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Empirical: Single or Multiple Studies

Evidence for the Common or Usual Name for Plant-Based Food Products

Adam Feltz[1], Silke Feltz[1], Uyen Hoang[1], Jenna Holt[1], Yangying Liu[1]

[1] *Department of Psychology, University of Oklahoma, Norman, OK, USA.*

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Corresponding Author: Adam Feltz, Department of Psychology, University of Oklahoma, 455 W. Lindsey St., Dale Hall Tower, Room 705, Norman, OK 73019, USA. E-mail: afeltz@ou.edu

Supplementary Materials: Code, Data, Materials, Preregistration [see Index of Supplementary Materials]

Abstract

Common or usual names for food products are important for regulation and consumer understanding. Because some plant-based products aimed at mimicking animal-based products are relatively new, there is little evidence concerning whether those products have common or usual names, and if they do, what those common or usual names might look like. We present evidence from a survey (Study 1) based on vocabulary tests (N = 181) suggesting that using plant-based qualifiers (e.g., 'veggie') along with traditional animal terms (e.g., 'chicken') is commonly used to identify plant-based meat and dairy analogues. These results are complemented by the results of Study 2 that takes data from posts on social media. Co-occurrence analyses on social media posts indicated that plant-based + animal terms are often used to describe plant-based meat and dairy analogues. Together, these results suggest that consumers may already have common or usual names for many plant-based meat and dairy analogues that often involve plant-based + animal terms. These results may help guide or inform regulations involving plant-based meat and dairy analogues. Changing labels from the common or usual names may reduce consumption of plant-based meat analogues potentially impacting both consumer and animal welfare.

Keywords

plant-based food, common or usual names, text analysis, meat analogues, dairy analogues

Non-Technical Summary

Background

Currently, there is debate about how to appropriately label plant-based products that mimic traditional animal products (e.g., plant-based beef). This debate has surfaced in regulatory recommendations at the state level in the USA as well as recommendations from the United States Department of Agriculture and the United States Food and Drug Administration (FDA). Most of the debate centers on whether consumers are confused by plant-based meat analogue labels. Because of the potential confusion caused by plant-based food labeling, many (e.g., the FDA) have recommended changing how plant-based products are labeled. We focus on establishing if plant-based products designed to mimic traditional animal products have a "common or usual" name—a name that most people use and understand when describing those products. The product's common or usual name is typically taken to be an important consideration in policies about labeling. The product's common or usual name is also important for consumer and animal welfare since unfamiliar products are less likely to be purchased.

Why was this study done?

There is little evidence concerning whether there is an already accepted way that the average consumer names plant-based analogues of traditional animal products (i.e., the "common or usual name"). Many of the current plant-based animal product analogue labels involve an instantiation of using a plant-based qualifier along with a traditional animal term (e.g., 'veggie chicken'). Our studies were designed to evaluate whether consumers already have common naming conventions that used versions of the plant-based + traditional animal term for plant-based analogues.

What did the researchers do and find?

We gathered data from a survey employing vocabulary tests and looked at naturally occurring data in social media posts. The survey used three different styles of vocabulary tests (fill in the blank, multiple choice, and binary choice). In each of vocabulary tests, we gave participants several prompts about plant-based meat analogues (e.g., a plant-based hotdog) and asked them what they would call that product. We also analyzed naturally occurring posts from Bluesky, X, and Reddit. The results from both studies provided evidence that at least for many plant-based analogues of traditional animal products, the current labeling conventions (e.g., 'veggie chicken') capture the common or usual names for those products.

What do these findings mean?

These findings indicate that for many consumers, the current labeling conventions likely capture the common or usual names for plant-based analogues of traditional animal products. If these labels already use common or usual names for those plant-based products, then changing those labeling conventions to something else is likely to generate consumer confusion, at least in the short term. Those changes can impact consumer and animal welfare.

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Changing the labels from common or usual names may decrease sales of plant-based products because of the new, unfamiliar terms used to describe those products. That decrease in sales may impact consumer welfare because people may be less likely to buy products that satisfy their preferences (e.g., environmental impact, animal welfare concerns, individual health). The decrease in sales may also negatively impact animal welfare since products used to replace food animals may be purchased less frequently. Finally, the evidence for the common or usual names may be important for policies involving plant-based meat analogue labeling.

Are there common or usual names for plant-based meat and dairy analogues, and if so, what do they look like? Answering this question is important not only for consumer understanding and behavior involving animals and plant-based food products but also for decisions about labeling regulations made by the United States Department of Agriculture (USDA) and the United States Food and Drug Administration (FDA). For example, recent efforts to regulate plant-based meat and dairy analogue labeling may come at the cost of already existing terms describing those products (e.g., the proposed DAIRY PRIDE Act S.549 in the United States) (Taylor, 2020). However, little empirical evidence exists about the common or usual names of some plant-based products, especially products that are meant to mimic traditional animal-based products. We aimed to help fill that gap. We provide some evidence from a survey and an archival study from social media posts that commonly used plant-based naming conventions (i.e., plant-based qualifier plus traditional animal term, e.g., 'veggie burger') are understood and used by many consumers to refer to plant-based meat and dairy analogues. We close by discussing how changing the current labels that appear to use common or usual names may negatively impact consumer and animal welfare.

Common or Usual Names

One of the central tenets of labeling regulations forwarded by the USDA and the FDA is that labels should provide enough information for a consumer to make an informed purchasing decision.[1] There are a variety of factors that could influence whether a product label helps consumers make an informed choice. Here, we focus only on one specific element for product labeling: the common or usual name of the product. One definition of common or usual names is provided by the FDA: "the name by which an

1) See, e.g., FDA, Food, Nutrition, Food Labeling, and Critical Foods https://www.fda.gov/food/nutrition-food-labeling-and-critical-foods; FDA News Release, FDA Works to Further Improve Nutrition, Reduce Diet-Related Chronic Disease with Dietary Guidance Statements on Food Labels (March 24, 2023), https://www.fda.gov/news-events/press-announcements/fda-works-further-improve-nutrition-reduce-diet-related-chronic-disease-dietary-guidance-statements.

article is known to the American public" (FDA docket number: FDA-2022-D-1102; see also FDA 21 CFR 102.5.d; USDA Guideline FSIS-GD-2007-0001). The FDA and USDA indicate that common or usual names are fixed by usage which is consistent with a long history in the philosophy of language (Austin, 1962). That is, the meaning of a term is determined by how a community of competent speakers of a language uses that term. On this view, the meaning of a term can come into existence, go out of existence, or change over time depending on how a community uses the term. As such, determining the usage of a term appears to be straight-forwardly empirical issue (i.e., how in fact a community uses a term) and can be difficult to address without empirical evidence.

Identifying the common or usual name for a product and if such a name exists is important for regulatory reasons and for general consumer understanding of a product. As the name suggests, common or usual names for products can be important because that is how the typical consumer refers to and identifies a product. If there is no common or usual name for a product, then regulatory agencies and lawmakers have suggested that other safeguards may need to be employed to make sure that the product is understood well enough by the consumer to make an informed buying decision. For example, proposed additional safeguards and provisions can include requirements that the product label indicates the source of the product (e.g., soybeans, chickpeas) or a descriptive designation of the product (e.g., "soy and chickpea-based burger" instead of "plant-based burger") on the principal display panel (i.e., front of the food product package) (9 CFR 317.2). Longstanding labeling regulations suggest that if a product has a common or usual name, however, those additional bits of information would often not be necessary. Hence, identifying common or usual names of products can play an important role in regulatory decisions, at least in the United States.

Identifying common or usual names can also be important for purchasing decisions and for animal welfare. Some research suggests that to the extent that a product labeling is confusing or uses unusual or unknown terms, there is a tendency for consumers to not buy that product. Sometimes referred to as "decision postponement," consumers who are confused or don't understand labeling information can either decide to walk away from a product or buy a different product that they understand better. For example, there is evidence that consumers prefer and buy products from familiar brands compared to similar products from unfamiliar brands (Hoyer & Brown, 1990). Since plant-based meat analogues are meant to mimic traditional animal products, making those product names unfamiliar may reduce the tendency for consumers to buy those plant-based products. That tendency, in turn, may maintain or increase the numbers of animals farmed which likely has a direct impact on animal welfare.

There is some evidence suggesting the common or usual name for many plant-based products employs a plant-based qualifier + traditional meat term formula (PB+AT). For example, consumers seem to readily understand that "soy milk" does not contain any animal ingredients and are no more confused about the nutritional content

of 'soy milk' compared to animal-derived milks such as 'whole milk' (S. Feltz & Feltz, 2019a). Additionally, a study by the International Food Information Council (https://tinyurl.com/33m32dnb) suggested that when people were shown an image of a burger or chicken fingers and were told that the product was made without meat, responses regularly followed the PB+AT, such as "veggie burger" and "plant-based burger." When participants in that study were asked to select from a pre-determined set of responses, "plant-based burger" and "veggie burger" were the most selected options for those images. Our studies expand on this existing work by using additional products and different assessment methods such as looking at naturally occurring social media posts.

There have been some efforts, suggestions, or recommendations to regulate plant-based labels that would change products' use of the PB+AT. In many instances, these suggestions and recommendations come from or are supported by stakeholders in the animal-based protein industry (Taylor, 2020). To illustrate, the additional requirements for products with no common or usual name mentioned above would change the way some plant-based products are currently labeled (e.g., from "plant-based burger" to "soy and chickpea-based burger"). Other efforts have attempted to restrict the use of traditional animal terms to describe plant-based products. For example, there are, or have been, several attempts to restrict traditional dairy terms (e.g., 'milk' or 'whey') to describe plant-based milk products (e.g., the DAIRY PRIDE Act in the U.S. Senate, S.549). These, among other potential recommendations, would change the current plant-based labels that may use common or usual names for products. While common or usual names are not often taken to be decisive factors involved in product labeling regulations, they are often taken to be weighty in regulatory decisions (see FDA 21 CFR part 102).

We aimed to systematically assess whether the PB+AT captures the common or usual name for some plant-based products. Our guiding theoretical approach was based on one common account of how to identify meaning of terms from the philosophy of language mentioned above. On that view, the meaning of plant-based terms is determined by how those terms are used by competent speakers of a language. If people have competency with a term and are competent speakers of a language, then they should reliably be able to indicate what those terms refer to, there should be consistent usage among competent speakers of the language, and speakers should be able to use those terms when talking about those objects (Nation & Webb, 2011).

Overview of Studies

We adopted a multi-pronged empirical approach to help assess whether the PB+AT captures common usage for at least some plant-based foods. We adopted a multi-pronged strategy because assessment of common or usual use of terms can be difficult based on the results of any single study (Nation & Webb, 2011; Schmitt, 2010). Study 1 developed tasks that were based on common practices in pedagogical research that are used to determine understanding of the meaning of terms with vocabulary tests (Dujardin et

al., 2021). If the plant-based qualifier plus traditional animal term is used in everyday language, then people should be able to successfully identify and use those terms when tested. Consequently, we had the following hypothesis:

> Hypothesis 1: Participants will most frequently select or use the PB+AT to describe plant-based products in vocabulary style tests.

To help provide evidence for Hypothesis 1, we selected three commonly used vocabulary tests: fill-in the blank, multiple choice, and binary choice tests. We selected three different tests to help provide converging evidence across different measures for Hypothesis 1, since there can be limitations with any particular vocabulary measure (Schmitt, 2010). The fill-in-the-blank test provided 1-2 sentences of context around a blank, and participants could freely respond with whatever they felt best fit in the blank. The multiple-choice test provided an image of a product and explained that the product was only made from plants and asked participants to select an answer from a predetermined list. The list of words was created based on the proposed common usage (the PB+AT) and along with some alternatives that have been suggested to replace the PB+AT (e.g., veggie discs (Boffey, 2019)). The binary choice test asked which of two sentences sounded more natural, with one involving the PB+AT and the other involving a suggested alternative to the PB+AT. For an overview of the strengths and weaknesses of each kind of vocabulary test, see Dujardin et al. (2021).

Results of Study 1 were consistent with the general view that people commonly used plant-based terms along with traditional animal terms to identify plant-based products. However, the tasks in Study 1 were contrived and participants were requested to respond to prompts. While our approach involved common ways to assess vocabulary mastery, there may have been some unintended or unknown demand effects conveyed to participants. For example, asking participants about what one would be expected to bring to a backyard party for *vegan* friends may have conveyed to the participants they should report something plant-based or primed plant-based terminology (e.g. '*vegan* burger').

To help address those potential worries, Study 2 involved exploring if the PB+AT was used in unsolicited, natural language. We predicted that the PB+AT would be present in unsolicited (i.e., not lab-based or survey responses) natural language leading to our second hypothesis.

> Hypothesis 2: The PB + AT would co-occur in social media posts.

To provide evidence for Hypothesis 2, we collected social media data from Bluesky, X, and Reddit. Co-occurrence analyses on the social media data suggested that in many instances, the PB+AT is used to name plant-based products.

Relevant materials, data, code, and registrations for all studies are available on the Open Science Foundation page for this project: https://osf.io/zmuc7/.

Study 1: Vocabulary Tests

Method

Participants

We recruited 246 participants from Amazon's Mechanical Turk on March 24th, 2022. Samples from Amazon's Mechanical Turk can offer reliable sources of data, especially when compared to alternative sources such as undergraduate subject pools (Douglas et al., 2023). However, there are some known issues with Amazon's Mechanical Turk data. Because of those potential issues, we used several techniques to help ensure data quality. First, we included an IP filter to ensure that participants had a U.S. IP address. Second, we screened out I.P. address associated with known VPN farms to help reduce participation outside of the USA and to help minimize the presence of bots in the study. Participants that had IP addresses outside the USA or an IP with known VPN farms could not proceed to the survey. Third, we included a true/false attention check question "Human skin is made of glass" (55 excluded: 44 answered "yes", 9 answered "I don't know", and 2 left blank). Finally, we eliminated (N = 10) those who completed the survey too fast (so called "speeders") determined by completion times more than 2 standard deviations from the mean completion time, or less than four minutes and 54 seconds. We also checked for potential straight-lining (e.g., responding 1 to all items or simply selecting the first item in a list for questions). We calculated a standard deviation for the 15 Readiness to Change scale items (see below) that participants should theoretically respond differently to. A standard deviation of 0 would be strong indication of straight-lining. After the previous screenings, no participants had a standard deviation of 0 providing some evidence that participants did not straight-line responses. All these procedures have been shown to help ensure data quality for online panels such as Amazon's Mechanical Turk (Leiner, 2019). The final sample used in analyses consisted of 181 participants.

Materials

After obtaining informed consent, participants received 3 blocks of tasks in random order. The first block consisted of a fill-in-the-blank task with 6 statements. For example, participants could freely respond to the following prompt:

> Tomorrow, Bill and Sally are having a backyard party for their vegan friends who don't eat meat. They went to the grocery store to get meat alternatives and bought some _____ to cook on the grill.

The second block consisted of multiple choice questions along with an image of a product. Participants were asked to select a term from 6 options that best describes what they would call that product. For example, participants were given an image of a hotdog and were asked the following question:

> Suppose the item above was made only from plants. What would you call it? (Plant-based hotdog, Plant-based cylinder, Plant-based tube, Plant-based roll, Plant-based barrel, None of the above)

Finally, participants were given a binary choice task where they had to select which of two sentences sounded most natural. For example, participants were given the following question and sentences:

> Which sentence sounds more natural? "Yesterday, I ate a plant-based burger." or "Yesterday, I ate a plant-based disc."

The alternatives to the PB+AT (e.g., plant-based disc) in the binary choice task were selected from one of the alternative PB+AT items used in the multiple-choice task.

Covariates and Demographic Information

We collected a standard battery of demographics including age, sex, political orientation, religious affiliation, highest education obtained, race, marital status, income, area of residence, and housing situation (summary statistics for demographics available on this project's OSF page). We also included a standard battery of covariates that our lab uses for animal-related studies including the Knowledge of Animals as Food Scale (S. Feltz & Feltz, 2019b), the 4Ns scale (Piazza et al., 2015), the Animal Consumption Readiness to Change Scale (Hoang et al., 2023), and the One Item Berlin Numeracy Test (Cokely et al., 2012). These covariates were not of primary concern for our study. However, other researchers may have hypotheses about those variables, and the data are available on this project's OSF page.

Results and Discussion

Fill-in-the-Blank

The coding scheme to classify the free responses to the fill-in-the-blank task into one of 6 categories: (1) A plant-based meat identified (PB+AT) (e.g., veggie dog) or already known market name (Tofurky); (2) other term describing meat alternatives (e.g. fake hot dog); (3) traditional meat term (e.g., hot dog); (4) other food that fits the context (e.g., hummus); (5) food that does not the context (e.g., groceries); (6) miscellaneous (e.g., good). Fuller descriptions of categories are on this project's OSF. Raw frequencies of responses using the coding scheme are reported in Table 1. Table 1 also includes analyses of what would be expected if people were randomly responding in categories 1-6 by using z-tests against a fixed value of 1/6. A sensitivity analysis with *power* = .8, *alpha* = .05, $N = 181$ yielded a minimal detectable *Cohen's h* of .21 for each of the vocabulary tests. *Cohen's h* is an effect size measure of proportion differences and Cohen has offered the following rules of thumb to help interpret the size of the effects: .2 = small, .5 = medium, and .8 = large (Cohen, 1988).

Table 1

Proportion of Free Responses per Category Along With a z-Test for Proportions Against a Fixed Value of 0.17

Question #	Response	*N*	Proportion	*z*	*p*	Cohen's *h*
1	PB+AT	57	32	5.35	< .01	0.35
Kappa = .89	Other meat alternatives	5	3	-5.02	< .01	0.51
	Traditional Meat Terms	45	25	2.96	.03	0.21
	Foods that fit context	45	25	2.96	.03	0.21
	Foods that does not fit context	4	2	-5.22	< .01	0.54
	Miscellaneous	25	14	-1.03	.30	0.08
2	PB+AT	62	34	6.34	< .01	0.41
Kappa = .85	Other meat alternatives	1	1	-5.82	< .01	0.69
	Traditional Meat Terms	38	21	1.56	.12	0.11
	Foods that fit context	40	22	1.96	.05	0.14
	Food that does not fit context	6	3	-4.82	< .01	0.47
	Miscellaneous	34	19	0.76	.44	0.06
3	PB+AT	53	29	4.55	< .01	0.30
Kappa = .75	Other meat alternatives	4	2	-5.22	< .01	0.54
	Traditional Meat Terms	26	14	-0.83	.40	0.06
	Foods that fit context	57	32	5.35	< .01	0.35
	Food that does not fit context	5	3	-5.02	< .01	0.51
	Miscellaneous	36	20	1.16	.25	0.09
4	PB+AT	43	24	2.56	.01	0.18
Kappa = .78	Other meat alternatives	8	4	-4.42	< .01	0.42
	Traditional Meat Terms	11	6	-3.83	< .01	0.34
	Foods that fit context	80	44	9.94	< .01	0.61
	Food that does not fit context	13	7	-3.42	< .01	0.29
	Miscellaneous	26	14	-0.83	.41	0.06
5	PB+AT	84	46	10.74	< .01	0.66
Kappa = .79	Other meat alternatives	0	0	-6.02	< .01	0.84
	Traditional Meat Terms	30	17	-0.03	.97	0.01
	Foods that fit context	20	11	-2.08	.04	0.16
	Food that does not fit context	4	2	-5.22	< .01	0.54
	Miscellaneous	43	24	2.56	.01	0.18
6	PB+AT	54	30	4.75	< .01	0.32
Kappa = .79	Other meat alternatives	3	2	-5.42	< .01	0.58
	Traditional Meat Terms	33	18	0.57	.57	0.04
	Foods that fit context	55	30	4.95	< .01	0.33
	Food that does not fit context	5	3	-5.02	< .01	0.51
	Miscellaneous	31	17	0.16	.87	0.01

We used Google Gemini to code participant's responses. Gemini was given the coding scheme and was instructed to code each of the free responses into one of the six categories. Some research suggests that using Large Language Models like Gemini to engage in deductive coding from human-created categories is comparable to traditional human coding (Chew et al., 2023). One of the authors coded the responses according to the codebook which was then compared to Gemini's coding. Average interrater reliability between the human coding and Gemini indicated excellent overall agreement, *Cohen's Kappa* = .81 (Cohen, 1960). Kappas for each question are provided in Table 1. Where there was disagreement, we used the human coding.

The results of the fill-in-the-blank task suggest that the PB+AT is often used. For 4 of the 6 questions, the PB+AT was the modal response. For the other two questions, the only other item that had a higher frequency of responses was other food that fit the context.

One may be worried about the relatively high rates of 'miscellaneous' responses. Our coding scheme treated all responses that did not fit into one of the other 5 categories as miscellaneous. However, there are some responses that may be understandable errors rather than random or nonsensical answers. We looked further into the items we coded as 'miscellaneous' and found that while almost all the responses we correctly coded into the miscellaneous, only some of the responses were truly nonsensical by our lights (e.g., '33', 'yes', 'on') and most looked like plausible errors (e.g., 'food', 'spices', 'vegetarian'). The percent of plausible errors for each question were: question 1 = 72%, question 2 = 79%, question 3 = 61%, question 4 = 85%, question 5 = 70%, question 6 = 39% (full analyses on this project's OSF page).

Multiple Choice

We coded responses to the multiple-choice questions by counting the number of times each option was selected. We then performed z-tests of the proportions against a fixed value of 1/6. In each case, the option following the PB+AT was chosen significantly greater than chance and was the most commonly selected option (selected greater than 48% of the time among 6 possible options), even in cases where there was another reasonable non-PB+AT option (e.g., 'plant-based soy nuggets' for chicken, 'plant-based crumbles' for ground beef; see this project's OSF page for the complete analyses).

Binary Choice

We coded responses to the binary choice task by counting the number of times each option was selected. We then performed z-tests of the proportions against a fixed value of 0.5 (i.e., random responses, see this projects OSF page for full analyses). For each binary choice, the option fitting with the PB+AT was the preferred option (greater than 65% of the time) even in cases where there was another reasonable non-PB+AT alternative (e.g. 'plant-based soy nuggets' for chicken).

The results of the vocabulary tests suggest that the PB+AT often captures the common or usual name for some plant-based products. The modal response to most of the fill-in-the-blank question involved instances of the PB+AT. For the multiple choice and binary choice vocabulary tests, the options involving the PB+AT were chosen at a much higher rate than alternatives, indicating terms consistent with the PB+AT are often the preferred ways to refer to those products.

Associations With Covariates

While we were not primarily concerned with predicting responses to these 3 tasks, our data allowed providing some evidence for what predicts use of the PB+AT. For these supplemental analyses, we coded all the responses to the 3 tasks as either using PB+AT or not. We then calculated correlations for each of the responses for each of the tasks. For ease of presentation, we calculated mean correlations for each of the 3 tasks as a function of the predictor variables Knowledge or Animals as Food, 4Ns, age, sex, and political orientation. Full correlation tables are in the supplemental materials on this project's OSF page. Of the predictor variables, Knowledge of Animals as Food was the most consistently and most strongly related to choosing the PB+AT (free response r = .44, multiple choice r = .29, binary choice r = .16, all ps < .05). Sex, politics and age were not reliably related to choices and the 4Ns only significantly related to the free responses (r = -.34, p < .01).

Study 2: Natural Language

Study 1 provided some evidence that the PB+AT is used to describe some plant-based products. If the PB+AT is used to identify and name plant-based products, then one would expect to see those terms used in natural, everyday language. The prediction is that the plant-based qualifier would regularly occur next to a traditional animal term. If the PB+AT was not part of everyday usage, then we would expect to see that the plant-based qualifier is weakly or not related at all to traditional animal terms. Social media provides one source of unsolicited usage in natural environments (i.e., not in a lab or response to a specific survey question). As such, social media posts provide one way to help assess whether the PB+AT is used in everyday language.

Posts were taken from Bluesky social media (https://bsky.app/) (for the same analyses and similar results on data taken from X and Reddit, see the OSF page for this project). We specified the search to be in reverse chronological order until 1000 posts were retrieved. We used the bskyr package (Kenny, 2023) in R (R Core Team, 2024) to search for posts that had the following keywords: 'animal free', 'dairy free', 'meat free', 'plant based', 'meatless', 'plant based', 'vegan', and 'veggie' on November 11th 2025. Then, we processed the texts so that they could be analyzed in the Quanteda package for R (Benoit et al., 2018). We engaged in common pre-processing of the text, such as removing stop

words (e.g., 'this', 'a', 'the', 'and') and removing punctuation. We also removed a set of custom words from the list (e.g., 'can', 'even').

We used co-occurrence analyses. Co-occurrence analyses determine how often two words occur before or after one another. These co-occurrences can then be used to help identify the common themes, usage, and term meanings. This analysis was particularly important for our purposes because the PB+AT essentially involves the co-occurrence of terms (plant-based qualifier + traditional animal term). We should therefore expect those two kinds of terms to occur together often. For other, supplemental analyses (e.g., word clouds, network analysis) see this project's OSF page.

For the co-occurrence matrices, we specified the analyses to return the top 35 occurring words for visualization. We selected 35 words (including the target plant-based term) for ease of reading the figures. Figure 1 to 7 represent bar graphs of the co-occurrences. The co-occurrence analyses indicated that terms of the PB+AT commonly occurred together, such as "vegan cheese", "vegan meat", "veggie chicken", "veggie beef", "plant-based milk", and "meatless turkey."

Figure 1

Bar Graph of Co-Occurrence for Words in the Bluesky Search for Key Term Corpus 'Vegan'.

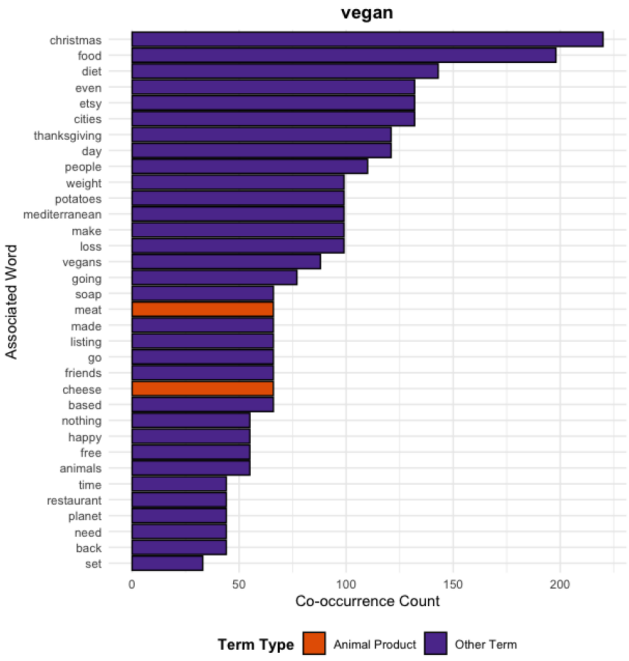


Figure 2

Bar Graph of Co-Occurrence for Words in the Bluesky Search for Key Term Corpus 'Veggie'.

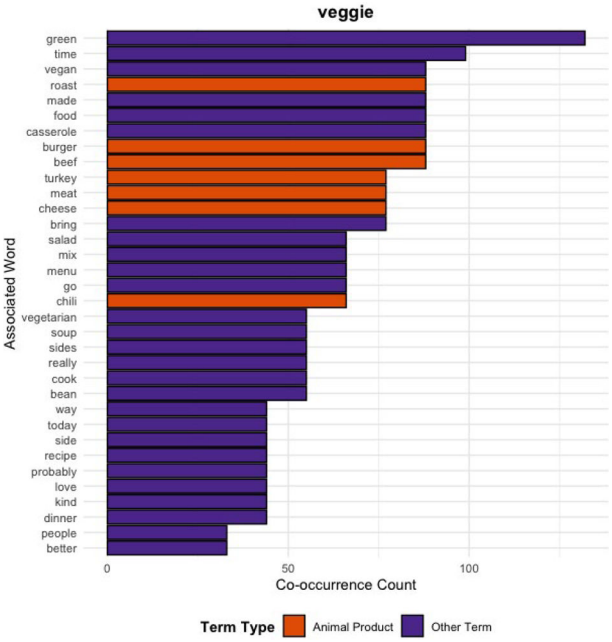


Figure 3

Bar Graph of Co-Occurrence for Words in the Bluesky Search for Key Term Corpus 'Plant Based'.

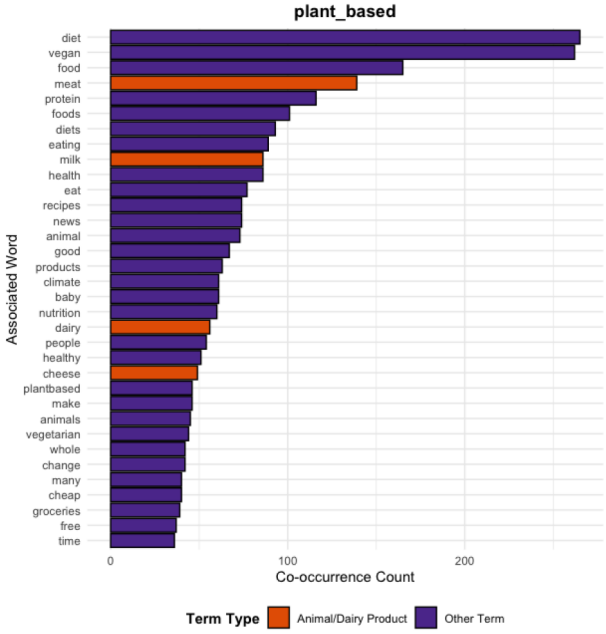


Figure 4

Bar Graph of Co-Occurrence for Words in the Bluesky Search for Key Term Corpus 'Meatless'.

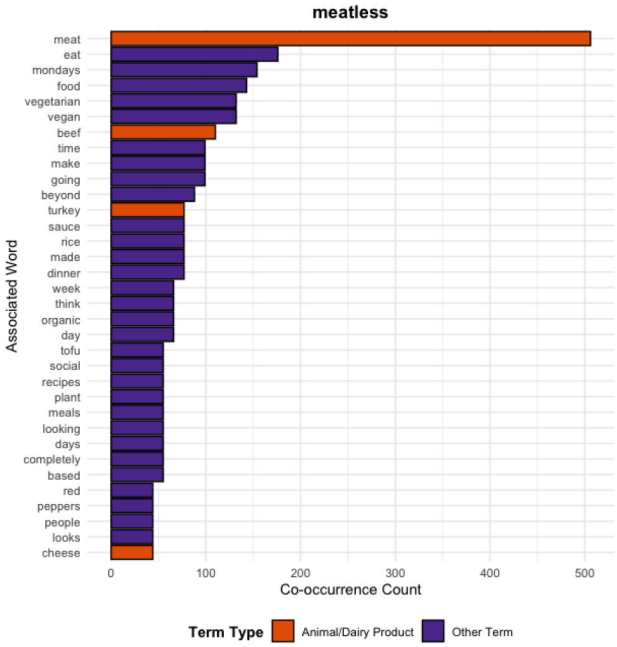


Figure 5

Bar Graph of Co-Occurrences for Words in the Bluesky Search for Key Term Corpus 'Meat Free'.

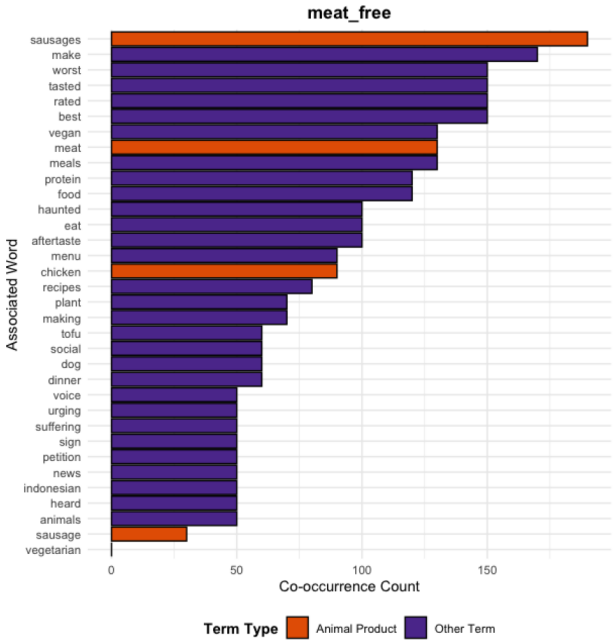


Figure 6

Bar Graph of Co-Occurrences for Words in the Bluesky Search for Key Term Corpus 'Dairy Free'.

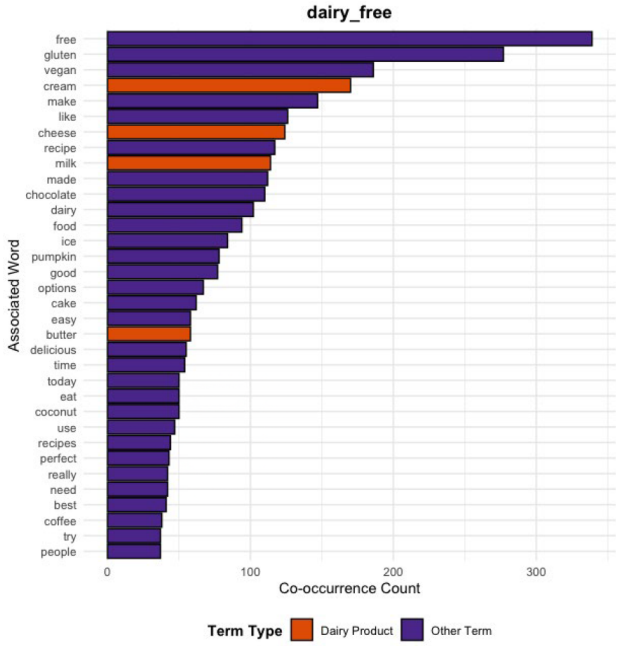
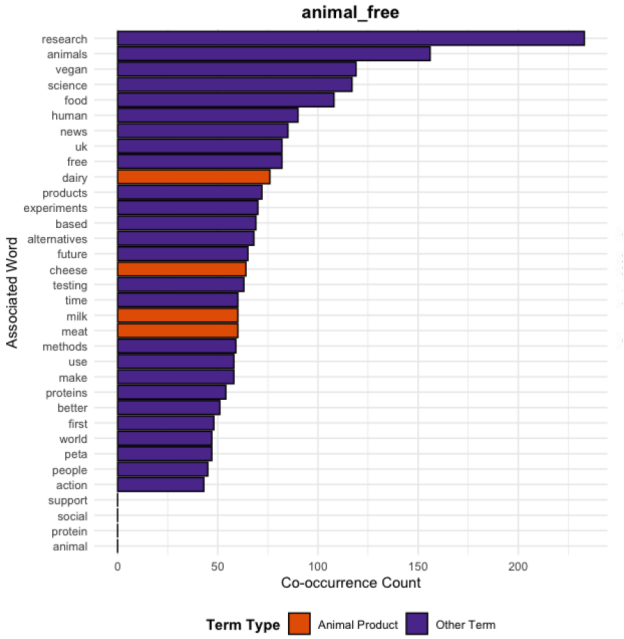


Figure 7

Bar Graph of Co-Occurrences for Words in the Bluesky Search for Key Term Corpus 'Animal Free'.



General Discussion

Two studies offered some converging evidence that plant-based qualifiers in conjunction with traditional animal terms (i.e., the PB+AT) often represent common usage in English to describe some plant-based products. Results from the vocabulary tests in Study 1 suggested that the PB+AT is the preferred way to refer to several products. Moreover, some alternative names were preferred less than would be predicted by chance, suggesting that those alternatives are not the common or usual names for those products. These results were reinforced in Study 2 that looked at real-world, non-laboratory generated data from social media posts. The combined results of the two studies suggest that at least in many instances, names involving the PB+AT are the common or usual name.

Our results suggest that changing some current plant-based labeling would likely come with some costs to consumers' understanding and may have the potential to influence how humans relate to animals. First, the PB+AT seems to be widespread and used by many consumers. Changing labels from the PB-AT likely would, at least temporarily, cause confusion about those products. There are analogies in other cases where rebranding or renaming caused some consumer confusion. Anecdotally, changing

the name of some major companies resulted in consumer confusion about what products and services were offered (e.g., 'Royal Mail' to 'Consignia'; 'Radio Shack' to 'The Shack'; 'Weight Watchers' to 'WW', Ilic, 2021). More specifically concerning plant-based products, Gleckel (2020) found that changing the names of some plant-based products from the PB+AT to some proposed alternatives made people less likely to understand what the products could be used for or taste like (see also Feltz et al. 2025b). For example, people were less likely to understand what a "plant-based veggie patty" tasted like compared to a "plant-based beef burger" and were less likely to understand that "cultured vegan spread" than "cultured vegan butter" could be eaten on biscuits. As a result, some people may opt for animal-based products that are more familiar to them and are less confusing than these plant-based alternative names.

Second, there is some reason to think that consumers who do not recognize a name or a product would be less willing to try that product, even if that product would fit their dietary needs and desires (Hoyer & Brown, 1990). For instance, there is some evidence that some people have neophobia, or the fear of consuming or experiencing something new (Fischhoff et al., 1978). Food neophobia is sometimes involved in a lack of willingness to consume protein alternatives, and familiarity is often cited as a key factor in overcoming some types of food neophobia. (Kröger et al., 2022). If changing the name of products is something new and unfamiliar to consumers, then there is the risk that newness will activate neophobia in some of those consumers, thereby making it less likely that they will buy or consume those products. This reduction in willingness to buy or consume those products may thereby hinder the satisfaction of interests or desires of at least some consumers since there are many reasons why consumers may wish to consume alternative proteins (e.g., health, ethical, or environmental reasons (Tso et al., 2021).

Changing labels away from the PB+AT may also have wider implications for some aspects of human-animal relations. Our auxiliary analyses suggest that a major predictor of those who are likely to use the PB+AT are those who are more knowledgeable about animals used as food. The PB+AT was largely unrelated to more value-laden justifications or demographic variables like the 4Ns, age, sex, or political orientation. This suggests that the PB+AT is learnable and not necessarily associated with any particular political orientation or value. The potential learnability of these terms may influence perceptions of food animals. Take a related example. Heidemann et al. (2020) suggest that consumption and awareness of cell-based meat (i.e., lab grown meat) may reduce the perception that animal consumption is necessary. That awareness may decrease desensitization to animal suffering because the link between the animal and being thought of as food is weakened (Loughnan et al., 2010). Something similar may happen with PB+AT. The PB+AT may help increase awareness that humans do not need to consume animals. Changing the PB+AT may reduce that awareness, thereby maintaining the status quo that animals are required for food. That status quo could then lead to the persistence

of desensitization to animal suffering, especially animals that are used for food. That raises the likelihood that the current number of farmed animals will remain constant or increase, thereby potentially having direct effects on animal welfare. Whether these potential effects are actual remains to be explored.

Our results may also help inform some policy issues regarding the labeling of plant-based products. To the extent that our findings generalize, there is good reason to think that instances of the PB+AT are the common or usual name for many plant-based products. Both the FDA and the USDA state that common or usual names of products are important considerations when regulating labeling information. As such, many of the additional labeling requirements that have been suggested when a product does not have a common or usual name may not be necessary for many plant-based products and, in some cases, might actually produce a new, unintended harm (e.g., making products less identifiable or recognizable). Whether those additional harms are likely to happen remains to be explored. At a minimum, our studies suggest that some current plant-based product naming conventions are likely to involve common or usual names, and the existence of these common or usual names should be a factor in regulatory decisions.

While the primary focus of our study was common and usual names for products in the USA, our results may also help inform regulatory decisions outside of the USA. There are multiple instances where regulations state that food labels should not be misleading or confusing, and some of these regulations appear to prioritize or give substantial weight to common or usual names. For example, Canadian regulations give some preference to common or usual names for products when they exist (https://tinyurl.com/p7eufh8m). India has similar regulations that recommend using common or usual names when there is no proscribed name in regulations (https://tinyurl.com/fx9f6y76). The Philippines also has a model similar to the United States that emphasizes the importance of common or usual names (Philippines Administrative Order 20014-0030). Even the Food and Agriculture Association of the World Health Organization considers common or usual names to be important to help aid in consumer understanding of food products (https://www.fao.org/4/y2770e/y2770e02.htm). Hence, our results may help inform labeling decisions that involve common or usual names for plant-based products outside of the USA. While our results are suggestive that similar common or usual names will be found in other languages and locations, the techniques we used here of combining vocabulary style tests along with natural language analyses could help identify common or usual names of products in other locations and languages

There are some limitations with our studies. First, out of practical necessity, we could not test every possible instantiation of the PB+AT or every possible product that could instantiate the PB+AT. Consequently, while there is good reason to think that the PB+AT will be understood by consumers in many instances, generalizing beyond the products and terms we have tested lacks empirical evidence. Additionally, it is still possible that

some other naming convention will be better understood or used even more frequently by participants. Establishing whether other naming conventions are better understood or used more frequently would require some empirical evidence. We are somewhat skeptical that other conventions would increase understanding given the already high rates of preferred usage in some of our tasks (e.g., the binary choice task). Second, we used an internet-based sample of IP addresses in the United States for Study 1 and searched Bluesky, X, and Reddit in Study 2. All the studies were in English. Hence, there is some risk in generalizing to populations outside of the United States, those who do not speak English, or those who are not computer literate. Third, our studies only addressed one specific issue—whether the PB+AT is commonly used to refer to plant-based products. Our study does not address any other potential confusion associated with plant-based products, such as whether those products contain animal ingredients or if there is confusion about those products' nutrition (but see A. Feltz & Feltz, 2019a; A. Feltz et al., 2025a, 2025b; Gleckel, 2020). Finally, our data were gathered at a snapshot in time. Our data suggest that currently the PB+AT is likely to be the common or usual naming convention for the products we tested and alternative naming conventions are not common or usual, that does not mean that usage is immutable.

In summary, our data suggest that using plant-based qualifiers along with traditional animal terms is often the common or usual way consumers refer to many plant-based products. Alternative naming conventions are not the preferred common or usual way to refer to those products, and changes to naming conventions may come with potential costs to consumer understanding, welfare, and relations to animals.

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Declaration of Human Participants in Research: All involvement of humans in research were reviewed by the University of Oklahoma's IRB, IRB #17048 and approved on March 27, 2024. Informed consent was provided by all participants.

Data Availability: For this article, data is freely available (see Feltz, 2025b).

Supplementary Materials

For this article, materials, data, code, and registrations for all studies are available (see Feltz, 2025a, 2025b).

Index of Supplementary Materials

Feltz, A. (2025a). *Vegan common usage vocab tests* [Preregistration]. OSF. https://doi.org/10.17605/OSF.IO/4ZTUD

Feltz, A. (2025b). *Vegan common usage* [Materials, data, code]. OSF. https://osf.io/zmuc7

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