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An Analysis of Pet Food Label Usage

We use the 2008 Health and Diet Survey to investigate the extent to which pet owners consult pet food labels. We find that pet food label usage has not penetrated shopping behavior to the degree that using the Nutrition Facts label has for human food purchases. While we find no gender difference in using pet food labels among dog owners, women may be less likely than men to consult labels among cat owners. The data also suggest that usage increases when at least three pets are owned; cat owners consult pet food labels less frequently than dog owners; and usage is not dependent on the type of product purchased.

The Nutrition Facts label has been required on most packaged food since 1994 and provides consumers with a wide array of valuable nutrition information. Recent data from the National Health and Examination Surveys showed that 42% of adults used the label all or most of the time when shopping in 2009/2010, which was up from 34% in 2007/2008 (Todd 2014). Additionally, Campos, Doxey, and Hammond (2011) and Ollberding, Wolf, and Contento (2011) found that label users exhibited better diet patterns than nonlabel users.

Many of the benefits from standardizing the labeling of food also potentially apply to the labeling of pet food. One goal of pet food labeling, much like the labeling of packaged food, is to help pet owners make smarter choices and thereby provide a higher quality of care for their pets (Michel et al. 2008). Acknowledging the well-established correlations between proper nutrition and pet health, the American Animal Hospital Association provides recommended pet nutrition guidelines with the aim of enhancing the length and quality of pets' lives (American Animal Hospital Association 2010).

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With 95 million pet cats and 83 million pet dogs in the United States, together cats and dogs outnumber the number of children under the age of 18 by almost two to one (American Pet Products Association 2014). According to the American Pet Products Association, almost 56 billion dollars was spent on pet products in the United States in 2013, with almost 23 billion dollars being spent on pet food alone. Moreover, expenditures on pets have been increasing at more than a 6.5% annual rate since 1994 (American Pet Products Association 2014).

Despite the potential health implications for pets and the economic importance of the pet food market, a lack of data has precluded an analysis of pet food label usage from being conducted. The 2008 Health and Diet Survey (HDS), however, collected data on pet owners and their feeding habits. Using this data set, we investigate the extent to which dog and cat owners consult pet food labels for nutritional information when purchasing a pet food for the first time. We also compare consumer use of pet food labels to their use of the Nutrition Facts label. Furthermore, the survey design of the 2008 HDS allows empirical analysis of the usage of pet food labels by the number and type of pets owned. The results presented here provide a baseline for comparing behavior in 2008 against future results when other surveys interview pet owners about their usage of pet food labels.

In order to differentiate between the labeling of food meant for human consumption from pet food, we refer to the Nutrition Facts label as the "food label" and refer to a label on pet food as the "pet food label." Additionally, "pets" refers to dogs and cats, and "pet food" refers to dog and cat food products. Finally, "pet owner" is taken to mean a pet owner who self-reports in the 2008 HDS as being a primary shopper for pet food.

A HISTORY OF PET FOOD LABELS

From a legal standpoint, pet food products are a subset of all products marketed as food for animals. Animal foods are regulated at both the federal and state levels with most state regulations imposing additional requirements beyond the federal requirements. Because each state enacts specific laws and regulations for animal foods sold in the state, the potential exists for multiple sets of divergent requirements for the labeling and composition of animal foods.[1]

1. See Bren (2001) and Dzanis (1994, 2008) for more information on the history and development of pet food labels.

The Association of American Feed Control Officials (AAFCO) is an association of state and federal officials involved in the regulation of animal food products. In order to promote a uniform set of requirements for animal food products across all of North America, AAFCO has developed a set of proposed laws and regulations (termed the AAFCO Model Bill and AAFCO Model Regulations) that the association recommends individual states adopt (AAFCO 2014). Although not every state has adopted the most current version of the AAFCO's model regulations, a sufficient number of states have so that states will generally allow products to be sold if the products are in compliance with the current model regulations.

The AAFCO model regulations contain many of the same requirements specified in federal regulations, including (1) an appropriate name to describe the product, (2) a listing in descending order by weight of the ingredients used to make the product, (3) a statement of the net quantity of contents in the package, and (4) a listing of the name and place of business of the product's manufacturer, distributor, or packer. The current AAFCO model regulations also require calorie content to be stated on all dog and cat food products by 2017.

The AAFCO model regulations for pet foods require most pet foods to list guarantees of minimum crude protein, minimum crude fat, maximum crude fiber, and maximum moisture content. Many manufacturers also list guarantees for additional nutrients, either voluntarily or to support nutrient content claims made elsewhere on the product label, such as the content of omega-3 fatty acids and ascorbic acid. The guarantees allow consumers the opportunity to compare products directly and make decisions based on nutrient content. A nutritional adequacy statement is also required on most pet foods by the AAFCO model regulations. This statement explains which life stage and species the product has been formulated for and how that determination was made.

THE 2008 HDS

The 2008 HDS was administered by the FDA's Center for Food Safety and Applied Nutrition. The results were derived from eligible respondents in a randomized selection of 2,584 American adults 18 years of age or older who had a residential telephone. The unit of observation is an individual within a household. The study protocol was approved under exempt review by the institutional review board of the FDA. The 2008 HDS includes sampling weights that allow researchers to replicate the entire distribution

of adult individuals who own pets.[2] Similar surveys have been used in the past to investigate usage of the food label (Campos, Doxey, and Hammond 2011). The purpose of this study is to extend such analysis to the usage of pet food labels.

Unique to the 2008 HDS is a section on the use of pet food labels. This section identifies dog and cat owners who are then queried about their pets and shopping habits. Use of the pet food label is measured from the question: "Now think about the first time you purchase a pet food product. When you look at pet food labels for the first time, either in the store or at home, how often, if at all, do you use the label to determine if a product meets your pets' nutritional needs? Would you say often, sometimes, rarely, or never?"[3] Our analysis focuses on this question because it asks about nutrition which can be gained by looking at the guaranteed analysis, the nutritional adequacy statement, and the directions for product use which are all included in pet food labeling.

It is standard practice in research of food label usage to restrict analysis to a household's primary shopper. To mirror this, the 2008 HDS asked respondents, "About how much of the decisions do you make about your household's pet food purchases? Would you say all of them, some of them, or none of them?" We took a primary pet food shopper to be someone who answered "all of them" or "some of them" to this question. There are 1,049 respondents in the 2008 HDS who report being the primary pet food shopper. Among the households that these respondents represent, 528 own at least one dog and do not own cats, 298 own at least one cat and do not own dogs, and 223 own at least one dog and at least one cat.[4]

RESULTS

The 2008 HDS was collected, in part, to provide a measure of pet food label usage that could serve as a baseline for future comparisons. In addition to exploring other pet-related covariates of pet food label usage, our analysis focuses on the relationship between food label and pet food

2. All of the results in the article except raw counts of responses are reported after weighting the data to replicate the distribution of pet owners over the age of 18 in the United States.

3. Telephone interview studies of label usage suffer from a potential self-reporting bias as there is no way to confirm a respondent's actual usage. Although this issue is present, it is also unclear just how biased answers given over the phone would be. Moreover, because respondents in the 2008 HDS are asked about their pet food label usage in an identical way as they are asked about their food label usage, the results on pet food label usage should be comparable to the literature on food label usage.

4. Because of missing data, sample sizes can vary slightly. Of the 1,049 respondents with pets, there is complete data on 1,031.

label usage. Specifically, rates of label usage between food and pet food labels may be similar if the quality of information provided is similar across the two types of labels and people value the information equally. Conversely, rates may differ if people value information about human foods more or less than pet foods and/or if the quality of information provided on one type of label is more relevant or easier to use and apply than the other.[5]

We also investigate gender effects. In general, women are more likely than men to check food labels (Blitstein and Evans 2006; Campos, Doxey, and Hammond 2011; Stran and Knol 2013). It is important to know if a gender difference also exists when shopping for pet food in order to strategize how label usage might be improved.

As an analysis of pet food label usage is lacking from the literature, the data are first presented in raw form. Because four classes of use (often, sometimes, rarely, and never) comprise each distribution, a chi-squared test that the distributions differ will almost always be associated with a small *p*-value. Thus, although some *p*-values are given, the cross-tab analysis focuses on differences in magnitudes. Logistic regression models of pet food label usage are then estimated.

Cross-Tabulations

Table 1(a) provides the overall weighted distribution of primary shoppers who own pets according to the extent they use food labels and pet food labels for nutritional information when a product is purchased for the first time. According to the 2008 HDS data, 54% of primary pet food shoppers report using the food label "often," 24.8% report "sometime" use, 9.2% report "rarely" using the food label, and 12% report "never" using the label for nutritional information. This distribution of food label usage closely mirrors what has been documented in the literature (Blitstein and Evans, 2006; Campos, Doxey, and Hammond 2011; Nayga, 1996). In comparison, pet food label usage is much lower than food label usage among these same individuals. The percent of pet owners who claim to use pet food labels often to gain nutritional information is only 37.5 (nearly 17 percentage points lower than for food purchases), and 26.1% report never

5. While the same efforts that have led to increased usage of the food label over time may have also led to similar increases in pet food label usage, it is also possible that pet owners fail to use the pet food label to the same extent they use food labels. Unfortunately, if this is the case, the 2008 HDS survey will not allow us to ascertain whether lower usage is due to shoppers not knowing about the pet food label, not finding the pet food label useful, or not valuing nutritional information for pets to the same extent they consider nutritional information when purchasing groceries.

TABLE 1
Label Usage by Household Characteristics of Pet Owners

	(a) Label Usage		(b) Number of Pets in Household			(c) Type of Pets in Household		
	Food	Pet Food	1	2	3+	Cat	Dog	Both
Often	54.0%	37.5%	41.2%	32.8%	36.7%	30.7%	42.1%	34.9%
Sometimes	24.8%	25.9%	27.3%	24.7%	24.7%	27.4%	21.5%	32.2%
Rarely	9.2%	10.6%	7.9%	12.4%	12.6%	9.1%	9.5%	13.5%
Never	12.0%	26.1%	23.6%	30.1%	26.0%	32.8%	26.9%	19.4%
N	1,033	1,037	505	279	253	295	517	219

	(d) Type of Purchase			(e) Gender of Shopper	
	Dry Food	Canned Food	Treats	Female	Male
Often	37.8%	37.4%	38.4%	41.9%	33.2%
Sometimes	26.7%	28.6%	26.6%	20.0%	31.9%
Rarely	10.7%	5.7%	10.6%	8.9%	12.1%
Never	24.8%	28.3%	24.4%	29.2%	22.8%
N	941	369	758	706	320

Notes: Source: 2008 Health and Diet Survey, authors' calculations. Observations are restricted to primary pet food shoppers in the 2008 HDS. Sample sizes can vary across panels due to missing data. The data are weighted to replicate the distribution of pet owners over the age of 18 in the United States.

using pet food labels (over two times greater than for food labels). Comparing the two distributions, pet food label usage is substantially below food label usage ($p = 0.0003$).

Table 1(b) reports the distribution of pet food label usage by the number of pets owned. These raw percentages fail to identify a clear pattern. Owning just one pet is associated with the most usage whether measured by the "often" response or by combining the "often" and "sometimes" responses. Usage is less, however, when owning two pets than when owning three or more pets.

Table 1(c) provides the distribution of pet food label usage by households that own just cats, own just dogs, or own both types of pets. There is a substantial difference in the use of pet food labels by type of pet owner—30.7% of cat owners compared to 42.1% of dog owners use pet food labels often. Individuals that own both dogs and cats use pet food labels at an intermediate rate (34.9%). Owners of both dogs and cats, however, are less likely to never use the pet food label compared to just dog owners ($p = 0.0005$) or just cat owners ($p = 0.0170$).

Table 1(d) provides the distribution of pet food label usage by the type of product purchased—dry food, canned food, or treats. It is important to note that the 2008 HDS does not ask the pet food label question for each type of purchase. Rather, each pet owner was asked: Do you feed your pet

commercial dry food? Do you feed your pet commercial canned food? Do you feed your pet commercial treats? The pet food label usage distribution was then constructed for all pet owners who responded positively to a particular category. Thus, the responses are not mutually exclusive by category in that a single pet owner could be included in one, two, or all three categories depending on the type of products they reported feeding their pet. Although feeding dry pet food is much more common than feeding commercial treats, which is more common still than feeding canned food, there is a striking similarity across the three categories—about 38% of pet owners in each category report using pet food labels "often," about 27% report using pet food labels "sometimes," and about 25% report never using pet food labels. There is no statistical evidence that the distributions differ by type of food ($p = 0.8104$).

Table 1(e) reports the distribution of pet food label usage by gender. A difference exists at the top end of the distribution with 41.9% of females but only 33.2% of males using pet food labels "often" ($p = 0.0045$). If using the pet food label "often" or "sometimes" are grouped together, however, as will be done in the regression analysis, a reversal occurs with 61.9% of females and 65.1% of male shoppers consulting pet food labels, and the difference is no longer statistically significant ($p = 0.2794$).

Regression Analysis

Table 2 presents the summary statistics of all of the variables used in the regression analysis, weighted to replicate the population over the age of 18 in the United States of pet owners who are primary shoppers for their pet's food. The dependent variable in the logistic regression models equals 1 if the respondent indicated consulting pet food labels "often" or "sometimes" to check nutritional information at the time of first purchase and equals 0 otherwise. Table 2 shows that 63.3% of pet owners consult pet food labels "often" or "sometimes" to gain nutritional information when they purchase a product for the first time. In comparison, 79% of these individuals consult food labels often or sometimes. The average pet owner has just over two pets. The empirical model, however, will include indicator variables for owning two pets and owning three or more pets compared to owning exactly one pet. Among pet owners in the 2008 HDS, nearly half own only dogs while 22% own only cats and about 28% own both dogs and cats. The next three rows of Table 2 summarize whether pet owners ever feed their pet dry food, canned food, or treats. As mentioned earlier, a great majority (over 94%) of pet owners feed their pet dry food, while 79% also feed treats and only 30% feed canned food. Finally, the empirical

TABLE 2
Proportion of All Primary-Shopper Pet Owners by Demographic Category

	N	Mean	SD
Uses pet food labels for nutritional information	1,037	0.633	0.482
Uses food labels for nutritional information	1,043	0.789	0.408
Number of pets (dogs and/or cats) in household	1,049	2.07	1.19
Household owns one pet	1,049	0.422	0.494
Household owns two pets	1,049	0.276	0.447
Household owns three or more pets	1,049	0.302	0.459
Owns only dogs	1,049	0.495	0.500
Owns only cats	1,049	0.220	0.414
Household ever feeds its pet(s) dry food	1,047	0.943	0.232
Household ever feeds its pet(s) canned food	1,049	0.304	0.460
Household ever feeds its pet(s) commercial treats	1,045	0.793	0.406
Respondent is female	1,044	0.530	0.499
Kids are present in the household	1,045	0.451	0.498
Respondent has more than a high school degree	1,044	0.597	0.491
Respondent is non-Hispanic White	1,049	0.827	0.377
Respondent is non-Hispanic Black	1,049	0.047	0.211
Respondent is Hispanic	1,049	0.094	0.292
Respondent is another race	1,049	0.032	0.177
Age of respondent	1,030	44.24	15.10
Under 30 years old	1,030	0.189	0.392
Between 30 and 55 years old	1,030	0.567	0.496
Over 55 years old	1,030	0.236	0.425
Annual household income between $0 and $50,000	926	0.432	0.496
Annual household income between $50,000 and $100,000	926	0.394	0.490
Annual household income exceeds $100,000	926	0.174	0.379

Notes: Source: 2008 Health and Diet Survey, authors' calculations. The sample is restricted to primary pet food shoppers in the 2008 HDS, and the data are weighted to replicate the population of pet owners over the age of 18 in the United States who self-report being the primary shopper for their pet's food.

model contains many of the same demographic variables that are included in models estimating food label usage. In particular, the 2008 HDS allows us to include gender, having children present in the household, having some education beyond a high school degree, race (non-Hispanic White, non-Hispanic Black, Hispanic, and other, primarily Asian), categorical measures of age, and categorical ranges of annual household income.

Table 3 presents the estimated marginal effects from three logistic regressions that predict pet food label usage. Model [1] includes all 900 HDS respondents who reported complete information and owned at least one pet (cat or dog). Model [2] restricts the sample to the 446 cat owners (256 own just cats while 190 also own at least one dog), while Model [3] restricts the data to the sample of 644 dog owners (454 own just dogs while 190 also own at least one cat).

TABLE 3
Marginal Effects from Logistic Regression of the Usage of the Pet Food Labels

	Cat and Dog Owners [1]	Cat Owners [2]	Dog Owners [3]
Uses the nutritional facts panel	0.282***	0.071	0.297***
	(0.073)	(0.106)	(0.082)
Owns two pets	−0.018	−0.051	0.010
	(0.059)	(0.092)	(0.060)
Owns at least three pets	0.146**	0.214**	0.145**
	(0.074)	(0.105)	(0.066)
Owns cats but not dogs	−0.269***	−0.224**	
	(0.094)	(0.091)	
Owns dogs but not cats	−0.016		0.011
	(0.090)		(0.080)
Ever feeds dry pet food	0.066	0.171	0.029
	(0.093)	(0.133)	(0.101)
Ever feeds canned pet food	0.001	0.001	0.028
	(0.055)	(0.081)	(0.054)
Ever feeds commercial treats	0.062	0.070	0.068
	(0.059)	(0.085)	(0.065)
Female shopper	−0.068	−0.193**	0.027
	(0.054)	(0.077)	(0.057)
Kids are present in household	−0.106*	−0.164*	−0.063
	(0.065)	(0.095)	(0.066)
Educated above high-school degree	0.054	−0.053	0.199**
	(0.063)	(0.093)	(0.067)
Non-Hispanic Black	0.096	−0.049	0.144**
	(0.080)	(0.150)	(0.058)
Hispanic	0.144*	0.190	0.124**
	(0.081)	(0.153)	(0.063)
Other non-White, non-Hispanic race	0.133	0.158	0.045
	(0.111)	(0.198)	(0.086)
Under 30 years of age	0.115	0.015	0.069
	(0.100)	(0.182)	(0.106)
Over 55 years of age	0.037	−0.058	0.117*
	(0.056)	(0.081)	(0.061)
Annual income $50,000 to $100,000	−0.046	−0.001	−0.095
	(0.061)	(0.089)	(0.064)
Annual income exceeds $100,000	−0.088	−0.036	−0.113
	(0.075)	(0.107)	(0.084)
Pseudo R^2	0.1143	0.1236	0.1190
Number of observations	900	446	644

Notes: Source: 2008 Health and Diet Survey, authors' calculations. The dependent variable equals 1 if the respondent reports to check the pet food label "often" or "sometimes" for nutritional information. Standard errors are reported in parentheses beneath coefficient estimates.
*$p < .10$, **$p < .05$, ***$p < .01$.

Table 3 shows that food label and pet food label usage are correlated, especially among dog owners. In particular, dog owners who use food labels are almost 30 percentage points more likely to also use pet food labels. No such statistical relationship, however, is observed among cat owners.

All three models in Table 3 provide the same conclusion regarding the number of pets in the household—there is no statistical difference in the rate of pet food label usage among pet owners with one or two pets, but pet food label usage increases substantially (by about 21 percentage points for cat owners and almost 15 percentage points for dog owners) when three or more pets are owned.

Compared to households that own at least one cat and at least one dog, Model [1] shows that cat owners (who do not own dogs) are 27 percentage points less likely to use pet food labels. In contrast, there is no statistical difference in the rate at which households with cats and dogs and households with just dogs use the pet food label. Models [2] and [3] reinforce both of these results. All three models in Table 3 also fail to find a statistical difference in label usage by whether the pet's owner feeds the pet dry food, canned food, or commercial treats.[6]

The results concerning the gender of the pet food shopper are mixed depending on the type of pet owned. Among cat owners, females are almost 19 percentage points less likely to use pet food labels compared to males. No such statistical relationship exists among dog owners.[7]

The remaining results in Table 3 concern various demographics that are typically included when predicting food label usage. In general, these characteristics (kids in the household, education, race, age, and income) are very poor predictors of pet food label usage.

DISCUSSION OF RESULTS

The 2008 HDS provides the first opportunity to formally assess the proclivity of pet owners' use of pet food labels to gain nutritional information

6. The *p*-values for the joint test that all three coefficients equal zero for Models [1], [2], and [3] are 0.6572, 0.5272, and 0.9117, respectively.

7. This result concerning female cat owners is not robust to the choice of how to measure pet food label usage. All of the previous results discussed persist whether pet food label usage is defined by grouping "often" and "sometime" use (as is done in Table 3) or if usage is defined more stringently as using the pet food label "often." When this more stringent definition is used, however, there are no gender differences in pet food label usage. When usage is defined as using the pet food label "often" to re-estimate Model [2] of Table 3, the −0.193 coefficient estimate on "female shopper" becomes a statistically insignificant −0.061.

when purchasing pet food products for the first time. Our empirical analysis follows the style of the literature that investigates consumers' use of the Nutrition Facts label when purchasing food products for their household. Just as the Nutrition Facts label is intended to help consumers make more informed and potentially healthier decisions about diet, the pet food label, which is largely influenced by AAFCO's model regulations for pet food, has the potential for informing pet owners about the content and potential health benefits of their pet food choices. The research presented here provides foundational information about pet food consumers and pet food label usage. The results will provide a meaningful comparison for future research that further explores the behavior of the pet food consumer.

One of our most important results is that primary pet food shoppers are about 15 percentage points less likely to use pet food labels than they are to use the food label when purchasing a product for the first time. That said, despite less frequent use of the pet food label, regression analysis does show that pet owners who use the food label for their own shopping are substantially more likely to use the pet food label. Another important finding is that, unlike the literature on food label usage which consistently finds greater use of food labels among female shoppers (Blitstein and Evans 2006; Campos, Doxey, and Hammond 2011), there is no such difference among male and female pet owners. Why this is the case is unclear. Additional research is needed to further probe this issue.

The pet food label, like the food label, provides the consumer with important information about the nutrient content of the food, so that increasing pet food label usage would be expected to have positive health consequences for pets. According to the 2008 HDS, 47% of pet owners report using veterinarians to get "a lot" of their information about their "pet's nutritional needs." Although veterinarians are a prime source of information, many pet owners likely do not have more than annual contact with their vet. Furthermore, the 2008 HDS also reports that pet owners frequently obtain information about their pet's nutritional needs from books and magazines (15%), the Internet (10%), and advertisements (8%). Taking steps to expand pet food label usage (either by improving the label or educating pet owners about the benefits of the label) could effectively improve pet health and allow consumers to make better shopping decisions from an economic standpoint.

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