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What is a 'critter'? Potential problems with the scientific community's use of informal language to describe non-human species

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Abstract

This article explores how the word "critter", an informal, vernacular synonym for animals, is used in science news articles and other sources aimed at the general public. Content analysis suggests that the term is particularly associated with small, unusual, and extinct species, which might have the unintended effect of distancing non-human species in general in the minds of readers. Further, given that language can influence both attitudes and behavior, this distancing could have undesirable effects on environmental attitudes and public support of the conservation of species and ecosystems.

Keywords: conservation communication, science communication, non-human species, science education

1. Introduction

Language influences thought, as research in cognitive psychology, linguistics, and related fields has established. English speakers, who typically speak of directions in relational terms like "left" or "front", tend to get lost more often than speakers of languages that prioritize absolute directions like "north" or "southwest" (Boroditsky & Gaby, 2010). Perception of the flow of time on a horizontal line is not universal: speakers of some languages, including Tzeltal Maya and Mandarin, express and perceive the flow of time vertically, where the future is "up" (Majid et al., 2013). Future-oriented economic and health-related decisions are influenced by variation in how grammatical tenses are used to denote the future in different languages (Ayres et al., 2020), and understandings of many other concepts, including cause and effect, gender, and mathematics, are influenced by differences in the

way these concepts are linguistically encoded (DeFranza et al., 2020; Wolff & Holmes, 2011). Further, language can lead to differences in thinking not only across but within languages, as supported by research on movements to de-gender pronouns and other words in English (Bigler & Leaper, 2015).

How words are used metaphorically can also influence thought. In one experiment, two descriptions of crime differed by only one word: crime as a "beast" or crime as a "virus". Participants were significantly more likely to emphasize law enforcement as the strategy to solve the problem when it was described as a "beast" (Thibodeaux & Boroditsky, 2011). And polysemous words, those with several meanings, further inform and complicate the relationship between language and thought. For example, many words that describe parts of plants, like "berry", "seed", "stalk", and "root", differ in meaning in conventional and scientific realms (Laferrière, 1987), and these multiple meanings can complicate their interpretation (Larson, 2011, p. 12). The word "animal" is a good example, as it can connote both negative ("a filthy animal") and positive ("the thinking animal") attributes (Bryson, 2001).

Further, the use of informal, non-scientific terminology to describe species has been argued to have negative effects on attitudes and behavior towards them. For example, "germ" has concerned microbiologists and others because it connotes filth and disease, the fear of which can overwhelm appreciation of beneficial microorganisms and even encourage hygienic practices that weaken our immune systems (Rook & Stanford, 1998). Similarly, a "weed" can be troublesome in one context and a valuable food crop in another, but the negative term often obscures any potential benefits (Chandrasena, 2014). Finally, "bug" as used conventionally to describe all insects carries connotations associated with illness and dread that might create barriers to their public appreciation (Liberman, 2005; Spring, 2006).

In sum, the theory that language influences thought (sometimes known as neo- or moderate Whorfism, after one of the theory's early proponents) also predicts linguistic relativity. Not only should speakers of different languages to some extent perceive differently, but linguistic change within a language, even at the level of specific, informal vocabulary, should affect attitudes as well (Ahearn, 2017; Swoyer, 2003). And while support for this theory is not unanimous (Bohnemeyer, in press), there is empirical support for its predictions, as well as for their likely relevance to science communication and education. Through the word "critter", this article explores an instance of how informal, non-scientific words in science writing aimed at the general public might negatively influence attitudes and behavior.

2. "Critter" in science writing

"Critter", a word originating in North America in the early 19th century, is a vernacular synonym for animal. It can refer to any species, wild or domesticated, small or large, including human beings (especially children). It is also used, albeit comparatively rarely, to

refer to non-living things, including toys and robots. Critters often appear in movies (for example, the comedy horror film series "Critters") and in children's books (like the "Little Critter" series by Mercer Mayer that features "cuddly monsters"). These uses suggest a degree of friendliness and approachability, but critters can also be frightening and unnerving. The *Merriam-Webster Dictionary*'s most common synonyms for it, after animal and creature, are "beast", "beastie", and "brute", and *Thesaurus.com* provides synonyms and related concepts that include "monster", "pig", "barbarian", "fiend", "gargoyle", "glutton", "monstrosity", "quadruped", and "lower animal". In short, the word as used in both adult and children's contexts has various and sometimes conflicting connotations, including harmless, humorous, and even dangerous.

The complicated polysemy of "critter" makes it a strange choice for use in science-related communication. Nevertheless, a Google search of "critter" and "science" produced nearly 8 million entries, while "critter" with "animal behavior" produced 5.6 million. A Google Scholar search of the word yielded over 27,000 entries, and a systematic sample drawn from them (every tenth entry in the first 100 pages of results) found a third of the entries related to public science communication. These searches suggest that the number of times "critter" was used may be on the rise among science writers, as the number of science-related entries increased annually from 2001 to 2019 at a rate of 7.7 percent in Google Scholar and 11.3 percent in Google.

"Critter" is also used in many science and conservation education programs, products, and services aimed at both children and adults. It can be found in communication from state fish and wildlife departments, non-profit wildlife organizations, national associations, zoos and aquariums, local public education groups, and wildlife veterinary clinics. There are Critter Camps, Critter Havens, Critter Corners, Critter Profiles, Critter Connections, and Critter Evictions (for "nuisance" wildlife). Today, wildlife cameras are widely known as "Critter-Cams".

Finally, "critter" also appears in science news articles, as established by a search of Feedspot's "Top Science News Websites on the Web" (https://blog.feedspot.com/science_news_websites). The word was found to be in use in eighteen of the top twenty searchable websites, in some cases, like in *Science News* and *Scientific American*, hundreds of times. And here too, use of the word appears to be increasing, more than doubling in *Science News* and quadrupling in *Scientific American* in this decade compared with the last.

Why would such an informal, imprecise word be used in so many science-related contexts? A possibility is that calling animals "critters" affectionately renders them, and, thus, communication about them, more accessible. Use of the word may lighten the overall tone of a text and so appeal to readers. But this usage may also have unintended effects. Because "critter" has multiple connotations and shades of meaning, its use might lead to negative perceptions of non-human species. If so, the term's use might have counterproductive behavioral consequences, especially as related to environmental attitudes and public support of the conservation of species and ecosystems.

3. Study

Analysis of the uses of "critter" in science news articles preliminarily supports this prediction. The method used was content analysis, a systematic approach to identifying patterns to determine the relationship of selected words and concepts in texts to particular messages, audiences, or larger societal issues (Anandarajan et al., 2019, pp. 15-25). All articles that included the word "critter" from 2001 through 2019 in the two science news publications aimed at the general public noted earlier, *Science News* and *Scientific American,* were examined. Articles on these platforms are typically short (500-700 words), written by science writers (as opposed to primary researchers), and uniform in tone, and so lend themselves well to this kind of analysis. Each article was read to establish what species, or group of species, the term "critter" was used to describe. Additional coding included identifying if the term was found only in the headline or a quote, which in both cases would suggest that someone other than the piece's author had selected it for use.

The word appeared in 275 articles on the *Science News* website, in 24 instances in the headline and only twice as part of a quote. While any species could be labeled a critter (as could non-living entities — the word was used several times to describe toys and virtual characters), there was some patterning in the term's use. In many cases (41, or 15%) the term was used to group miscellaneous unrelated non-human species that shared a particular attribute (e.g., Antarctic species, plant eaters, live-bearing fish, invasive species) and, in 11 cases (4%), all marine life. More broadly, "critter" was used once each to describe a primarily terrestrial order (Rodentia), classes (Mammalia, Reptilia), and the dinosaur clade, and in 23 cases (8%), all animals or life on Earth. However, when used to describe specific species or groups of closely related ones, the term most often referred to small arthropods, bacteria and other microorganisms, zooplankton, and insects (41%). Many paleo-species, of any size, were also "critters" (22%). And while there were instances describing mammals, including large species like bears and giant pandas, these uses of "critter" totaled only 19 (7%), seven of which were mice or rats. Except three times in a multi-species grouping, there were no non-human primates referred to by the term, and only once was it used in reference to humans.

A search of the *Scientific American* website (which includes *Scientific American Mind)* revealed similar patterning. The word appeared in 190 articles from 2001 to 2019, nine times in headlines and six in quotes. It was used to describe species under a subject grouping eight times (e.g., backyard animals, poisonous and dangerous ones, territory-marking species) and, in eight additional instances, it described all animals or life. Small identified species comprised nearly a third of the sample. Mammals were few, 11%, with only two non-human primates represented (tarsiers and rhesus monkeys), and two humans. Paleo-species made up 27%, although 40 of these 53 instances were associated with an identical question, "What sort of critter?", that was part of a summary at the end of a "Paleo-Profile" series of articles that ran from May 2016 to June of 2018 (beginning on March 17, 2017, the question was changed to "What sort of organism?").

This patterning suggests several problematic connotations of the use of "critter" in science communication. There was no explicit definition of the term "critter", nor consistent emotional associations with particular types of species — in the articles, critters might as easily have been "cute" (e.g., rabbits) as "scary" (venomous insects and parasites). In many cases, the term was a catch-all for miscellaneous species under a topical umbrella, or for large categories of life, perhaps because rhetorically this use permits avoiding repetition of the words "species" or "animals". However, the term was very rarely used to refer to humans, which is consistent with a human/non-human dichotomy often discussed in the environmental literature as particularly prevalent in the West (e.g., Descola, 2013). Further, the samples suggest a strong tendency by writers to use the term to refer to small, non-mammalian, or long-extinct species. The low numbers of mammals called "critters" was particularly striking, as mammals and primates were frequently the subjects of articles.

Thus "critter" is often used to refer to species that are "not like us" in terms of various attributes: size, evolutionary relatedness, and status as extinct or extant. In other words, "critters" are often "others". The othering or distancing of non-humans species, arguably already linguistically accomplished by the use of a single term like "animal" to describe them all (Borkfelt, 2011a), might be exacerbated by the use of "critter" in a way that emphasizes the differences between the species it describes and humans. And the more phylogenetically or morphologically dissimilar to humans species are perceived to be, the less empathy and support they tend to engender (Amiot & Bastian, 2015; Burghardt & Herzog, 1980).

While this analysis is primarily textual, it is consistent with similar work using discourse analysis. Andrews (2018), for example, analyzed informants' patterns of the use of abstract categories (e.g., "biodiversity"), mass nouns (e.g., "nature"), and terms typically used for objects as applied to living things (e.g., bird "damage" rather than "injury"), to suggest that they reflected the cognitive distancing of non-human organisms (see also Lakoff, 1993; Stibbe, 2014). She also noted "size is importance" as a conceptual metaphor that privileges modern industrial growth societies over the natural world, and which is consistent with the use of "critter" to denote small and in some sense insignificant species. Similarly, Stibbe (2012) describes "destructive discourses" that include the distancing of non-human species at the lexical level through the use of the word "animal" as synonymous with "non-human", as well as "beef" and "pork" and other terms that distance the meat we consume from the animals killed to provide it (see also Mitchell, 2011).

4. Attitudes and behavior

The final point to be discussed is that a term like "critter" might influence not only perceptions of non-human species but also behavior related to them. In fact, research in conservation social marketing suggests that the use of terms like "critter" can indeed negatively impact both conservation-related attitudes and behavior. Labeling or naming animals can have a powerful influence on behavior towards them (Borkfelt, 2011b), and

even seemingly positive descriptors can be ambiguous in effect. For example, some researchers argue that describing species as "cute" can encourage conservation giving (e.g., Small, 2012). Neotenous features and proportions appear to elicit the same reactions universally, and many languages have words that appear to refer to cuteness. However, definitions vary cross-culturally, and there appears to be no word in any language to capture the actual emotional reaction — in English, often described as "aww" — that cuteness elicits (Buckley, 2016). Further, meanings change over time, as in the concept of *kawaii* in Japanese, which although roughly equivalent to "cute", can also mean "pathetic", and historically suggested something "one could not bear to look at" (Nittono, 2016).

Similarly, anthropomorphic descriptions of animals can engender conservation-related reactions. For this reason, anthropomorphized images and descriptions are often used in marketing (Brown, 2010). However, anthropomorphizing non-humans can emphasize both negative and positive qualities, as well as lead to expectations of human-like social capabilities that many species do not possess (Root-Bernstein et al., 2013). Predators in particular suffer from anthropomorphism (e.g., coyotes as "brazen" or "wily") in ways that can negatively influence public understanding and involvement in conservation management (Alexander & Quinn, 2012).

Kin terms can also influence conservation-related reactions. In one study, merely changing one word in a paragraph-long description of a fictitious salamander, from little "swimmer" to little "sister", positively impacted the willingness of survey participants otherwise uninterested in environmental issues to engage in conservation efforts (Morris & Qirko, 2020).

More specifically, the drawbacks of using words like "focal", "umbrella", "surrogate", and others to describe species in conservation-related contexts have received attention (e.g., Armstrong, 2002). The negative impact on conservation literacy of metaphors that separate humans from nature used in introductory ecology and environmental studies textbooks has also been explored (Cachelin et al., 2010). And differences in descriptions of economic transactions ("payment" versus "compensation") have been shown to have an impact on decision-making regarding conservation programs (Clot et al., 2017).

In short, in the case of "critter", its associations with "creatures" far different than us might easily lead to public attitudes that are counterproductive to conservation-related efforts.

5. Conclusion

Richard Boyd (1993) points out that, in science, problems can arise from linguistic imprecision. One occurs when a term can refer to two or more different kinds of phenomena, "or (worse yet) to no particular kinds at all" (1993, pp. 522-523). The solution, he argues, is continuous accommodation that results in more precise and specific meanings of terms or, in some cases, the terms' abandonment. While Boyd is referring to this process of accommodation as it relates to scientific practice, it applies equally well to the

pedagogical aspects of language use in science communication.

All that content analysis allows is predicting the likely cognitive context of a term's use by its authors and readers. The fact that "critter" tends to be used in this sample for small, strange, and/or extinct species, and rarely for humans, primates, or even large mammals, suggests distancing to be a likely effect. In addition, the use of "critter" as a general term for various categories of (again, almost exclusively non-human) life, similarly suggests a human/non-human dichotomy in the minds of writers and readers. An alternative possibility, of course, is that authors simply use "critter" to render whatever life form they describe as more approachable. The patterning described here suggests otherwise, but further analyses to test this notion, including cognitive and behavioral experiments, are required to be sure. Whatever the results of such analyses might be, it is clear that informal and semantically ambiguous words used in serious scientific communication and education are likely to complicate the public's reaction to species and ecosystems in need of study and protection. Armstrong (2002), in noting potential confusion around the term "surrogate species", warns conservation biologists to "get the language right". This seems like sensible advice more generally.

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