

A STUDY ON THE COMPARATIVE STUDY OF DIFFERENT DRY DOG FOOD CONSUMER PRODUCTS THAT DRIVES THE MARKET

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Abstract

The objectives of this study were to compare the acceptance of different dry dog food products by consumers, determine consumer clusters for acceptance, and identify the characteristics of dog food that drive consumer acceptance. Eight dry dog food samples available in the market were evaluated by pet owners. In this study, consumers evaluated overall liking, aroma, and appearance liking of the products. Consumers were also asked to predict their purchase intent, their dog's liking, and cost of the samples. The results indicated that appearance of the sample, especially the colour, influenced pet owner's overall liking more than the aroma of the product. Overall liking clusters were not related to income, age, gender, or education, indicating that general consumer demographics do not appear to play a main role in individual consumer acceptance of dog food products.

Keywords: appearance; aroma; consumer; dog; liking; pet food

Introduction

Pet food buyers, despite economic recession challenges and subsequent money-saving trends, seem to be more than willing to spend money on pet food. A recent survey indicated nearly one-third of consumers "preferred to shop at pet product retailers that offer the best products available, even if they are more expensive". Another survey on pet owners showed that 21% of dog owners spend an average of Rs 5000 or more per month on their dogs. The pet food industry benefits from this consumer behaviour and is focusing even more on premium products. In the pet food market, this means natural ingredients and a focus on health issues.

Factors such as brand and package contribute to the formation of expectation, the selection process, and the purchase intention of a product by consumers. For those products that can be experienced only after purchase and in categories where multiple products are available for the consumer, such as the pet food category, brand represents a signal of quality and can help in the selection process. Moreover, considering that pet food will not be directly consumed by owners, and therefore complete feedback cannot be provided, branding can hold a much higher importance. Packaging in the pet food industry conveys information on the particular properties of 'premium' products or natural and healthy ingredients, increasing with humanization of pets by owners. When brand and packaging information are removed, only sensory properties such as appearance and aroma contribute to the consumer's acceptance of the pet food, with the result being important especially for the repurchase of a product by owners.

Objectives

- understand consumers' acceptance of various different commercial dry dog food products without branding or packaging.
- identify consumer clusters and determine if these clusters relate to age, income, gender, or education and
- isolate drivers of consumers' liking and purchase intent.

Methods

Samples

Eight samples were purchased from local pet stores, grocery stores, and discount stores. Samples were different in brand, type of kibble, price, and presence of specialty ingredients. Sample A (3 kibbles) and sample C (4 kibbles) were each comprised of multiple kibbles, differing in size, shape and color. The samples were chosen based on their aroma and appearance characteristics measured. In that study, samples were small (D, G), medium (A, B, E, F, H) and large (one kibble type of sample A). Some samples were nugget-shaped (A, B, E, G, H), otherwere oval-shaped (kibble in sample A), 'o-shaped' (D), square-shaped (F), or they showed a miscellaneous shape such as one kibble in sample A. The choice of some of the samples was based on preliminary descriptive data collection in order to have a wide range of aroma profiles within the sample set. Some samples had higher fishy aroma notes (G, H) while others, such as sample E, had higher grain aroma notes. Sample D had high oxidized aroma levels and sample A showed plastic aroma notes. Some samples (F and D) presented higher meaty aroma notes than the others and sample G showed higher levels of liver aroma.

All samples were evaluated within the "best by" date on the package and all sample lots were checked to ensure they had not been subject to a product recall. The products were purchased one week before testing and were stored at room temperature.

Descriptive Sensory Analysis

Six highly trained panelists from the Sensory Analysis Center, analyzed the samples for aroma and appearance attributes. Each of the panel lists had more than 120 hours of descriptive analysis panel training which included techniques and practice in attribute identification, terminology development, and intensity scoring. Moreover, each assessor had more than 1,000 hours of experience with a variety of food products, including dried dog food, and had conducted studies using the consensus method (used in this study). Attribute intensities were evaluated on a scale where 0 = none and 15 = very high. Samples were first evaluated individually by panelists, then the final aroma and appearance profile was developed after a discussion led by the panel leader to determine the consensus score for each attribute. Similar procedures have been used recently in other sensory studies [13-

15]. The lexicon used in descriptive profiling was developed. Each sample was prepared 30 minutes prior to testing and was served in a 100 mL plastic cup for appearance evaluation. For aroma evaluation, 3 grams of sample was weighed in a medium glass snifter, and covered with a watch glass. Samples were coded with three-digit random numbers. The testing room was maintained at 21 ± 1 °C and $55 \pm 5\%$ relative humidity.

Consumer Study

A Central Location Test (CLT) was conducted in the Sensory and Consumer Research Center. Participants ($n = 100$, men = 30, women = 70) were recruited. Participants were recruited from the Center's database and were screened for age (>18 years old), dog ownership, not working in the pet food industry, and had to be personally responsible for at least 50% of dog food purchases. Among recruited pet owners, 66% had one dog in the household, 29% had two dogs, and 5% had 3 dogs.

Data Analysis

Clusters among consumers were identified according to their *overall liking* score (Ward's clustering procedure) using SAS® statistical software (Version 9.3). Significant differences ($P < 0.05$) among products were determined using two-way analysis of variance and Fisher's protected Least Significant Difference (LSD) in SAS® statistical software (Version 3) for clusters among consumers according to their overall liking scores and HSD test in Compusense *at-hand* for liking scores. Unscrambler software was also used to plot a liking map of samples fitted with consumers' liking using Principal Components Analysis. Compusense *at-hand* was used to collect consumer scores and analyze JAR data. For this data, scores 1-2 were grouped as "too low" and scores 4-5 were grouped as "too high". Scores of 3 were considered as "just about right". Correlation among overall liking, appearance, aroma, color, size, shape, uniformity, and oily appearance liking was calculated using Pearson correlation in Unscrambler.

Result and Discussion

Descriptive sensory analysis showed a wide range of shapes, sizes, aromas, and flavors present in the samples. The aroma attributes common to all of the samples were barnyard and cooked. Aroma attributes such as broth, grain, musty/dusty, straw-like, and vitamin, were detected in seven out of eight samples while brown and cardboard were present in six samples. Other attributes found were oxidized oil (B, D, G, H, A), toasted (C, D, E, F, A), meaty (C, D, F, A), soy (C, D, E, A), spice complex (C, D, E, F), stale (B, C, E, A), smoky (C, F, A), oily (C, E, F), fish (G, H), dusty/earthy (B, G), vegetable complex (C, A), burnt (D), liver (G), spice brown (F), starchy (D) and plastic (A). Most of the scores were within the low intensity range (0-5 on a scale from 0 to 15), indicating the low overall aroma and the blended and complex nature of the product category, Sample D showed

barnyard aroma notes in the moderate intensity range (5.5-10 on a scale from 0 to 15) with attributes such as cooked and oxidized oil scoring low-moderate and low for meaty and toasted notes. Descriptive analysis confirmed the specific characteristics expected to be present in the samples, such as the fishy notes in samples G and H, or the higher meatynotes in samples D and F. Sample D (the sample with no grain notes) had the highest levels of barnyard, broth, burnt, and cooked as well as meaty, musty/dusty, oxidized oil, soy, spice complex,

Consumer Study Results

Overall liking was significantly correlated with appearance, color and aroma liking of the products. Sample C, one of the two samples composed of multiple kibbles was the sample that was scored the highest overall liking score as well as highest scores for liking of appearance, shape, uniformity, oily appearance and color. The liking score for color in this sample represented the highest liking score observed in the study (average score >7).

Discussion

Descriptive analysis showed the tested samples were different from each other and offered a wide range of characteristics to study across the samples. This enabled analysis of these different characteristics with the aim of understanding the aspects that drive consumer's acceptance of dry dog food when brand and packaging are removed. Clearly, appearance is a key driver for acceptance of dry dog food, a product that is not eaten by the actual purchaser. Other examples of aspects that were important for consumer segments were the overall intensity perception of aroma or the presence of particular aroma notes.

Conclusion

Eight dry dog food samples, with different appearance and aroma characteristics, were evaluated by a descriptive panel and by pet owners. The study indicated that consumers' liking was most influenced by the appearance of the products. Product color intensity, especially darker brown colors, seems to have a negative relation with pet owners' liking. In addition, kibble size also influenced product liking, with products where kibbles are perceived as too small showed the lowest overall liking scores. Cluster analysis showed a group of consumers who liked large kibble size more than other participants, but the same was not seen for small kibbles. Uniformity of shape within a product can also play an important role in dry dog food acceptance. Of the two multi-colored and multi-shaped kibbles products, one resulted the most liked and the other, perceived as too low in uniformity of shape (particularly related to one of its kibbles), earned a score almost 2 points lower for appearance liking. The brands consumers usually purchased seem to be associated with overall liking at least for some consumer segment. Aroma of dry dog food

seems to have less of a role in driving consumers liking and their willingness to purchase specific dry dog foods than appearance. However, for products where the aroma was perceived as too strong, was disliked, or had higher the presence of off-flavor notes (e.g., oxidized oil, musty/dusty), overall liking was impacted negatively. This indicates that pet owners are generally accepting of “dog food aroma” or specific flavor notes associated with the product.

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