

Article

Exploring Predictors of US Consumers' Pet Food Preferences—Spoiling Them One Bite at a Time!

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Abstract

The present study is dedicated to exploring key factors impacting US pet owners' preferences for brand, price, country of origin, and health and nutrition claims as important extrinsic and credence attributes. Pet engagement and subjective and objective knowledge, as well as varying forms of pet humanisation behaviour, were thought to be suitable factors. The study is of an explorative and quantitative nature, rooted in an online consumer survey, descriptive statistics, and partial least squares structural equation modelling (PLS-SEM). To strengthen the PLS-SEM model, relative preference shares derived from a best–worst analysis were integrated into the model. The results with the strongest effect sizes indicate that US pet owners' objective knowledge is positively associated with pet non-humanisation behaviour, those who actively engage with their pet are positively associated with loving humanisation behaviour, and that health and nutritional claims on pet food are less important for those reporting non-humanisation behaviours. The analysis between the varying types of pet humanisation behaviours and the best–worst-derived relative preferences for extrinsic and credence attributes provides a diverse picture. Together, the results suggest that pet engagement and both subjective and objective knowledge are associated with pet humanisation behaviour, which are differentially linked to the importance of pet food product attributes. Best practice recommendations for marketers in the pet food industry are provided.

Keywords: pet food; consumer preferences; USA; humanisation behaviour

1. Introduction

The US population can rightfully be described as a nation of pet enthusiasts [1,2]. In 2025, 94 million households kept at least one pet [3,4], a 12 per cent increase in the past two years [5]. Dogs, cats, freshwater fish, small animals such as rabbits and guinea pigs, and reptiles are among the top five most popular pets in the US [5]. In 2024, pet owners spent \$152 billion on their pets, including veterinary care, medications, grooming, training, pet sitting, and food. Pet food is available in physical and online stores [6], and food and treat expenditures contributed \$65.8 billion to the overall spending on pets [5]. This was followed by vet care with \$39.8 billion, supplies and over-the-counter medicine with \$33.3 billion, and \$13 billion on all other services outside veterinary care [5].

The food and treat expenditures are unsurprising, as US owners often have strong emotional bonds to their animals, and often humanise their pets, regarding them as furry friends, companions, or even as children [7]. Emotional attachment and humanisation



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appear to be an important part of contemporary pet ownership, impacting consumer behaviour and concerns for animal welfare [2]. Pet-related consumer behaviour goes beyond toys and pet accessories, because responsible pet ownership lies at the intersection of caregiving and animal well-being, ultimately translating into product and brand choices [8,9]. For instance, European reports and US studies attribute pet humanisation as a contributor to changes in pet nutrition, health and food preferences, and as pet clothing [10,11]. Reportedly, luxury brands such as Versace, Gucci and Barbour offer luxury pet clothing [10,12]. For pet food, functional food items and pet supplements have been receiving increased favour among consumers, and businesses are widening their product assortments with premium foods and supplements that support digestive and urinary comfort for senior animals [10,13].

Product composition and other intrinsic attributes such as appearance, texture, taste, and smell for pet food are widely discussed in the animal welfare and veterinary literature [14,15]. What has yet to be fully explored are preferences for extrinsic attributes such as packaging, size, and price, as well as credence attributes such as sustainability, safety, hygiene, health, and nutritional claims, which pet owners cannot observe or verify after purchase and consumption.

The present study seeks to fill this literature gap and explore key factors impacting US consumers' preferences for brand, price, country of origin, and health and nutrition claims as important extrinsic and credence attributes that appeal to involved and caring pet food owners. These attributes are of crucial importance, as pet humanisation has led to intensified US consumer interest in premium products and health and nutritional features since the coronavirus pandemic. Understanding these preferences allows marketers in the US pet food industry to design consumer messages and products that stand out in this competitive market.

1.1. Conceptual Framework and Hypotheses Development

The present study is anchored in involvement theory, which has been developed by multiple scholars over several decades. The concept of involvement builds on commitment and a consumer's perception that a product aligns with their values and is therefore an extension of themselves, as these values define individuality, ego, and identity [16,17]. The extant literature distinguishes forms of involvement, such as product, advertising, and situational involvement. Product involvement describes how consumers attach meaning to a product of their interest. Similarly, advertising involvement relates to their mental state when presented with an advertisement and how well they connect with its message. Finally, situational involvement speaks to the personal needs of consumers and a short-term connection to the product. The underlying assumption behind each form is that highly involved consumers have preferences that align with their attitudes, priorities, and values, and therefore their purchase or the advertisement content they are exposed to feels meaningful to them [18,19]. In contrast, low involvement does not entail great personal significance [20,21]. Experience, information exposure, knowledge, and leisure activities such as playing sports or, for the present study, being engaged with a pet, have proved to be important indicators of involvement. Specifically, knowledge and pet engagement reflect responsible pet ownership and explain how owners perceive and treat their pets. Ultimately, it also influences pet owners' preferences for specific product attributes, which is the train of thought for the present study.

1.1.1. Pet Engagement

Engagement with pets builds on human–animal interaction, which is beneficial for the physical and mental well-being of the pet and human being [22–25]. Human–animal

interactions are described as relationship-like, growing through a series of engagements over time [24]. The extent of engagement depends on the animal's purpose and role within the pet owner's life [26]. Reportedly, in households with pets and children, pet owners engage less in shared pet activities and spend less time and resources on pet care [26–28]. Engagement with pets is higher among empty-nesters, newlyweds, and singles [26]. Other studies have examined human–pet interaction and viewed engagement with a pet as a form of human self-expansion, where a pet constitutes a positive addition to the owner's self, bringing new relationships and experiences [9]. Engagement with a pet can occur in physical form or visual form. Physical engagement is tactile, such as petting and playing or grooming and feeding, while visual engagement is observing an animal or showing pictures to an animal [24].

1.1.2. Subjective and Objective Knowledge

In the absence of an extensive body of literature on US consumers and pet food knowledge, this section builds on studies dedicated to pet food and animal feed (husbandry) from multiple countries. Studies in both areas outline the distinction between subjective and objective knowledge as important predictors of perception [29–31]. While subjective knowledge stems from consumers' understanding and interpretation of direct experiences, objective knowledge is based on long-term memory of individuals and is evaluated through testing [32]. Objective knowledge leads to the application and evaluation of information. In contrast, subjective knowledge is self-reported by individuals participating in consumer research. Subjective knowledge encompasses the consumer's confidence in the knowledge they possess, with low levels of subjective knowledge indicating missing confidence and triggering information searches [33]. High levels of confidence indicate dependence on prior knowledge [33,34].

Ai et al. (2025)'s recent literature review on the drivers of pet food choices reports that pet owners possessing knowledge and higher education are less sensitive to price and store reputation [35]. Similarly, Xiao et al. (2021) [36] found that in the Chinese pet food market, knowledgeable pet food owners preferred online stores and reputable brands, confirming findings of Kumcu and Woolverton (2014) [37], who state that those with higher levels of education, as a reflection of knowledge, and smaller households prefer quality and premium food. In the US pet food market [36,37], Rombach and Dean (2021) [30] found that both subjective and objective knowledge are significant positive predictors for US pet owners' preferences for natural ingredients, health claims, and convenient product sizes as relevant product attributes. While it is established that knowledge impacts product and attribute preferences directly, it can only be inferred from the pet humanisation literature [22,38,39] that knowledge impacts pet humanisation behaviour, such as treating a pet as a friend or family member, treating a pet as an animal, and exhibiting spoiling behaviour.

1.1.3. Pet Humanisation Behaviour

According to Forbes et al. (2018) [39], pet humanisation behaviour is widely studied and refers to circumstances in which pet owners regard their pet and their relationship with their pet to be of a human nature. Owners give their pets human names of endearment and perceive their pets as friends, companions, family members, soulmates, surrogate children, and substitute grandchildren [23,39–41]. In addition, the rise of pets being buried like human beings and the increasing number of pet cemeteries is further evidence of pet humanisation among owners [39,42,43]. Also, in terms of their grief, pet owners reported feelings of loss and grief for lost pets as strong as those for lost humans [44,45]. Other evidence stems from pet housing and from research investigating relationships between small children and animals. Reportedly, small children place higher importance on their

furry friendships than on their relationships with human beings [46]. In pet housing, pet humanisation behaviour is also reflected. Pets may be allowed to roam freely in the house and are permitted to sleep next to or in the bed with owners [39]. Owners with such behaviour patterns tend to view their pet as a child or family member, showing a loving, humanised relationship with their pet. Some more intense humanisation behaviours include pet spoiling. For special occasions such as birthdays and the holidays, gifts are given to all members of the households, including pets [47], while other studies report pet rituals, including pet weddings and blessings [48]. White et al. (2016), Forbes et al. (2018), and Rombach and Dean (2021) provide evidence that humanisation behaviours and pet spoiling are also associated with purchase behaviour, such as buying food, treats, pet clothing, toys, and other accessories [30,39,49]. In the food context, owners viewing their pet as a child or family member tend to more frequently buy premium products or products available from the vet [39]. The veterinary literature showcases the negative effects of pet humanisation and spoiling behaviour, namely obesity, weight-reducing diets, and exercise programmes for pets [50–53].

1.1.4. Attribute Preference

Product compositions and intrinsic food attribute preferences for wet and dry pet food are well-explored among pet owners [54–57], but their preferences for extrinsic and credence attributes are not as extensively covered [53,58]. Hobbs and Anderson (2024) [58] explored consumer preferences and their willingness to pay for health and well-being attributes for pet food products. Their study found that pet owners are willing to pay a higher price premium for health-related credence attributes, related to allergy, skin, digestion, and immune support [58]. Another important credence attribute is country of origin, a pet food attribute that is often discussed within the context of food safety and pet health [32,38]. Lee et al. (2025) [59] emphasise the importance of product origin, brand credibility, and practical features like easy-to-store packaging as important features to pet owners' trust and brand loyalty. Hobbs et al. (2023) analysed pet product reviews and found that health/benefit, natural/organic, processing, sourcing, small/large breed, price, and service are important extrinsic attributes determining post-purchase experiences [60]. An earlier study dedicated to dog and cat owners found that natural ingredients are preferred compared to organic ones. Overall, price and ingredient source were the most important attributes impacting dog and cat owners' choices [61]. In terms of pet food brand preferences, Hobbs & Shanoyan (2018) [62] discuss that the online market is gaining popularity as a distribution channel and that brand preferences vary. Investigating two dog food brands, Nestle Purina and Mars Inc [62], it was highlighted that the brands are marketed via ingredient characteristics. However, Nestle Purina is dominant and has been competitive in the US dog food market [62]. The advantages stem from balancing ingredients and other product characteristics, while Mars Inc. solely focuses on input ingredients and misses out on other marketing tactics to leverage consumer preferences for pet food and pet food attributes [62].

Building on the literature, a conceptual model is proposed. It is suggested that objective knowledge, subjective knowledge, and pet food engagement are indicators of involvement, which influence pet perceptions and associated humanisation behaviour among US pet owners, namely treating pets as animals, as family members or friends, and pet spoiling behaviour. These three types of behaviours are assumed to impact relative attribute preferences for brand, price, country of origin, health benefit claims, and nutrition claims (see Figure 1). The following hypotheses are proposed:

Hypothesis 1. US pet owners' objective knowledge is positively associated with (a) loving humanisation behaviour (treating pets as friends or family), (b) non-humanisation behaviour (treating pets as animals), and (c) intense humanisation behaviour (spoiling behaviour).

Hypothesis 2. US pet owners' subjective knowledge is positively associated with (a) loving humanisation behaviour (treating pets as friends or family), (b) non-humanisation behaviour (treating pets as animals), and (c) intense humanisation behaviour (spoiling behaviour).

Hypothesis 3. US pet owners' active engagement is positively associated with (a) loving humanisation behaviour (treating pets as friends or family), (b) non-humanisation behaviour (treating pets as animals), and (c) intense humanisation behaviour (spoiling behaviour).

Hypothesis 4. US pet owners' loving humanisation behaviour (treating pets as friends or family) is associated with their relative attribute preferences for (a) brand, (b) price, (c) country of origin, (d) health benefit claims, and (e) nutrition claims.

Hypothesis 5. US pet owners' non-humanisation behaviour (treating pets as animals) is associated with their relative attribute preferences for (a) brand, (b) price, (c) country of origin, (d) health benefit claims, and (e) nutrition claims.

Hypothesis 6. US pet owners' intense humanisation behaviour (pet spoiling) is associated with their relative attribute preferences for (a) brand, (b) price, (c) country of origin, (d) health benefit claims, and (e) nutrition claims.

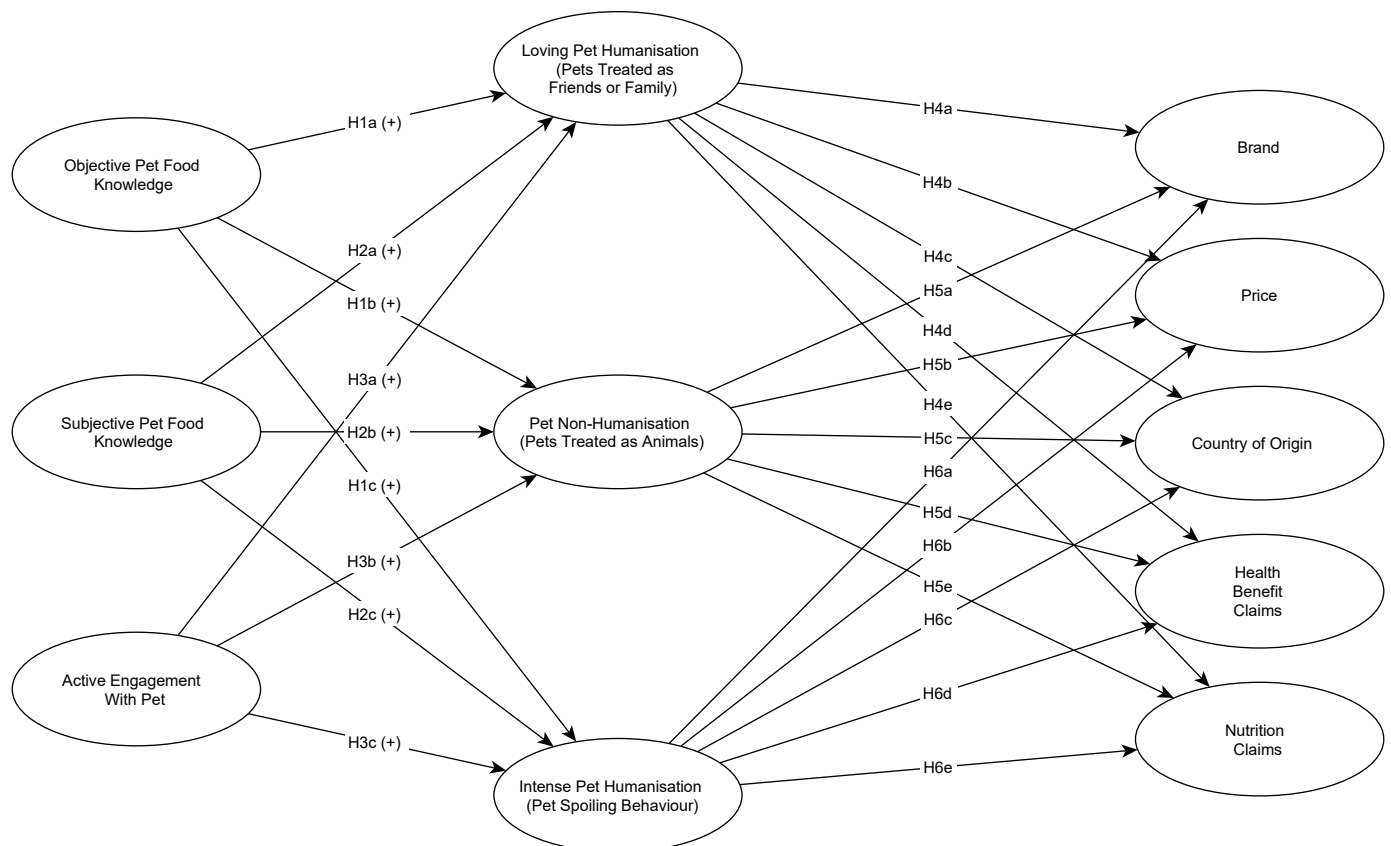


Figure 1. Conceptual model.

2. Methods

The present study builds on an online consumer survey developed via the Qualtrics survey tool and disseminated via the crowdsourcing platform MTurk. Using crowdsourcing platforms to obtain responses from consumers is a common and widely accepted practice in marketing and consumer research [63–65]. The survey was designed to explore the behaviours and preferences of pet food owners in the US. Survey respondents had to be 18 years old, be pet owners, and oversee the household's food shopping. Respondents not fulfilling these criteria were excluded from study participation. In addition, participants who were well short of the average completion time were omitted from the survey, as rushing through a survey without carefully reading leads to poor data quality [66]. A sample from 206 survey responses was considered appropriate for the analysis, following Hair's rule to determine a minimum sample size suitable for a partial least squares structural equation modelling analysis [67]. Following Hair et al. (2022) [68], the ten-times rule indicates that a sample size of 50 would be sufficient. The rule stipulates that the sample size should be greater than 10 times the maximum number of inner or outer model links pointing at any latent construct within the model [68]. The statistical description of the sample can be seen in Table 1. The sample can be described as young, with most surveyed pet owners in the age range of 25–34, well-educated, and with an annual mid-range income between \$25,000–\$75,000. While the purposive sample does not mirror the population in terms of the most recent census, it leans towards pet owners for whom the phenomenon of pet humanisation is said to be more strongly pronounced [69]. Among the generational cohorts, Millennials and Gen Zs are known to be pet humanisers who are very involved in buying pet food [69]. These generational cohorts associate pet interaction with consumerism, for instance, luxury health services, pet birthday parties, and humanised care trends encouraged and adopted from social media content [69]. To be able to afford these pet products and services requires a medium to high income. Older generational cohorts were also included in the sample, as for these pet-owners, pet ownership and humanisation are often tied to emotional well-being, and the pet may serve as a child replacement [69].

The survey comprised several sections with closed-end questions, and respondents were asked to indicate their knowledge, their perceived importance of pet engagement, their perspectives on pet humanisation behaviour, socio-demographic information, and their relative preferences for pet food attributes. Question items and scales were derived from the extant literature. Apart from socio-demographic questions and pet food attribute preferences, responses were based on seven-point Likert scales.

To understand the relative preferences for extrinsic and credence pet food attributes, a best–worst scenario was given to the respondents. The respondents were presented with eleven sets. Each set comprised five attributes, where for each set they had to indicate their most preferred (best) and least preferred (worst) attribute choices [70,71]. The responses to the task constitute relative preferences. The experimental design requires balance with respect to the choice set, systematic choice set construction, and randomisation in terms of choice set order and item position [72]. Balance and randomisation are important to ensure that every item is compared fairly, and pet owners' choices indicate their actual relative importance, rather than methodological artefacts [70,71]. The eleven pet food attributes were included in the best–worst scaling task to obtain a comprehensive range of factors impacting pet food choices. However, for the PLS-SEM analysis, only five of the eleven attributes were considered relevant, namely health benefit claims, nutrition claims, price, brand, and country of origin, and were included in the model. The selection of the five attributes was informed by theoretical relevance, and the investigation's core focus on purchase preferences impacted by varying forms of humanisation behaviour.

Table 1. Sample description.

	Freq	%	Census %
Age			
18–24	10	4.9	12
25–34	130	63.1	18
35–44	43	20.9	16
45–54	14	6.8	16
55–64	7	3.4	17
65+	2	1	21
Total	206	100	100
Education			
Did not finish high school	1	0.5	11
Finished high school	20	9.7	27
Attended University	23	11.2	21
Bachelor’s Degree	129	62.6	28
Postgraduate Degree	33	16	13
Total	206	100	100
Household Annual Income			
\$0 to \$24,999	39	18.9	18
\$25,000 to \$49,999	82	39.8	20
\$50,000 to \$74,999	58	28.2	17
\$75,000 to \$99,999	20	9.7	13
\$100,000 or higher	7	3.4	31
Total	206	100	100

Portion size, convenience, tolerable smell, meat type, and packaging were excluded as they are consumption facilitation attributes, and collectively they impact conditions and suitability under which consumption occurs. Therefore, they are not appropriate core evaluative dimensions for this work. In addition, the excluded attributes display a strong conceptual interdependence and shared perceptual dimensions; modelling them individually may have led to redundancy, increased their relative importance, or jeopardised overall conceptual independence of the constructs.

Overall, the integration of the best–worst-derived preference shares into a PLS-SEM model was considered appropriate as it may strengthen measurement validity and improve predictive power by embedding the attribute trade-offs that pet owners make into the model [73]. Given that the best–worst-derived relative preferences are likely to contribute to stronger behavioural variance, compared to the Likert scale items, enhanced predictive accuracy and predictive relevance would be expected. The integration of best–worst preference shares into a PLS-SEM model incorporates psychometric constructs and empirically derived relative preference shares, resulting in a more complete and realistic understanding of consumer decisions [73].

A PLS-SEM analysis is a two-step procedure, which was executed with SMART-PLS 4.1. The first step is the outer model analysis (measurement model), and the second step is the inner model analysis (structural model) [67,68]. Hair et al. (2022) discuss how to execute these steps and the appropriate criteria for reliability, validity, model fit, and performance [68]. PLS-SEM was deemed an appropriate methodological choice for the present study. It was preferred over a covariance-based approach (CB-SEM), due to data characteristics, research objectives, and model complexity [67]. This study was explorative in nature, aiming to explore key driver constructs rather than confirm theory or test existing models, which is a major strength of CB-SEM, so PLS-SEM was deemed a suitable fit [68]. In addition, PLS-SEM was chosen as the sample size was rather small/moderate

in size for a consumer sample. PLS-SEM can obtain higher statistical power with smaller sample sizes compared to CB-SEM, which requires large samples for stability [67]. In contrast to CB-SEM, PLS-SEM does not require specific distributional assumptions. This is particularly important because best–worst scores are not generally assumed to be normally distributed [67]. Moreover, PLS-SEM can better cope with missing values by using mean substitution and pairwise deletion. Lastly, PLS-SEM is not as prone to convergence issues and is better suited for complex models with larger numbers of constructs [68].

3. Results

Figure 2 displays the measurement and structural model analysis, including its concepts, tests, thresholds, and performance results. PLS-SEM analysis has two parts, and the first examines model measurement, which is also called outer model analysis, and concentrates on the fit between the items/questions and constructs/scales. Tests include reliability, convergent validity, and discriminant validity [68]. The second part concentrates on model performance, which is also called structural or inner analysis, and the tests include model fit, predictive accuracy (R^2), predictive relevance (Q^2), and freedom from unwanted collinearity [68]. Figure 2 displays the concepts comprising the outer and inner model analyses, their explanations, test criteria targets, results, and interpretation. For the current study, most of the tests met the specified criteria, indicating that the measurement and structure test criteria were satisfied. Therefore, the model was considered suitable for testing the hypotheses. Table 2 offers more detailed convergent validity and reliability scores and provides the specific wording of the survey questions. The overall convergent validity is adequate, yet a more critical discussion of specific item performance is required. The items with loadings of 0.683 (I know about the nutritional value) and 0.695 (I know that I am feeding my pet food) are considered moderate but still exceed the widely accepted minimum threshold of 0.50 for retaining items in scale development. This indicates sufficient item convergence onto the subjective pet food knowledge construct. Therefore, it can be argued that item pruning is not needed in this case. It can be assumed that omitting these items would likely decrease the scale’s content validity and comprehensiveness without significant statistical gain. The overall conclusions are robust because the scale meets the formal criteria for convergent validity, confirmed by an Average Variance Extracted of 0.549 (>0.50) and a Composite Reliability of 0.783, also exceeding the threshold. All in all, the rather moderate loadings do not compromise mode integrity [67,68].

In line with Figure 2, subjective pet food knowledge can be statistically defended, as the Composite Reliability (0.783) and Average Variance Extracted (0.549) values both exceed the established thresholds for PLS-SEM [68]. Admittedly, Cronbach’s alpha (0.587) is below the 0.60 threshold, but it must be considered that Cronbach’s alpha is a rather conservative estimate [68]. It is assumed the included items have equal “weight”; however, this is not necessarily true in practice. Given that three items have varying factor loadings (ranging from 0.68 to 0.83), Composite Reliability provides a more accurate measure of true reliability [68]. Furthermore, Cronbach’s alpha is mathematically punishing for having only three items. Its formula is rooted in a function of item quantity, where three items do not have the required volume to average out random error and this therefore deflates the reliability score. Given that the Average Variance Extracted confirms that the subjective pet food knowledge construct captures more than 50% of the variance in its indicators, the scale demonstrates adequate convergent validity and internal consistency for PLS-SEM standards (see Figure 2 and Table 2).

PLS-SEM Stage 1 — Measurement/Outer Model Analysis — This analysis examines suitability of how the construct scales have been measured using the questions (items) from the data collection		
Concept to be Tested	Criterion (threshold)	Current Results (Interpretation)
Scale Reliability Consistency and dependability of the proposed measurement scales	(a) Cronbach's alpha of items in a scale (≥ 0.6) (b) Composite reliability of items in a scale (≥ 0.6)	(a) Cronbach's alpha for 6 of 7 scales > 0.6 (acceptable) (b) Composite reliabilities for all scales > 0.6 (acceptable)
Convergent Validity Sufficient relationship between proposed scales and individual questions	(a) Factor loadings of questions on a scale (≥ 0.4) (b) Average Variance Extracted (AVE) of scale (≥ 0.5)	(a) Factor loadings of all scales ≥ 0.4 (acceptable) (b) AVE values for all scales ≥ 0.5 (acceptable)
Discriminant Validity Scale items are most closely aligned with their proposed scales	Heterotrait-Monotrait (HTMT) ratio (≤ 0.9)	39 of 40 Heterotrait-Monotrait ratios ≤ 0.9 (acceptable)
Multicollinearity The relationships between scales is not problematically high	(a) Individual Variance Inflation Factor (VIF) (≤ 5) (b) Average Variance Inflation Factor (VIF) (≤ 3.2)	(a) Max VIF score is 1.936 (acceptable) (b) Average VIF score is 1.625 (acceptable)
PLS-SEM Stage 2 — Structural/Inner Model Analysis — This analysis examines structural fit of the model, its ability to accurately predict, the relevance of its predictions		
Concept to be Tested	Criterion (threshold)	Current Results (Interpretation)
Model Fit The Model has sufficient fit to test the hypotheses	(a) Goodness of Fit (GoF) (larger is better but no agreed threshold) (b) Normed Fit Index (NFI) (larger is better but no agreed threshold) (c) Standardised Root Mean Square Residual (SRMR) (≤ 0.08)	(a) GoF is 0.464 (adequate) (b) NFI is 0.711 (acceptable) (c) SRMR is 0.081 (adequate)
Predictive Accuracy (Explanatory Power) The Model is able to adequately explain the variance of the dependent variables	The explained variance (R^2) of the dependent variables is considered weak ($R^2 \approx 0.25$), moderate ($R^2 \approx 0.50$), and substantial ($R^2 \approx 0.75$)	Average R^2 across all dependent variables is 0.273 (weak) (a) Treating pet as a friend / family member R^2 is 0.500 (moderate) (b) Pet spoiling behaviour R^2 is 0.336 (weak-moderate) (c) Treating pet as a pet R^2 is 0.537 (moderate) (d) Relative importance of brand R^2 : 0.091 (weak) (e) Relative importance of country of origin R^2 : 0.109 (weak) (f) Relative importance of health benefit claims R^2 : 0.251 (weak) (h) Relative importance of nutrition claims R^2 is 0.214 (weak) (g) Relative importance of price R^2 is 0.254 (weak)
Predictive Relevance The Model is able to adequately reconstruct the values of the dependent variables	Stone-Geisser (Q^2) values of the dependent variables are considered adequate but weak ($Q^2 > 0$), medium ($Q^2 > 0.25$), and high ($Q^2 > 0.50$)	Average Q^2 across all dependent variables: 0.216 (weak) (a) Treating pet as a friend / family member Q^2 is 0.463 (medium) (b) Pet spoiling behaviour Q^2 is 0.300 (medium) (c) Treating pet as a pet Q^2 is 0.520 (high) (d) Relative importance of brand Q^2 is 0.049 (weak) (e) Relative importance of country of origin Q^2 is 0.056 (weak) (f) Relative importance of health benefit claims Q^2 is 0.100 (weak) (h) Relative importance of nutrition claims Q^2 is 0.162 (weak) (g) Relative importance of price Q^2 is 0.079 (weak)

Figure 2. Data testing for analytical suitability. Source: Authors' own creation following Henseler et al. (2015) [74]; Hair et al. (2019) [67]; Hair et al. (2022) [68].

Table 2. Scale reliability and convergent validity.

Scales and Items	Factor Loadings	Cronbach's Alpha	CR	AVE
Objective Pet Food Knowledge		0.890	0.924	0.753
Difference between kibble and freeze-dried	0.848			
Difference between frozen raw and human food	0.877			
Difference between human food and fresh meat chunks	0.854			
Difference between wet can and human food	0.890			
Active Engagement with Pet		0.687	0.864	0.761
It is important that I interact with my pet every day	0.850			
I regularly groom my pet	0.894			
Subjective Pet Food Knowledge		0.587	0.783	0.549
I know about the nutritional value of pet food	0.683			
I am confident in my knowledge about pet food	0.835			
I know that I am feeding my pet food that is best for its health and well-being	0.695			
Loving Pet Humanisation		0.663	0.816	0.597
My pet is treated as a member of the family	0.770			
I treat my pet like a child	0.780			
I cannot imagine a life without my pet	0.767			
Intense Pet Humanisation		0.768	0.863	0.679
I regularly buy treats for my pet	0.728			
I buy gifts for my pet on special occasions (Christmas or birthday)	0.870			
I regularly buy accessories for my pet (clothing or toys)	0.866			
Pet Non-Humanisation		0.831	0.898	0.748
My pet is a nuisance	0.931			
I treat my pet like an animal	0.726			
My pet is not a big focus in my life	0.922			

Note: Composite Reliability is abbreviated as CR. Average Variance Extracted is abbreviated as AVE. Relevant threshold values: Cronbach's Alpha ≥ 0.6 ; CR ≥ 0.7 ; AVE ≥ 0.5 .

Figure 2 presents a Standardised Root Mean Square Residual value of 0.081, which slightly exceeds the conservative 0.08 threshold; it is still an acceptable result within a PLS-SEM context. Hair et al. (2022) recommend prioritising predictive relevance over perfect fit [68]. Hair et al. (2022) [68] state that an SRMR value of up to 0.10 is considered satisfactory for PLS-SEM models. They caution against overfitting models [68].

Overall, our model demonstrates varying levels of predictive relevance across the included constructs (see Figure 2): pet non-humanisation (0.52) and loving pet humanisation (0.463) show a large degree of predictive relevance. Nutrition (0.162) and intense pet humanisation (0.300) show a medium degree of predictive relevance. Brand, country of origin, health benefits, and price show a small degree of predictive relevance. This goes to show that overall, the included constructs exhibit positive predictive relevance, supporting the model's overall utility. Importantly, the strong performance in core areas of the model is generally considered sufficient justification with respect to the marginal SRMR value.

Table 3 displays more detailed discriminant validity information, such as the specific HTMT. Apart from one notable exception, discriminant validity is supported. The HTMT value between "Loving Pet Humanisation" and "Intense Pet Humanisation" is slightly above the threshold value of 0.9 [68]. However, the concepts can be theoretically

distinguished, as loving pet humanisation refers to an emotional state and intense pet humanisation to material actions. “Loving Pet Humanization” focuses on the intrinsic affective dimension of the pet owner and pet relationship and the pet’s status as a family member. However, “Intense Pet Humanisation” measures an extrinsic behavioural dimension, e.g., consumption behaviours spoiling the pet. The HTMT value shows that both constructs are correlated; they represent distinct modes of interaction, justifying their retention as separate, yet related, constructs within the model.

Table 3. HTMT results.

Heterotrait–Monotrait Ratio	A	B	C	D	E	F	G	H	I	J	K
(A) Active Engagement											
(B) Brand	0.089										
(C) Country Of Origin	0.133	0.023									
(D) Health Benefit Claims	0.126	0.362	0.340								
(E) Nutrition Claims	0.096	0.295	0.314	0.581							
(F) Objective Pet Food Knowledge	0.262	0.268	0.280	0.362	0.433						
(G) Loving Pet Humanisation	0.804	0.216	0.239	0.184	0.197	0.669					
(H) Pet Non-Humanisation	0.190	0.276	0.301	0.527	0.482	0.802	0.322				
(I) Intense Pet Humanisation	0.532	0.117	0.270	0.202	0.144	0.497	0.934	0.362			
(J) Price	0.195	0.089	0.115	0.172	0.075	0.315	0.402	0.137	0.401		
(K) Subjective Pet Food Knowledge	0.531	0.189	0.241	0.233	0.333	0.893	0.890	0.769	0.752	0.400	

Note: Relevant threshold values: HTMT: <0.9.

Similarly, the HTMT ratio of 0.893 for subjective pet food knowledge and objective pet food knowledge is nearing but still below the threshold value of 0.9 [68]. This can be attributed to theory, as both types of knowledge are closely related yet distinct [34]. Subjective knowledge relates to the intrinsic aspect, such as the individual’s confidence and perceived understanding [34]. Objective knowledge focuses on measurable extrinsic aspects: fact-based recall regarding pet food differences [34]. The HTMT value shows an expected correlation and a respective higher value. However, given that they are theoretically distinctive and below the threshold value, their separation in the model is deemed appropriate.

Finally, Table 4 contains the results of the hypothesis testing. US pet owners’ objective knowledge is positively and moderately associated with loving humanisation behaviour (treating pets as friends or family) and strongly positively associated with non-humanisation behaviour (treating pets as animals), indicating support for hypotheses H1a and H1b. However, no significant association was found between objective knowledge and intense humanisation behaviour (spoiling behaviour), indicating no support for hypothesis H1c.

In contrast, hypotheses H2a, H2b, and H2c all found support, indicating a positive significant association with moderate effect size between US pet owners’ subjective knowledge and loving humanisation behaviour (treating pets as friends or family) and non-humanisation behaviour (treating pets as animals), and intensely loving humanisation behaviour (spoiling behaviour).

US pet owners’ active engagement with their pet is positively and strongly associated with loving humanisation behaviour (treating pets as friends or family) and positively and strongly associated with intensely loving humanisation behaviour (pet spoiling), indicating support for hypotheses H3a and H3c. However, a significantly negative and small-effect association was found for active engagement with the pet and non-humanisation behaviour (treating their pets as animals), indicating no support for hypothesis H3b.

Table 4. Path coefficients.

Hypothesised Relationship	Coefficient	Std Error	T Stat	p Value	95% Confidence Interval		Effect Size
					Lower	Upper	
H1a Objective Pet Food Knowledge→Loving Pet Humanisation	0.267	0.089	2.968	0.003	0.093	0.441	Moderate
H1b Objective Pet Food Knowledge→Pet Non-Humanisation	0.578	0.058	10.131	0.000	0.464	0.692	Strong
H1c Objective Pet Food Knowledge→Intense Pet Humanisation	0.157	0.100	1.578	0.115	−0.038	0.348	n.s.
H2a Subjective Pet Food Knowledge→Loving Pet Humanisation	0.248	0.110	2.225	0.026	0.034	0.465	Moderate
H2b Subjective Pet Food Knowledge→Pet Non-Humanisation	0.242	0.073	3.335	0.001	0.094	0.378	Moderate
H2c Subjective Pet Food Knowledge→Intense Pet Humanisation	0.343	0.095	3.576	0.000	0.162	0.532	Moderate
H3a Active Engagement→Loving Pet Humanisation	0.409	0.062	6.583	0.000	0.288	0.527	Strong
H3b Active Engagement→Pet Non-Humanisation	−0.183	0.051	3.585	0.000	−0.279	−0.081	Small
H3c Active Engagement→Intense Pet Humanisation	0.233	0.071	3.256	0.001	0.094	0.375	Moderate
H4a Loving Pet Humanisation→Brand	0.184	0.091	1.730	0.084	−0.026	0.383	n.s.
H4b Loving Pet Humanisation→Price	−0.172	0.091	1.898	0.058	−0.356	0.005	n.s.
H4c Loving Pet Humanisation→Country of Origin	0.027	0.093	0.284	0.776	−0.152	0.216	n.s.
H4d Loving Pet Humanisation→Health Benefit Claims	−0.095	0.086	1.129	0.259	−0.255	0.079	n.s.
H4e Loving Pet Humanisation→Nutrition Claims	−0.082	0.083	0.993	0.321	−0.242	0.082	n.s.
H5a Pet Non-Humanisation→Brand	0.255	0.070	3.598	0.000	0.116	0.389	Moderate
H5b Pet Non-Humanisation→Price	0.050	0.082	0.604	0.546	−0.112	0.21	n.s.
H5c Pet Non-Humanisation→Country of Origin	0.225	0.078	2.858	0.004	0.071	0.376	Moderate
H5d Pet Non-Humanisation→Health Benefit Claims	−0.504	0.051	10.094	0.000	−0.598	−0.4	Strong
H5e Pet Non-Humanisation→Nutrition Claims	−0.454	0.057	7.916	0.000	−0.562	−0.341	Strong
H6a Intense Pet Humanisation→Brand	−0.103	0.111	0.924	0.356	−0.323	0.114	n.s.
H6b Intense Pet Humanisation→Price	−0.256	0.106	2.451	0.014	−0.455	−0.041	Moderate
H6c Intense Pet Humanisation→Country of Origin	0.161	0.091	1.732	0.083	−0.023	0.335	n.s.
H6d Intense Pet Humanisation→Health Benefit Claims	0.107	0.082	1.325	0.185	−0.057	0.266	n.s.
H6e Intense Pet Humanisation→Nutrition Claims	0.050	0.077	0.645	0.519	−0.098	0.206	n.s.

Bold = $p < 0.05$; n.s. = not significant. Path significance was evaluated via bootstrapping. Paths are considered significant when $p < 0.05$ and the 95% confidence interval does not include zero; effect size interpretation follows PLS-SEM guidelines for standardised path coefficients [67] being small (<0.20), moderate (0.20 to 0.39), and strong (≥ 0.40) effects.

The analysis between the varying types of pet humanisation behaviour and the best–worst-derived relative preferences for extrinsic and credence attributes provided a diverse picture. To interpret these associations, the relative importance of the extrinsic and credence attributes must be understood. Best–worst scores were standardised from +1 (chosen best in every scenario) to −1 (chosen worst in every scenario). Using mean values for the overall sample, health benefit claims were the most important attribute (0.354), followed by

nutrition claims (0.303), price (0.045), and brand (−0.091), and country of origin (−0.193) was the least important attribute. In the discussion below, associations pertain to reported behaviours and how individual best–worst scores deviate from the overall sample. For example, a significant and positive relationship indicates that higher levels of behaviour were associated with higher importance scores relative to the overall sample. Conversely, non-significant findings indicate that levels of behaviours and the importance of attributes do not significantly covary, whether positive or negative.

The association for US pet owners' loving humanisation behaviour (treating pets as friends or family) and their relative attribute preferences for brand, price, country of origin, health benefit claims, and nutrition claims were not significant, finding no support for hypotheses H4a, H4b, H4c, H4d, and H4e.

US pet owners' non-humanisation behaviour (treating pets as animals) was significantly positive and moderately associated with their relative preferences for brand, significantly positively and moderately associated with country of origin, significantly negatively and strongly associated with both health benefit claims and nutrition claims, and non-significantly associated with price. This supports hypotheses H5a, H5c, H5d, and H5e. The non-significant relationship between pet non-humanisation and price shows that no support was found for hypothesis H5b.

In contrast, the association between US pet owners' intense humanisation behaviour (pet spoiling) and their relative attribute preferences for brand, country of origin, health benefit claims, and nutrition claims were not significant, indicating no support for hypotheses H6a, H6c, H6d, and H6e. The only significant association found was negative and moderate between intense humanisation behaviour (pet spoiling) and their relative attribute preferences for price, indicating support for H6b.

4. Discussion

The knowledge-related results indicate a clear differentiation in how both types of knowledge influence pet humanisation behaviours. Given that objective knowledge is associated with loving humanisation and non-humanisation, but not with intense humanisation, this indicates that factual knowledge underscores fond yet measured treatment of pets. The approach discourages pampering and unrestrained behaviours.

These findings are aligned with the recent body of literature; owners who possess actual fact-based knowledge about pets, including responsible ownership and feeding, are also committed to animal-focused and emotional and affective relationships with their pets [73]. In contrast, intense humanisation behaviours among US pet owners, including feeding of treats or other forms of pet pampering, appear to be driven by reasons that are beyond objective knowledge. Such behaviours can be linked with the owner's personality or due to psychological and well-being reasons, e.g., stress or loneliness reduction, as reported in the literature of anthropomorphism and humanisation of pets [39,74], as well as feeling good about being a pet owner or wanting to demonstrate status or lifestyle, which are reasons stemming from self-expansion theory [9,75]. For the findings related to subjective knowledge, the element of confidence towards their knowledge plays an important role. Building on the fact that subjective knowledge was positively associated with every type of pet humanisation behaviour, while objective knowledge was not, it can be deduced that US owners rationalise their respective behaviours considering their subjective knowledge [29]. This implies reliance on their perception of their knowledge instead of actual factual knowledge about pet feeding and responsible ownership [76].

In terms of active engagement, the explanation for all results lies in the reciprocal nature of human and pet interaction [75]. Many pet owners experience positive emotion and receive favourable responses from their pet in engagement situations. Seeing the

pet be playful or affectionate contributes to owners' emotional fulfilment, leading to pet pampering or loving behaviour [77,78]. Patterns resulting from multiple pet–human interactions validate owner behaviour.

With respect to the pet food attributes, it appears that US pet owners who view their pets as friends or family members appear not to deviate from the hierarchy of relative attribute importance found in the overall sample, which is, from most important to least important, health benefit claims, nutrition claims, price, brand, and country of origin. Therefore, it can be assumed that decisions are made based more on health and nutrition attributes and less on price, brand, and country of origin attributes. Likely, their decisions are impacted by their bond with or feelings towards their pet [75]. Or potentially, pet food buying is already an established habitual purchase for these owners [79].

The results for non-humanising pet owners clearly deviate from the hierarchy of relative attribute importance found in the overall sample. Pet owners with a non-humanising approach who view pets as animals put relatively more importance on brand and country of origin, and place relatively less importance on health and nutrition claims. The latter suggests that for these owners, in a purchase situation, health and nutrition claims do not add value or signals for pet feeding. In contrast, the country of origin supposedly does, as it is often interlinked in the consumer mind with food safety, and similarly, brand is linked with quality [80,81]. With the elevated importance of brand and country of origin, and dampened importance of health and nutrition claims, pet owners who view their pets as animals appear to make functional and pragmatic feeding decisions that stem from observable cues, allowing them to make quick decisions derived from heuristics [82].

Finally, the results for intense pet humanisers deviate from the hierarchy of relative attribute importance found in the overall sample. Intense pet humanisers appear to place relatively less importance on price, but otherwise follow the general hierarchy of attributes, with health benefits and nutrition claims being more influential, and brand and country of origin being less influential. This suggests that these owners are willing to purchase pet food products more due to health benefits and nutritional claims and less due to price, brand, and country of origin. These findings are in line with statistics and recent studies on pet food and pet humanisation [13,58]. Pet well-being and nutritional supplements, as well as premium products showcasing health and nutrition, are highly relevant for owners who enjoy pampering their pets [39].

5. Conclusions

The results of this paper are of value to US retailers and marketers. Pet food marketers may want to consider tailoring consumer messages and advertisements that align with varying degrees of pet humanisation. For owners with intense pet humanisation tendencies, interactive and educational marketing tactics may be appropriate, as this group is highly engaged with their pets and seeks experiences and information that go beyond the human–pet bond. Since health benefits and nutritional attributes are most important to them, and they are not as price-sensitive, luxury and premium items are aligned with pet pampering [38,39].

Given that non-humanising US pet owners had relatively higher preferences for brands and country of origin and lower health and nutritional product claims than others, messages related to reliable brands providing minimal and functional feeding are likely to appeal. This consumer group tends to be rather pragmatic in their choices, as they favour attributes associated with trust, safety, and product origin rather than emotional attachment to their pets. The negative effects associated with health and nutrition claims suggest that marketers would want to avoid strong messaging in this direction. For this rather functional consumer group, these claims are likely to be less appealing or unnecessary.

Finally, pet owners who lovingly humanise and regard their pets as friends or family appear to value the bond with their pet and are swayed by health and nutritional claims [83,84], somewhat swayed by price, and indifferent to brand and country of origin product attributes. Storytelling addressing responsible pet ownership and feeding as elements of care and well-being are likely viewed favourably. In addition, marketers may receive favour from this consumer group by providing transparent information on ingredients and expert recommendations to capitalise on the moderate positive influence of knowledge and pet engagement. This is helpful because this consumer group cares for their pets like family members or close friends, and products should provide them with assurance that their feeding choices are in line with responsible and informed pet ownership.

In terms of its originality and merit, the present study is a first of its kind. To the authors' best knowledge, no other study has yet incorporated best–worst-derived preference scores into a PLS-SEM model. Best–worst-derived relative preference scores stem from trade-offs made by US pet owners reflecting utility rather than ratings, leading to potentially more meaningful pathways of interest for retailers and marketers. In terms of content novelty, the present study complements the findings of Hobbs & Anderson (2024) [58], who outlined the importance of nutritional and well-being attributes among US online consumers. The present study found that these preferences are relevant to loving humanisers viewing their pets as friends and family, and for those spoiling pets, but less for those who view their pet as an animal. Respectively, it is added that the relevance of these attributes depends on the relationship perspective and ownership style.

In addition to its merit, the authors acknowledge the limitations of the sample. It stems from a crowd-sourcing platform and does not mirror the US population, limiting generalisability for the US population. However, it has relevance for pet owners with varying humanisation and pet engagement tendencies. In future studies, a quota sample following the most recent US census in terms of age, gender, income, education, and residence may help to overcome this shortcoming. Furthermore, potential overlap between construct measures or social desirability should be addressed in upcoming research. Clearly distinct constructs and the inclusion of behavioural and observational measures could be helpful to mitigate this shortcoming.

Future research deepens the findings on intensely loving humanisation behaviour and focuses on ritual-based consumption. Interviews and qualitative content analysis may allow the in-depth exploration of daily rituals, special occasions, and trends and social media impact, as well as the ethical elements associated with pet spoiling. Other studies may consider the degree of pet humanisation and pet food brand loyalty.

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