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Consumer Preference of a Novel Canine Treat in a Texas University Community

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Abstract: An estimated USD 5.59 billion is spent on dog treats annually; yet little is known about the purchasing decisions of dog owners. The study objective was to conduct consumer research on a novel treat in comparison to three commercially available products. Participants (n = 70) were recruited from a Texas university campus. Respondents were shown four different treat products individually, without packaging, and asked to rate attributes such as aroma and texture, recording choices via an electronic survey. Packaging of the treat products was then shown and respondents were asked to rate marketing attributes such as ingredients and packaging type. Treat attribute likeness scores differed across brands for aroma, texture, and overall appearance ($p < 0.001$), with the novel product having the lowest overall average score ($p < 0.05$). All treat attributes were correlated with owner-predicted dog likeness ($p < 0.001$). Package type and all marketing attributes differed between products; the novel product had the lowest likeness scores in both categories ($p < 0.05$). Overall packaging appearance was correlated with respondents' willingness to pay for a product ($p < 0.001$). A general linear model predicted a dollar value increase of USD 1.31 for every one unit increase in overall appearance likeness score. Respondents were willing to pay the least for the novel product when compared to all other products. Purchase intent was different across brands and was lowest for the novel product ($p < 0.001$); purchase intent correlated with all marketing attributes but not brand ($p < 0.001$). Both treat characteristics and marketing attributes may affect consumer's purchase intent while simultaneously influencing the price they are willing to pay. Novel products may be less preferred by consumers, especially if compared against established commercial products.

Keywords: dog treats; consumer behavior; sensory marketing; market segmentation

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1. Introduction

The pet industry in the United States is remarkable, with 86.9 million US households owning at least one pet and 65.1 million of those households owning at least one dog [1]. United States households are two times more likely to own a pet than they are to have a child under 18 years of age [2]. Pet ownership has a significant economic impact; USD 136.8 billion was spent in 2022, of which USD 58.1 billion was spent on food and treats [1]. The pet industry has seen immense growth over the last 80 years; since 1960, the industry's average growth rate per year has been 7.5%. This growth rate is 80% faster than total income growth and twice as fast as total spending. Estimating the exact number of dog treat sales is difficult; however, the American Pet Products Association 2021 survey estimates that USD 5.59 billion was spent on dog treats alone, representing at least 10% of pet food product sales. That is a sizable percentage, considering that USD 58.1 billion in food product sales was for all pet food products, including fish, birds, rodents, etc. [1]. Dog treats clearly own a massive portion of the market.

The amount of money spent in the pet industry is thought to "be less than capacity", meaning owners are willing to spend more money if presented with products that meet

their needs and expectations. Current market research is focused on ways to fill that gap by focusing in on consumer preferences [3]. Much effort has gone into investigating pet food product palatability; however, most of this research is proprietary and not publicly available [4]. Additionally, much research has been conducted on American consumers [5–7], but very little has been carried out on consumer preference regarding pet food products. There is heavy focus on the pets' preference for a food product, but that is only one part of the big picture. Pets do not buy their products; rather, the pet owner, must buy the product and then offer it to the pet. If the product is not purchased, the palatability of the product is not determined. The pet food industry is consistently growing, with plenty of space in the market for new companies and products to fulfill consumer needs, especially those within niche markets [8]. There is a known, yet poorly studied, divisions amongst dog owners with regards to their intended purpose behind dog-ownership and therefore different priorities when it comes to selecting dog treats. Consumers vary from casual pet owners and those who actively compete to those who own working dogs, such as for search and rescue or for therapy. Further investigation is warranted to understand how individuals perceive a novel health bar for active/working/sports dogs. This study aims to better determine the purchasing behavior and motivation of individuals who feed their dogs treats.

2. Materials and Methods

2.1. Samples

Three different commercially available dog treats were selected and purchased from a local pet retailer in a rurally located city in Texas. All products were verified to be unopened and in-date. Treats were chosen based on not having animal protein as the first ingredient and being crunchy in texture so as not to be distinctly different from the novel product. In addition, all products had similar marketing claims, such as healthy, all natural, etc. The novel product was purchased directly from the manufacturer. Three brands were represented, including the novel product. Two of the commercially available products were from the same brand but had different formulations. Samples varied in size, shape, and color, apart from two, which were the same size and shape but had slightly differing colors. Throughout this text, the products will be referred to by their primary flavor acronym. Table 1 lists their ingredient contents.

Table 1. Ingredient contents of canine treat products.

Canine Treat Products	Ingredients
Product 1: CSP	Pea flour, canola oil, cane molasses, carrot puree, sweet potato puree, peanut butter
Product 2: BRY	Whole brown rice, oatmeal, chicken meal, cane molasses, sunflower oil, dried blueberries, dried cranberries, dried cherries, and rosemary extract
Product 3: CK	Brown rice flour, peanut butter, extra virgin olive oil, pink Himalayan salt, carrot puree, and kelp puree
Product 4: PBB	Pea flour, canola oil, cane molasses, peanut butter, and banana puree

CSP = carrot–sweet potato sample (brand same as PBB brand, different flavor); BRY = berry sample; CK = carrot–kelp sample (novel product); PBB = peanut butter–banana sample (brand same as CSP brand, different flavor).

2.2. Participants

Surveying was conducted with Institutional Review Board approval from a rurally located university in Texas over a three-day period. Seventy consumers were recruited via word of mouth, flyers posted around the university campus, and mass e-mail to current students at the university. Participants were required to be at least 18 years of age and own at least one dog. Other than the two listed criteria, respondents were not filtered in any way. Participation was incentivized using a raffle entry to win a gift basket valued at USD 50. Participants read and acknowledged their consent before proceeding with the survey.

Participation was voluntary and respondents could exit the survey without completing it or choose not to answer questions.

2.3. Survey Questionnaire

The survey was broken into four sections of questions: (1) dog demographics; (2) treat attributes; (3) general marketing; and 4) marketing and price of the novel product (Appendix A). The first portion of the survey consisted of six dog demographic questions: number of dogs owned [9,10], dog age range, breed group, sports and recreational activities, and owner-reported dog energy level; all response options were multiple-choice. The second portion of the survey consisted of 7 questions per treat, for a total of 28 questions. Questions in this portion asked respondents to rate aroma, texture, color, size, shape, and overall appearance on a five-point hedonic scale, where the answer options were strongly dislike, dislike, neutral, like, and strongly like [11]. The third portion of the survey had 8 questions per product and totaled 32 questions. The first five questions per product were five-point hedonic scale questions. Hedonic scale questions were formatted the same as in the second portion of the survey, except the attributes asked about differed. Attributes were overall appearance, package type (resealable/size), package statements, ingredients, and treat style (loose/breakable). Respondents could select multiple statements that they felt affected their purchase intent in either a positive or negative way, including packaging type, packaging appearance, packaging statements, treat style, product familiarity, and ingredients. The last portion of the survey was specific to the novel product and asked if the consumer would be interested in purchasing multiple packages at a time, and if so, how many, as well as correlating price points with those purchase intents.

2.4. Consumer Study

Treat samples were presented monadically unpackaged to the respondents on paper plates for the second part of the survey. Approximately 4 treats per sample product, an average amount of treats suggested to be fed in a day across all products, were labeled "sample #1"–"sample #4". All four sample products were served to each respondent during this portion of the survey. Respondents were asked to rate aroma, texture, color, size, shape, and overall treat appearance on a five-point hedonic scale. Samples were covered with paper cups between participants and while not being observed.. Sample treat products were replaced approximately after every 10 respondents to maintain freshness of aroma and texture as observed when the product was initially removed from the packaging by trained survey conductors. Survey conductors were trained to only facilitate the survey and not to interact with the respondent outside of assisting with technical issues and guiding them to the next step of this study. Additionally, respondents were instructed to look at the packaging of each sample product one at a time during the third portion of the survey. While observing the sample product within its packaging, the respondents were asked to answer questions related to the overall appearance of the package, package type (resealability/size), package statements, ingredients, and treat style (loose/breakable) before moving to the next sample product. The survey was completed using Qualtrics®XM (Qualtrics, Provo, UT, USA) on university-supplied iPads. Completion time averaged 34.3 min per respondent.

2.5. Data Analyses

G*Power 3.1 software was used to compute a priori power analysis at 0.95 power (probability of finding significance), alpha criterion level of 0.05, and an expected effect size of 0.25 for all tests [12–14]. Data were filtered by each survey section for completion. Section one was completed by all 70 participants, section two was completed by 66 participants, section three was completed by 45 participants, and section four was completed by 70 participants. To ensure the accuracy of statistical analyses, respondents were removed from each section if they did not complete that section. Microsoft Excel was used to process the data from words to associated numerical values for use in JASP (JASP Team, 2022 and

Microsoft Corporation, Redmond, Washington2018). All statistical analyses were run in JASP.

Repeated-measures analysis of variance (ANOVA) was performed to compare the likeness means of the six treat attributes (dependent variables)—aroma, size, shape, color, overall appearance, and texture—as a function of brand (explanatory variable) using a 95% level of significance with a Holm corrected *p*-value. Levene's test was conducted to verify the assumption of homogeneity of variances. Post hoc tests were performed only when the initial test suggested significant effect. A repeated-measures ANOVA was performed to compare the likeness means of the five marketing attributes (dependent variables)—overall appearance, package type (resealability/size), package statements, ingredients, and treat style (loose/breakable)—as a function of brand (explanatory variable) using a 95% level of significance with a Holm corrected *p*-value. Levene's test was conducted to verify the assumption of homogeneity of variances. Post hoc tests were performed only when the initial test suggested a significant effect.

A two-way ANOVA was performed to compare the means of how much the respondents thought their dog would like the treat (dog likeness) (dependent variable) as a function of brand (explanatory variable) using a 95% level of significance with a Holm corrected *p*-value. Post hoc tests were performed only when the initial test suggested a significant effect. A two-way ANOVA was performed to compare the means of how much the respondents were willing to pay for each product (dependent variable) as a function of brand (explanatory variable) using a 95% level of significance with a Holm corrected *p*-value. Levene's test was conducted to verify the assumption of homogeneity of variances. Post hoc tests were performed only when the initial test suggested a significant effect. A two-way ANOVA was performed to compare the means of how likely the respondents were to purchase each product (purchase intent) (dependent variable) as a function of brand (explanatory variable) using a 95% level of significance with a Holm corrected *p*-value. Post hoc tests were performed only when the initial test suggested a significant effect.

The following correlation analyses were also conducted using a 95% level of significance: treat attributes, brand, dog likeness, marketing attributes, package statements, treat style, and purchase intent. If significance was detected in any of the correlation analyses, a general linear model (GLM) was run on those variables to determine the exact relationship.

Dog demographic data and novel product-specific data are reported descriptively without statistical analysis.

3. Results

3.1. Demographics

A total of 70/70 respondents participated in the survey. Dog demographics reported by respondents were reported descriptively (Table 2). Most dogs represented were between one and three years old (48.6%), giving the demographic data a leftward skew for younger dogs. Most respondents reported owning one dog (68.6%), while 22.9% owned two dogs and 8.6% owned more than two dogs. All but one respondent said their dog(s) was engaged in some level of activity, with the majority being moderately active (45.7%) and 34.3% being very active. Additionally, only one respondent said they participated in no activities with their dog(s). Sixty-six respondents (94.3%) said they walk with their dog(s) and 52.9% said they run with their dog(s). One respondent reported biking with their dog(s) and 37.1% of respondents said they go hiking with their dog(s). Respondents were asked if they participate in structure work/sports with their dogs, such as conformation show, agility, working farm dog, etc. A total of 18.6% reported participation in such activities.

Table 2. Dog demographics reported by survey respondents.

Dog Demographics								
Age (years)				**1/2 to 1**	**1 to 3**	**4 to 6**	**7 to 10**	**Over 10**
N (70)				11	34	13	9	3
%				15.7	48.6	18.6	12.9	4.3
Number of Dogs Owned					1	2	3	4
n (70)					48	16	3	3
%					68.6	22.9	4.3	4.3
Breed Group	Herding	Mix	Sporting	Toy	Non-sporting	Terrier	Hound	Unsure
n	26	21	8	6	3	2	2	2
%	37.1	3	11.4	8.6	4.3	2.9	2.9	2.9
Owner-Reported Dog Activity Level				Extremely Active	Very Active	Moderate Active	Not Active	Extremely Inactive
n (70)				13	24	32	1	0
%				18.6	34.3	45.7	1.4	0
Activities				Biking	Hiking	Running	Walking	None
n (70)				1	26	37	66	1
% *				1.4	37.1	52.9	94.3	1.4
Participates in work/sports							Yes	No
n (70)							13	57
%							18.6	81.4

* Percentage is >100% as respondents could select multiple responses; Dog demographic information reported by respondents of this study. Owners were asked to select one dog to report individual information for. Dog age, number of dogs owned, breed group, owner-reported dog activity level, participatex in activities, and participates in work/sports.

3.2. Treat Attributes and Marketing

A repeated-measures ANOVA was run to compare the six treat attribute hedonic scores across brands from the second portion of the survey, in which respondents were asked how much they liked each treat's aroma, texture, size, shape, color, and overall appearance. At this time, respondents had only seen individual treats and had seen no packaging. There was a significant difference across brands, F (9.796), $p < 0.001$. Additionally, a repeated-measures ANOVA was run to compare the five marketing attribute hedonic scores across brands from the third portion of the survey, in which respondents were asked how much they liked each product's overall appearance, package type, package statements, ingredients, and treat style. There was a significant difference across brands, F (3.376), $p < 0.001$. Significant post hoc test results are displayed in Table 3 for both ANOVAs. Insignificant post hoc results were found for treat size, treat shape, treat color, package type (resealability/size), package statements, ingredients, and treat style (loose/breakable).

Table 3. Treat and marketing attributes post hoc results.

	Product			
Dependent Variable	**CSP**	**BRY**	**CK**	**PBB**
Aroma	3.197 [a]	3.712 [b]	2.924 [a]	3.258 [ab]
Texture	3.379 [ab]	3.727 [a]	3.045 [b]	3.621 [a]
Overall Treat Appearance	3.788 [a]	3.545 [ab]	3.121 [b]	3.727 [a]
Average of All Treat Attributes	3.528 [a]	3.563 [a]	3.24 [b]	3.576 [a]
Package Type	3.578 [a]	4.489 [b]	3.156 [a]	3.578 [a]
Overall Package Appearance	3.844 [ab]	4.222 [a]	3.422 [b]	3.822 [ab]
Average of All Marketing Attributes	3.764 [ab]	4.129 [a]	3.489 [b]	3.84 [ab]

CSP = carrot–sweet potato sample (brand same as PBB brand, different flavor); BRY = berry sample; CK = carrot–kelp sample (novel product); PBB = peanut butter–banana sample (brand same as CSP brand, different flavor); Different letters within a row indicate a significant difference among the samples ($p < 0.05$) (n = 66).

3.3. Owner-Predicted Dog Likeness

A type III sum of squares two-way ANOVA was performed to compare the means across brands of how much the respondents (n = 66) thought their dog would like the treat (owner-predicted dog likeness) from the second portion of the survey. At this point in the survey, respondents had only seen the individual treats and no packaging. No significance was found across brands, F (1.736), $p = 0.160$.

3.4. Dollar Value

A type III sum of squares two-way ANOVA was performed to compare the means of how much the respondents were willing to pay for each product from the third portion of the survey. Respondents had seen treats individually without packaging and with the full packaging while answering questions from this section of the survey. There was a significant difference across brands, F (7.748), $p < 0.001$. Post hoc test results are displayed in Table 4. Respondents were willing to pay the least for the CK (novel) sample and were willing to pay comparable amounts across the other three brands.

Table 4. Post hoc test results from the "Please select a price that you would be willing to pay for product #", question.

	Brand			
Dependent Variable	**CSP**	**BRY**	**CK**	**PBB**
Dollar Value Willing to Pay	8.333 [a]	8.867 [a]	5.978 [b]	8.933 [a]

CSP = carrot–sweet potato sample (brand same as PBB brand, different flavor); BRY = berry sample; CK = carrot–kelp sample (novel product); PBB = peanut butter–banana sample (brand same as CSP brand, different flavor); Different letters within a row indicate a significant difference among the samples ($p < 0.005$) (n = 45).

3.5. Purchase Intent

A type III sum of squares two-way ANOVA was performed to compare the means of how likely the respondents were to purchase the product (purchase intent) from the third portion of the survey. There was a significant difference across brands, F (8.157), $p < 0.001$. Post hoc test results are displayed in Table 5. Respondent purchase intent was highest for the BRY sample and it was lowest for the CK (novel) sample.

Table 5. Purchase intent post hoc results.

	Brand			
Dependent Variable	**CSP**	**BRY**	**CK**	**PBB**
Purchase Intent	4.956 ^{ac}	6.711 ^{b}	4.2 ^{c}	5.956 ^{ab}

CSP = carrot–sweet potato sample (brand same as PBB brand, different flavor); BRY = berry sample; CK = carrot–kelp sample (novel product); PBB = peanut butter–banana sample (brand same as CSP brand, different flavor); Different letters within a row indicate a significant difference among the samples ($p < 0.01$) (n = 45).

3.6. Treat Attributes and Owner-Reported Dog Likeness

A correlation analysis was conducted on the treat attributes in relation to owner-predicted dog likeness and product from the second portion of the survey. Survey respondents had only seen individual treats while answering this portion of the survey. All treat attributes were correlated with owner-predicted dog likeness ($p < 0.001$), but products were not. Results from this analysis are summarized in Table 6. General linear models were run on all significant correlations to determine the exact linear relationship via slope; those equations can be found in the Supplemental Materials.

Table 6. Owner-predicted dog likeness and treat attribute correlation.

Treat Attributes and Owner-Reported Dog Likeness Correlation							
Correlation *r*	**Overall Treat Appearance**	**Aroma**	**Texture**	**Shape**	**Size**	**Color**	**Brand**
Owner-Predicted Dog Likeness	0.489 ***	0.395 ***	0.333 ***	0.223 ***	0.349 ***	0.285 ***	−0.043

Correlation *r* values are shown for each treat attribute from the second portion of the survey (scored on a five-point hedonic scale) in relation to owner-predicted dog likeness, i.e., the amount the respondent thought their dog would like the treat based solely on treat attributes and no packaging. *** $p < 0.001$.

3.7. Treat Attributes and Overall Treat Appearance

Correlation analysis was conducted on the treat attributes in relation to overall treat appearance and brand from the second portion of the survey. Results from this analysis are summarized in Table 7. Overall appearance was correlated with all treat attributes, but not with the product. General linear models were attempted to extrapolate the relationship between overall treat appearance and the other treat attributes (aroma, texture, size, shape, and color) but did not add any information.

Table 7. Overall treat appearance and treat attribute correlation.

Treat Attributes and Overall Treat Appearance Correlation						
Correlation *r*	**Aroma**	**Texture**	**Shape**	**Size**	**Color**	**Brand**
Overall Treat Appearance	0.194 **	0.381 ***	0.468 ***	0.456 ***	0.418 ***	−0.093

Correlation *r* values are shown for each treat attribute from the second portion of the survey (scored on a five-point hedonic scale) in relation to the overall treat appearance attribute. ** $p < 0.01$, *** $p < 0.001$.

3.8. Marketing Attributes and Purchase Intent

Correlation analysis was conducted on the marketing attributes in relation to purchase intent and product from the third portion of the survey. Respondents had seen treats individually without packaging and with the treat with full packaging while answering questions from this section of the survey. Results from this analysis are summarized in Table 8. All marketing attributes were correlated with purchase intent ($p < 0.001$), though brand was not correlated. Significant GLM models were identified for all marketing attributes in relation to purchase intent. Slope equations for each attribute are listed in the Supplemental Materials.

Table 8. Purchase intent and marketing attribute correlation.

Marketing Attributes and Purchase Intent Correlation							
Correlation *r*	**Dollar Value**	**Package Type**	**Treat Style**	**Overall Package Appearance**	**Statements**	**Ingredients**	**Brand**
Purchase Intent	0.495 ***	0.489 ***	0.529 ***	0.547 ***	0.444 ***	0.481 ***	0.02

Correlation *r* values are shown for each marketing attribute from the third portion of the survey (scored on a five-point hedonic scale) in relation to respondent purchase intent, which was rated on a scale of 0 to 10, where 0 is "Not At All" and 10 is "Very Likely". *** $p < 0.001$.

3.9. Marketing Attributes and Dollar Amount

Correlation analysis was conducted on the marketing attributes in relation to the dollar value the participants were willing to pay (dollar value) and products from the third portion of the survey. Results from this analysis are summarized in Table 9. All marketing attributes were correlated with dollar value, though brand was not correlated. Significant GLM models were identified for all marketing attributes in relation to dollar value. Slope equations for each attribute are listed in the Supplemental Materials.

Table 9. Dollar value and marketing attribute correlation.

Marketing Attributes and Dollar Value Correlation						
Correlation *r*	**Package Type**	**Treat Style**	**Overall Package Appearance**	**Statements**	**Ingredients**	**Brand**
Dollar Value	0.347 ***	0.320 ***	0.382 ***	0.281 ***	0.225 **	−0.034

Correlation *r* values are shown for each marketing attribute from the third portion of the survey (scored on a five-point hedonic scale) in relation to how much the respondents said they would be willing to pay for each product. ** $p < 0.01$, *** $p < 0.001$.

3.10. Marketing Attributes and Overall Package Appearance

Correlation analysis was conducted on the marketing attributes in relation to overall package appearance and product from the third portion of the survey. Results from this analysis are summarized in Table 10. All marketing attributes were correlated with overall package appearance, though products were not correlated. General linear models were attempted to extrapolate the relationship between overall package appearance and the other marketing attributes but did not add any information.

Table 10. Overall package appearance and marketing attribute correlation.

Marketing Attributes and Overall Package Appearance Correlation					
Correlation *r*	**Package Type**	**Treat Style**	**Statements**	**Ingredients**	**Brand**
Overall Package Appearance	0.516 ***	0.334 ***	0.450 ***	0.368 ***	−0.094

Correlation *r* values are shown for each marketing attribute from the third portion of the survey (scored on a five-point hedonic scale) in relation to the overall marketing appearance attributes. *** $p < 0.001$.

3.11. Marketing Perceptions and Purchase Intent

Respondents were asked "What factors influenced your decision the most on whether or not to purchase product #," as part of the third section of the survey. Respondents could select multiple options for this question. The top three selected influences for CSP were as follows: positive ingredients, positive overall packaging appearance, and positive packaging type. The top three selected influences for BRY were as follows: positive packaging type, positive overall packaging appearance, and positive ingredients. The top three selected influences for CK were as follows: positive ingredients, positive overall packaging

appearance, and positive packaging type. The top three selected influences for PBB were as follows: positive package statements, positive overall packaging appearance, and positive package type. The top three selected influences across all products were as follows: positive ingredients, positive packaging type/positive overall packaging appearance, and positive package statements (Supplemental Figure S1).

4. Discussion

Despite dog treats representing a sector of the pet food industry with a steady year-on-year growing trend, little attention has been dedicated to investigating consumer interest in a novel product for a unique segment of the dog market. The results of this research showed that consumer preferences are impacted by a variety of factors when purchasing dog treats. In this study, an array of treat attributes and marketing factors were significantly different across brands. Overall, the novel product (CK) studied tended to be rated the poorest by respondents. This could have been impacted by the novel product being visually different from other samples surveyed, despite the fact that the products were all quite similar in formulation (primarily plant-based) and consistency (crunchy, dry, and baked). The novel product, CK, was packaged individually in a resealable pouch as small bars (1.25 ounce) that were scored to be broken into smaller square pieces (0.10 ounce). All other products were loose treats that were packaged in bags; products CSP and PBB were not resealable, whereas the BRY product's package was resealable. The CSP and PBB treats were large (compared to other products in this study), round treats that came in a 14-ounce package, and the BRY treats were small, rounded triangles with a small hole in the center that came in a 16-ounce package. A repeat study with more variation in treat shapes, styles, and packaging should be considered to identify specifically which attribute the respondents liked. The CK and BRY treats would generally fall into a "training treat" category, in that they are small enough to be used frequently during training sessions. However, the CK treat is not marketed as a training treat and is instead marketed as aK-9 health bar. In contrast, the CSP and PBB treats are larger and would generally fall into a "snack" category, in that they are most likely to be given infrequently for enrichment. Italian researchers reported that 42% of owners gave treats as training rewards and 5% gave treats for purported health benefits, with an estimated 53% giving for dog enjoyment or no defined reason [15]. Given that the novel product was the only marketed health K-9 bar in the study, future studies should include other products marketed with health benefits as the primary selling point.

The scope of this study should be understood within the demographics of the respondents. Respondents were primarily university students, and thus, these results are likely not representative of all US consumers but rather Texas university students. The university where the survey was held is in a rural county in Texas. Though participant demographics were not collected, it is likely that there is a variety of rural and urban responses represented given the university location and student population demographics. Therefore, our results may not be generalizable to the overall dog ownership population in the US. Dog ownership differs significantly by gender, income, age, race, and ethnicity [16]. The American Pet Products Association reported individuals aged 18–25 own 16% of all pets, with 86% of that being dogs, while Millennials (ages 26–43) make up the largest percentage (33%), with 66% having dogs [17]. Furthermore, Colorado, Virginia, Georgia, Alaska, and Nevada rank higher than Texas for the most devoted dog owners [17]. Future research should aim to include a more diverse sample population to survey to gain insight into consumer-driven choices related to dog ownership.

Only 18.6% of respondents said they participated in work/sport activities with their dog(s); since the novel product is primarily marketed as a health bar for active dogs, this skewed demographic could further explain its inferior performance in this survey. However, on the other hand, only one participant said their dog was inactive; 18.6% said their dog was extremely active, and 34.3% said their dog was very active. This may imply that individual dog activity levels do not necessarily correspond with what dog owners look

for in treat marketing statements. Additional research should target market segmentation in the dog industry and should include respondents attending sport/work/show events in addition to the general pet population [18].

Treat attribute likeness scores were different across products for aroma, texture, and overall appearance. No difference was found for color, size, and shape, which aligns with Morelli and others' findings in 2019. However, other previous studies found that color, size, and shape were significant factors in how much consumers liked different dry dog foods, and aroma was not significant unless the odor was found to be too strong [9,11]. While both prior studies were looking at dry dog food specifically, both results showed that consumers did not prefer dark kibbles or those with high-dimensional contrast shapes [9,11]. This would align with our results, as the overall treat attribute score (average of all treat attributes surveyed) was lowest for the novel product. The novel product was very dark in color and square in shape; however, the likeness scores for the overall appearance of the treats were not different between the BRY and CK products, though the CK product was scored significantly lower than the CSP and PBB products. All other products had comparable overall treat attribute scores and were light–medium in color, with lower-dimensional-contrast shapes. Additionally, our findings may contrast with the aforementioned studies as the BRY treat had a very strong berry odor that received the highest likeness score for aroma, which was significantly different from the CSP and CK treat aroma scores; this could be due to a berry aroma being perceived as pleasant by humans versus dry dog food odors.

All treat attributes were correlated with owner-predicted dog likeness, suggesting that the overall treat attribute score of a product is a good predictor of how much an owner anticipates their dog will like the product. Since consumers are generally unable to gauge treat attributes such as aroma and texture when deciding to make a purchase, this information may be more pertinent to repeat buyer behavior. General linear models showed that all treat attributes significantly impacted owner-predicted dog likeness scores, with overall appearance having the greatest impact, followed secondarily by aroma. An interesting finding in the GLMs was that shape negatively affected owner-predicted dog likeness scores. Since respondents were not asked to define if they preferred small or large treats, and there was no difference in size likeness scores across brands, we cannot accurately interpret this model for our study.

With overall treat appearance being the best predictor of dog likeness scores, correlation analysis was used to identify what treat attributes most affect overall appearance scores. All treat attributes were found to affect overall appearance. More research would be needed to further define which colors, shapes, sizes, aromas, and textures are preferred by consumers. A lexicon for the sensory properties of dry dog food, which could be used to further this area of research, was developed by Donfrenseco et al. in 2012 [10].

Previous research has noted that packaging and brand are the primary driving purchasing factors when dog owners buy products [3,4,9,15]. Like Morelli's 2019 [15] study, no difference in brand preference was reported in the current study; this significantly contrasts with other previous findings, such as those by Boya, Donfrancesco, and Koppel [3,4,9]. The lack of significant difference across brands for all other marketing attributes heavily contrasts with current industry notions that package statements and ingredients are of great importance to the consumer's purchase intent. There was perhaps not enough variation presented to respondents regarding packaging statements and ingredients as all products were similar in their statements and ingredient profiles. This is also apparent in our results from the questions that asked respondents about their perceptions of marketing attributes as answers were highly similar across brands. Future studies should include more variation in products with various packaging statements to ascertain their impact.

Given that the average of all marketing attributes was different between the CK and BRY products, further analysis was used to predict which attributes may have the most impact on consumer preference. Overall package appearance was correlated with all other marketing attributes surveyed but was not correlated with product. Additionally, overall

packaging appearance likeness scores were correlated with how much the respondent said they would be willing to pay for a product. A general linear model showed that dollar value increased by USD 1.31 for every one unit increase in likeness score. Theoretically, this means that a product with a "Strongly dislike" response would be worth USD 5.24 less than a product with a "Strongly like" response to that consumer. Depending on the product's profit margins, this could have a very significant impact on the manufacturer.

Dollar value was also correlated with all other marketing attributes, but not product. While GLMs showed significant linear relationships between these attributes and dollar value, their monetary impact was less than the overall appearance attribute. Dollar value increased by USD 1.06 per one unit increase in package type and by USD 1.08 per one unit increase in package statements. Like the finding with treat attribute size, one marketing attribute had a negative linear relationship with dollar value. As ingredient likeness scores increased, dollar value decreased by USD 0.02. Though this finding is statistically significant, the difference in dollar value is small and in contrast with current consumer research [3]. Further exploration of this finding with a larger and more diverse sample is needed.

The amount respondents were willing to pay for a product was lowest for the novel product and comparable for all other products. Given that the CK product did the poorest in all areas of this study, it is reasonable to think that consumers would be less willing to pay for said product. The average dollar value of the other three products was USD 8.71, where the mean for the CK brand was USD 5.98. However, this begs the question of whether respondents were basing their answers on how much product they thought they were purchasing. The CK product was presented as two individual bars in their packaging for a total of 2.5 ounce presented to the respondent. All other products were of much larger quantity; when price per ounce is calculated, respondents were willing to pay the most for the CK product, and double for what it currently retails. At the end of the survey respondents had the option to answer questions specific to the CK product to give feedback to the manufacturer regarding price points. Forty-six respondents participated in this section; in this portion, the average amount respondents were willing to pay per bar in a multi-bar package was USD 2.28. This value is still over triple the dollar value per ounce respondents were willing to pay for the other three products. Further investigation of this disparity is needed to clarify the relationship between dollar value, treat attributes, and marketing attributes, since the CK product did the poorest in all attributes yet appears to be worth the most to consumers on a per ounce basis.

Purchase intent was different across brands and was lowest for the novel product but comparable to the CSP product. Purchase intent was highest for the BRY product, which was comparable to the PBB product. Given the lower likeness scores of all attributes for the CK product, its lower purchase intent is not surprising. The BRY product was scored highest in aroma but was comparable to PBB; it also scored the highest for texture but was not different from CSP or PBB. Overall treat appearance for BRY was not different from any other products and the average of all treat attributes, while highest for BRY, was only significantly different from CK. Package type for BRY was the most preferred over all the other packages. The overall package appearance and average of all marketing attributes for BRY were higher than CK but were comparable to the other two products. Given our results, the only attributes that statistically set BRY apart from the other products were package type and aroma. This may explain why PBB also had high purchase intent as it scored as well as BRY for the aroma attribute and was comparable in other attributes. Given this information, it appears that treat attributes, while they are correlated with owner-predicted dog likeness and thus may have had some impact not captured in this study, do not directly impact consumer purchase intent in the capacity that marketing attributes such as package type do. Previous works [3,4,9] confirm that packaging is the primary driver for consumer purchase decisions and that appears to be supported in this study as well. In addition to the aforementioned, when consumers were asked what influenced their purchase intent in regard to marketing, the top three reasons selected were positive

perceptions of ingredients, packaging type, and overall packaging appearance. The least selected options for purchase intent influences were negative brand familiarity, overall packaging appearance, and packaging statements. In addition to our findings aligning with previous works, we also verified that preconceived negative or positive brand familiarity was not a contraindication within our study.

5. Conclusions

Treat attributes and marketing attributes may affect purchase intent and how much a consumer is willing to pay for a product. Specific attributes were difficult to discern, especially for dollar value in this study. It is unknown if respondents were basing their dollar value answers for the novel product based on the quantity of product displayed on the paper plates or a larger quantity, because when the price per ounce was calculated, they were willing to pay the most for the novel product. Nonetheless, there was a positive correlation for purchase intent, aroma, and package type to have the greatest impact based on the result from the product with the highest purchase intent.

Overall, the novel product in this study did the poorest, with the lowest purchase intent and lowest scores in all attributes. This may have been impacted by the conspicuousness of the novel product from the other products and future research should work to mitigate the stark contrast between the novel product and readily available products. Additionally, the respondent demographic may not have been diverse enough to fully capture the segmentation within the pet industry market, and thus, the novel product may have had better success within a different market segment or broader demographic. As mentioned previously, the novel product has been marketed as a K-9 health bar; thus, it would be invaluable to investigate owner-predicted dog likeness in an agility or sporting dog market segment of the pet treat industry to facilitate more differentiated strategies in the competitive market.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/pets1020013/s1, Figure S1: Marketing influences on purchase intent for all products were as follows: positive ingredients, positive packaging type/positive overall packaging appearance, and positive package statement (n = 66).

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of TARLETON STATE UNIVERSITY (1936079-1, approved on 19 October 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author upon reasonable request.

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Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Survey Questions

○ Sponsor: N/A

You are invited to participate in a research study about consumer preferences in regard to commercially available dog treats.
If you agree to be part of the research study, you will be asked to smell, feel, compare, and rate different dog treats, packaging, and delivery style.
If you agree to participate in the research study, it should take you no longer than 30 min to complete.
Benefits of the research include providing consumer feedback to treat manufacturers so that they may better meet consumer needs and wants.
Potential risks and discomforts include some treats may contain allergens such as peanut products, tree nut products, and dairy products.
Compensation to participate in the study is provided by entrance into a drawing to win a gift basket. Entrance into the drawing is not required to participate in the study.
Participating in this study is completely voluntary, and there is no penalty or loss of benefits for refusal to participate. Even if you decide to participate now, you may change your mind and stop at any time, and there is no penalty or loss of benefits. You may choose not to answer any survey question and may stop participation at any time for any reason.
The confidentiality of your research records will be protected by anonymity, we will not ask for any identifying information regarding your person or dog.
Information collected in this project may be shared with other researchers or used for future research studies. However, we will not share any information that could identify you.
If you have questions about this research study, please contact the PI.
The Institutional Review Board operates independently from the investigator named above, and can be reached for questions, concerns, complaints, injuries, and more information about subjects' rights. I have read the above consent statement and wish to continue. (1)

○ I do not wish to continue. (2)

Skip To: End of Survey If Principal Investigator: Reagan Grimes, B.S., Tarleton State University Co-investigator(s): Dr. Tr... = I do not wish to continue.

Q2 Are you 18 years of age or older?

○ No (1)
○ Yes (2)

Skip To: End of Survey If Are you 18 years of age or older? = No

Q3 Do you currently own at least one dog?

○ No (1)
○ Yes (2)

Skip To: End of Survey If Do you currently own at least one dog? = No

Q4 If your dog participated in the canine preference study, please type in their assigned number below:_____
Q5 How many dogs do you currently own?

○ 1 (1)
○ 2 (2)
○ 3 (3)
○ 4 (4)
○ 5 or more (5)

Q6 What breed group does your dog best fit in? (If you own more than one dog, answer for the one that participated in the canine preference study. If you did not have a dog in the canine preference study, answer for one dog you wish to reference throughout this survey.)

- ○ Herding (shepherds and collies) (1)
- ○ Sporting (retrievers and spaniels) (2)
- ○ Non-Sporting (poodles, dalmatians, etc.) (3)
- ○ Toy (Chihuahua, Maltese, etc.) (4)
- ○ Hound (Scent and sight hounds) (5)
- ○ Terrier (American pit bull terrier, fox terrier, etc.) (6)
- ○ Mix of multiple (7)
- ○ Unsure (8)

Q7 What age group is your dog in? (If you own more than one dog, answer for the one that participated in the canine preference study. If you did not have a dog in the canine preference study, answer for one dog you wish to reference throughout this survey.)

- ○ 6 months–1 year (1)
- ○ 1–3 years (2)
- ○ 4–6 years (3)
- ○ 7–10 years (4)
- ○ Over 10 years (5)

Q8 How active is your dog? (If you own more than one dog, answer for the one that participated in the canine preference study. If you did not have a dog in the canine preference study, answer for one dog you wish to reference throughout this survey.)

- ○ Extremely active (1)
- ○ Very active (2)
- ○ Moderately active (3)
- ○ Not active (4)
- ○ Extremely inactive (5)

Q9 What activities do you participate in with your dog(s) on a weekly basis? (Select all that apply)

- ☐ Hiking (1)
- ☐ Biking (2)
- ☐ Running (3)
- ☐ Walking (4)
- ☐ None of the above (5)

Q10 Do you participate in any dog sports or working activities with your dog(s)?

- ○ No (1)
- ○ Yes (2)

Skip To: End of Block If Do you participate in any dog sports or working activities with your dog(s)? = No

Q11 What dog sports or working activities do you participate in with your dog(s)? (Select all that apply)

- ☐ Agility (1)
- ☐ Conformation (2)
- ☐ Obedience/Rally (3)
- ☐ Barn Hunt (4)
- ☐ Scent work (5)
- ☐ Lure coursing (6)
- ☐ Herding trials (7)
- ☐ Hunting/Field trials (8)
- ☐ Tracking (9)
- ☐ Weight pull (10)

- ☐ Dock diving (11)
- ☐ Bite sports/Protection work (12)
- ☐ Working farm dog (13)
- ☐ Other (14) _____

Q12 Please rate the following attributes about sample #1 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Color (1)	○	○	○	○	○
Size (2)	○	○	○	○	○
Shape (3)	○	○	○	○	○
Aroma (4)	○	○	○	○	○
Texture (5)	○	○	○	○	○
Overall Appearance (6)	○	○	○	○	○

Q13 Please rate the following question about sample #1 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How much do you think your dog will enjoy this treat? ()

0 1 2 3 4 5 6 7 8 9 10



Q14 Please rate the following attributes about sample #2 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Color (1)	○	○	○	○	○
Size (2)	○	○	○	○	○
Shape (3)	○	○	○	○	○
Aroma (4)	○	○	○	○	○
Texture (5)	○	○	○	○	○
Overall Appearance (6)	○	○	○	○	○

Q15 Please rate the following question about sample #2 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How much do you think your dog will enjoy this treat? ()

0 1 2 3 4 5 6 7 8 9 10



Q16 Please rate the following attributes about sample #3 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Color (1)	○	○	○	○	○
Size (2)	○	○	○	○	○
Shape (3)	○	○	○	○	○
Aroma (4)	○	○	○	○	○
Texture (5)	○	○	○	○	○
Overall Appearance (6)	○	○	○	○	○

Q17 Please rate the following question about sample #3 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely

How much do you think your dog will enjoy this treat? ()

0 1 2 3 4 5 6 7 8 9 10



Q18 Please rate the following attributes about sample #4 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Color (1)	○	○	○	○	○
Size (2)	○	○	○	○	○
Shape (3)	○	○	○	○	○
Aroma (4)	○	○	○	○	○
Texture (5)	○	○	○	○	○
Overall Appearance (6)	○	○	○	○	○

Q19 Please rate the following question about sample #4 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How much do you think your dog will enjoy this treat? ()



Q20 Please rate the following attributes about product #1 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Overall appearance (1)	○	○	○	○	○
Package type (resealable/size) (2)	○	○	○	○	○
Package statements (3)	○	○	○	○	○
Ingredients (4)	○	○	○	○	○
Treat style (breakable or loose) (5)	○	○	○	○	○

Q21 What factors influenced your decision the most on whether or not to purchase product #1? (Select all the apply)

- ☐ Positive perception of packaging type (resealable/size) (1)
- ☐ Positive perception of overall packaging appearance (2)
- ☐ Positive perception of package statements (3)
- ☐ Positive perception of ingredients (4)
- ☐ Positive brand familiarity (5)
- ☐ Positive perception of treat style (loose or breakable) (6)
- ☐ Negative perception of packaging type (resealable/size) (7)
- ☐ Negative perception of overall packaging appearance (8)
- ☐ Negative perception of package statements (9)
- ☐ Negative perception of ingredients (10)
- ☐ Negative brand familiarity (11)
- ☐ Negative perception of treat style (loose or breakable) (12)

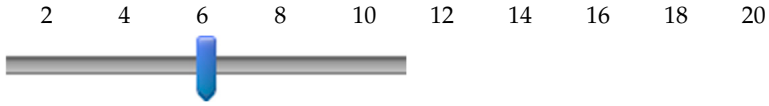
Q22 Please rate the following question about product #1 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How likely are you to buy this product? ()



Q23 Please select a price that you would be willing to pay for product #1:

Cost/package in US dollars ()



Q24 Please rate the following attributes about product #2 on a scale of "Strongly Dislike" to Strongly Like"

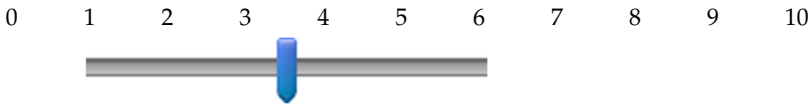
	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Overall appearance (1)	○	○	○	○	○
Package type (resealable/size) (2)	○	○	○	○	○
Package statements (3)	○	○	○	○	○
Ingredients (4)	○	○	○	○	○
Treat style (breakable or loose) (5)	○	○	○	○	○

Q25 What factors influenced your decision the most on whether or not to purchase product #2? (Select all the apply)

- ☐ Positive perception of packaging type (resealable/size) (1)
- ☐ Positive perception of overall packaging appearance (2)
- ☐ Positive perception of package statements (3)
- ☐ Positive perception of ingredients (4)
- ☐ Positive brand familiarity (5)
- ☐ Positive perception of treat style (loose or breakable) (6)
- ☐ Negative perception of packaging type (resealable/size) (7)
- ☐ Negative perception of overall packaging appearance (8)
- ☐ Negative perception of package statements (9)
- ☐ Negative perception of ingredients (10)
- ☐ Negative brand familiarity (11)
- ☐ Negative perception of treat style (loose or breakable) (12)

Q26 Please rate the following question about product #2 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How likely are you to buy this product? ()



Q27 Please select a price that you would be willing to pay for product #2:

Cost/package in US dollars ()



Q28 Please rate the following attributes about product #3 on a scale of "Strongly Dislike" to Strongly Like".

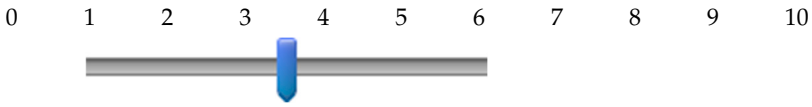
	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Overall appearance (1)	○	○	○	○	○
Package type (reseal-able/size) (2)	○	○	○	○	○
Package statements (3)	○	○	○	○	○
Ingredients (4)	○	○	○	○	○
Treat style (breakable or loose) (5)	○	○	○	○	○

Q29 What factors influenced your decision the most on whether or not to purchase product #3? (Select all the apply)

- ☐ Positive perception of packaging type (resealable/size) (1)
- ☐ Positive perception of overall packaging appearance (2)
- ☐ Positive perception of package statements (3)
- ☐ Positive perception of ingredients (4)
- ☐ Positive brand familiarity (5)
- ☐ Positive perception of treat style (loose or breakable) (6)
- ☐ Negative perception of packaging type (resealable/size) (7)
- ☐ Negative perception of overall packaging appearance (8)
- ☐ Negative perception of package statements (9)
- ☐ Negative perception of ingredients (10)
- ☐ Negative brand familiarity (11)
- ☐ Negative perception of treat style (loose or breakable) (12)

Q30 Please rate the following question about product #3 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How likely are you to buy this product? ()



Q31 Please select a price that you would be willing to pay for product #3:

Cost/package in US dollars ()



Q32 Please rate the following attributes about product #4 on a scale of "Strongly Dislike" to Strongly Like"

	Strongly Dislike (1)	Dislike (2)	Neutral (3)	Like (4)	Strongly Like (5)
Overall appearance (1)	○	○	○	○	○
Package type (reseal-able/size) (2)	○	○	○	○	○
Package statements (3)	○	○	○	○	○
Ingredients (4)	○	○	○	○	○
Treat style (breakable or loose) (5)	○	○	○	○	○

Q33 What factors influenced your decision the most on whether or not to purchase product #4? (Select all the apply)

- ☐ Positive perception of packaging type (resealable/size) (1)
- ☐ Positive perception of overall packaging appearance (2)
- ☐ Positive perception of package statements (3)
- ☐ Positive perception of ingredients (4)
- ☐ Positive brand familiarity (5)
- ☐ Positive perception of treat style (loose or breakable) (6)
- ☐ Negative perception of packaging type (resealable/size) (7)
- ☐ Negative perception of overall packaging appearance (8)
- ☐ Negative perception of package statements (9)
- ☐ Negative perception of ingredients (10)
- ☐ Negative brand familiarity (11)
- ☐ Negative perception of treat style (loose or breakable) (12)

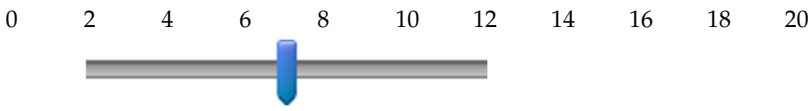
Q34 Please rate the following question about product #4 on a scale of "Not At All" to "Very Likely" where 0 is not at all and 10 is Very Likely.

How likely are you to buy this product? ()



Q35 Please select a price that you would be willing to pay for product #4:

Cost/package in US dollars ()



Q36 Please rank products 1 thru 4 on your likeliness to purchase the product:

- ☐ _____ Product #1 (1)
- ☐ _____ Product #2 (2)
- ☐ _____ Product #3 (3)
- ☐ _____ Product #4 (4)

Q37 Please rank products 1 thru 4 on your expectation of how much your dog will enjoy the treat:

- ☐ _____ Product #1 (1)
- ☐ _____ Product #2 (2)
- ☐ _____ Product #3 (3)

☐ _____ Product #4 (4)

Q38 Would you be interested in purchasing product #3 more than 1 bar at a time?

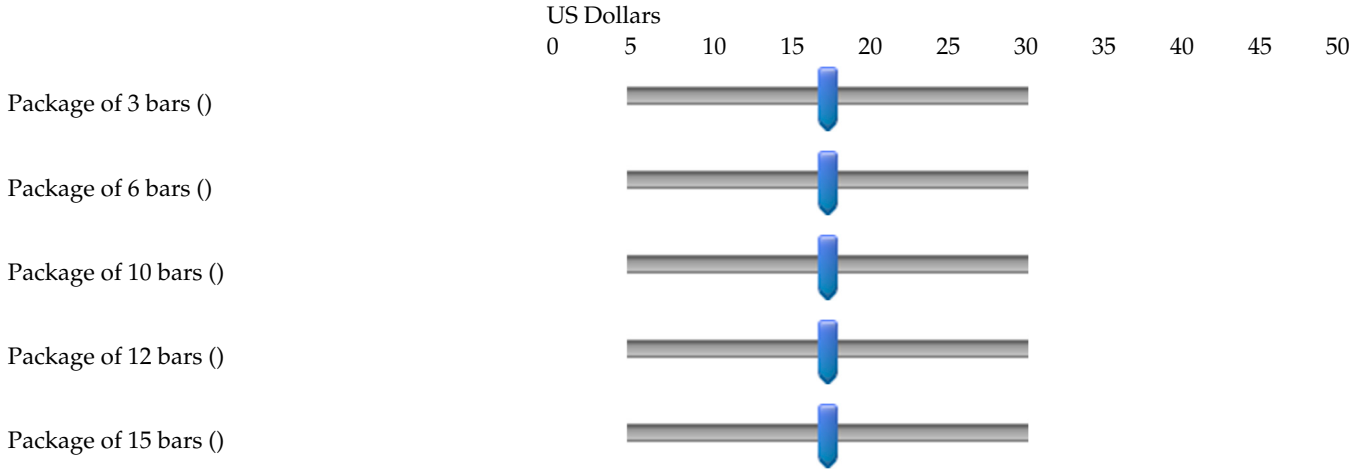
- ○ Yes (1)
- ○ Maybe (2)
- ○ No (3)

Skip To: End of Survey If Would you be interested in purchasing product #3 more than 1 bar at a time? = No

Q39 How many bars of product #3 would you prefer to purchase at a time if they were sold in packages containing more than 1 bar?

- ○ 3 bars (1)
- ○ 6 bars (2)
- ○ 10 bars (3)
- ○ 12 bars (4)
- ○ 15+ bars (5)

Q40 Please select the amount, in dollars, you would be willing to pay for each packaging amount:



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