anthropomorphism in terms of free will, intentions, consciousness, desires, beliefs, and emotions. To foster the perception of a conscious anthropomorphic brand, practitioners should therefore create a brand voice with a mix of human vocal characteristics, such as accent, pitch, quality, and gender. On the other hand, they should ensure that conversational experiences are highly responsive and reliable. That is, brands, through NBVAs, should react promptly and correctly to users' requests. Accordingly, through the appropriate design of its NBVA service, a brand, for the first time, can directly interact with its consumers through its unique name and vocal physique. The brand's goal, then, should be to instill in its consumers' minds a particular human profile aligned with its 'brand meaning' objectives.

Second, in light of the results, managers should consider this first goal a starting point on the path to a second fundamental achievement, i.e., strengthening brand trust, a critical factor in digital environments typically deemed high-risk privacy contexts (e.g., [Pitardi and Marriott, 2021](#)). Critically, from this perspective, the riskier the context perception is, the greater the brand trust benefit of a branding strategy geared toward brand anthropomorphism. In this sense, the brand should present itself to every user as a "person" highly committed to defending the privacy of its "interlocutors". That is, the brand should transparently and selflessly communicate its assumption of responsibility on all occasions of interaction, especially those deemed riskier (e.g., orders, payments, requests for socially sensitive or very intimate information).

Third, based on the findings of this study, managers should connect the goals of brand anthropomorphism and brand trust to achieve better CBE outcomes. Indeed, by leveraging both anthropomorphic profile building and brand trust strengthening, firms can achieve better results

concerning the three main dimensions of CBE (i.e., cognitive, affective, behavioral). Specifically, by strengthening brand trust, a brand perceived as anthropomorphic can garner higher consumer attention and interest (CBE cognitive dimension). Concerning the optimal achievement of the affective dimension of CBE, marketing managers should foster the perception of a friendly human-like brand that can experience emotions by choosing a specific mix of vocal features and building a playful human-like consumer-brand dialog. Finally, behavioral CBE should be built on the proactivity of "a human-like brand speaking" through an NBVA, providing prompts and calls for action.

## 5.3. Limitations and future research lines

This research has some limitations that open lines for future research. First, this study surveyed young adults who dialog through smartphones with Google Assistant. Future studies should examine other consumers (e.g., older generational class respondents), devices (e.g., smart speakers), and NBVAs (e.g., the BMW NBVA). Furthermore, the focus on Google and Google Assistant entails a significant limitation: consumers may already have established perceptions and attitudes toward such a well-known brand. Consequently, further experimental studies could test the relationships among brand anthropomorphism, brand trust, and multidimensional brand engagement by comparing the results for a fictitious brand vs. an existing, well-known brand (e.g., Google). Third, as the literature suggests that the cognitive, affective, and behavioral dimensions of CBE are complemented by social and experiential elements ([Gambetti et al., 2012](#)), future research should measure multidimensional CBE based on five dimensions to extend findings on the focal relationships in this article. Moreover, as this research has investigated only brand trust and multidimensional CBE, as the consequences of brand anthropomorphism, it neglects several cognitive (e.g., brand evaluation), attitudinal (e.g., brand attitude), and behavioral (e.g., brand loyalty) branding outcomes. These factors should be considered in further research. Furthermore, this research has not accounted for negative branding outcomes, such as brand dislike or brand hate (e.g., [Kucuk, 2016/2019](#)). Therefore, the authors call for studies to investigate critical issues concerning negative consumer-generated brand anthropomorphism ([Kucuk, 2020b](#)) in the NBVA interaction context, such as the relationship between negative reverse brand anthropomorphism and brand trust. Finally, since the branding implications in the NBVA environment remain underinvestigated, this study calls for empirical research from both consumer and managerial perspectives to advance the knowledge in this innovative interaction field; such studies could identify relevant opportunities in terms of brand anthropomorphism (e.g., [Sharma and Rahman, 2022](#)).

## Declaration of competing interest

The authors state that there is no conflict of interest.

## Data availability

The data that has been used is confidential.

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