



Online Noise as Illustrated by Pitfalls and Biogeography Associated With Common Names for *Puma concolor*

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Noise is the non-target search results that people encounter when searching for a particular topic of interest; it is also the cloud of distracting data that can obscure or deflect conservation communication. Online noise associated with large carnivores is particularly dense because their defining characteristics make them salient. Mountain lions (*Puma concolor*) exemplify noise associated with multiple vernaculars for a species in the crosshairs of conservation conundrums. We compared internet search results, Google Trends reflecting topic interest, use in science publications and sentiment in print and online media for *P. concolor*'s most frequent vernacular names, "mountain lion," "cougar," "puma" and "Florida panther." Puma and panther exhibited greater noise and salience than cougar or mountain lion, but, results for mountain lion, followed by cougar, yielded the highest biological relevance. Online sentiment negatively correlated with biological relevance, with positive sentiment highest for the noisiest vernaculars, puma and panther. As conservation practitioners, we must recognize that public outreach is part of our scientific agenda and be conscious of crafting communication that reaches and resonates with our intended audiences.

Keywords: communication, mountain lion, media, *Puma concolor*, sentiment, salience, vernacular

INTRODUCTION

Increasingly, conservation scientists have embraced popular news and social media channels to 1) engage the general public, 2) amplify the findings and implications of their research, 3) improve buy-in for conservation agendas and, inevitably, and 4) offset the spread of misinformation accelerated by digital networks (Papworth et al., 2015; McClain, 2017; Nanni et al., 2020). Twitter reached one billion tweets only three years after the first ever tweet (Twitter Inc., 2011) and, since 2014, people have been tweeting over 500 million times per day. Conservation practitioners now recognize internet traffic as big data that provide insights into diverse questions about how humans interact with and relate to nature (Toivonen et al., 2019), and they are leveraging online tools to engage and communicate with a vast and diverse audience (Bik et al., 2015). Culturomics, for example, is the emerging field in which researchers analyze quantitative data reflecting cultural trends in language and communication, and the sentiment associated with communication (Michel et al., 2011; Toivonen et al., 2019).

Given the current speed with which information moves across networked devices, and the sheer volume of information being shared today, word choice is more imperative than ever in effective communication. Noise is defined as the non-target search results that people encounter when

searching for a particular topic of interest; noise is also the cloud of distracting data that can obscure or deflect one's conservation communication. Vernacular names for species, for example, create noise for conservation practitioners communicating with colleagues and the general public. When a species has more than one common name, it can fragment conservation attention (Ladle et al., 2016), or in cases when there is confusion over what name matches with what organism, vernaculars may hinder conservation support (Jarić et al., 2016). Further, names themselves carry negative and positive connotations (Karaffa et al., 2012; Ehmke et al., 2018). These issues are exacerbated when species names are used as product names (called thronyms), or when cultures create new meanings for animal names to represent concepts that are completely different (called homonyms) (Jarić et al., 2016; Ladle et al., 2016).

Online noise associated with large carnivores is particularly dense because their defining characteristics, such as beauty, power, stealth and dominance, have made them salient and, consequently, part of our everyday vernacular. This is important to recognize given that effective conservation communication is especially imperative for people working on the conservation of large carnivores and related ecosystem health. In general, real and perceived risks associated with predators drive human perceptions about these species (Bruskotter et al., 2017; Bombieri et al., 2018). Nevertheless, online resources about large carnivores frequently include misinformation that can undermine conservation strategies for these species, and that facilitate the rapid spread of negative sentiment that can reduce social tolerance for large carnivores more broadly (Bruskotter and Wilson, 2014); (Young et al., 2015).

Mountain lions (*Puma concolor*) exemplify the dilemma surrounding the use of multiple vernaculars for a species in the crosshairs of conservation conundrums. Barnes (1960) reported 84 common names for the species in English, Spanish, Portuguese and numerous indigenous languages across North and South America (Table 1). *P. concolor* inhabits the largest range of any native terrestrial mammal in the Americas and holds the Guinness World Record for the animal with the most common names (Guinness World Records, 2019). *P. concolor* is also a charismatic apex carnivore that disproportionately supports biodiversity and ecological resilience (Elbroch et al., 2017b; Barry et al., 2019), as well as a prominent character in diverse spiritual beliefs and historical narratives of the various cultures with which it overlaps (Herrmann et al., 2013), suggesting it also plays a cultural keystone role (Garibaldi and Turner, 2004). Yet despite its value to people and the ecosystems upon which humans depend, *P. concolor* conservation management remains controversial because the species competes with humans for space, ungulates, and other resources (Elbroch et al., 2017a), and because it poses both real and perceived risks to people, pets and livestock (Herrmann et al., 2013; Wolfe et al., 2015). Media reports also sensationalize encounters with *P. concolor*, contributing to negative sentiment about the animal (Wolch et al., 1997; Bombieri et al., 2018).

Among *P. concolor*'s most frequently used vernacular names are "mountain lion," "cougar," "puma" and "Florida panther." Multiple thronyms exist for these vernaculars, including

Mountain Lion, an Apple Macintosh operating system released in 2012, the Mercury Cougar, a U.S. model of vehicle manufactured from 1967–1997 and 1999–2002, and the Keystone Cougar, a popular line of recreational vehicles. "Cougar" is also slang for an older woman who dates younger men. Black Panther is the name of a Marvel comic character, as well as synonymous with black jaguars and leopards. Perhaps the most well-known thronym is PUMA, a global brand of clothing and athletic equipment that sponsors star athletes and global sporting events. "Puma" is also the name of a line of recreational vehicles competing with the Keystone Cougar. In addition, all of these vernaculars are widely used as names of professional and college sports teams, mascots, retail stores and more.

Our goal was to gather diverse usage data from the internet, social media, scientific literature and news articles to assess the cultural salience, or frequency of use, for the four most common *P. concolor* vernaculars, and their associated noise. This information is relevant to refining our understanding of best strategies when communicating about *P. concolor* to a variety of audiences across online and in print platforms, as well as across film, radio, and print communication. More broadly, we offer a suite of easy-to-navigate methods for conservation practitioners to explore, understand and penetrate the noise around topics of interest to ensure conservation communication reaches its intended audience.

MATERIALS AND METHODS

Cultural Salience and Biological Relevance

We measured cultural salience in terms of total search results for "mountain lion," "cougar," "puma" and "Florida panther" on Google Search and Instagram. We determined the biological relevance of search results, as defined by the proportion of the top 100, or total available results if <100, for each name on Google Images, YouTube, Twitter, and Facebook, and the proportion of the first page of Google Search results, that were pertinent to *P. concolor* (*sensu* Çakir et al., 2008).

Bioregional Analysis With Google Trends

We used Google Trends to assess the use of each of the four names over a 5-year period spanning August 2, 2015 until August 2, 2020. Google Trends data illustrate "interest" in a subject for 1-week periods over time, scored on a scale ranging from 1 to 100. We did this for U.S. and Mexican states, Canadian provinces and other countries as a whole for which there were sufficient trend data. We first sampled for each name broadly, and then compared results when searching within the subcategory "Pets and Animals."

Use in Peer-Reviewed Science

Our goal with regards to science literature was to assess the proportion of papers that use each of the vernaculars and to determine whether there has been any change in the use of vernaculars over time. We surveyed articles about *P. concolor* populations in the United States and Canada, separately from those from Latin America, where populations are almost always referred to as pumas.

TABLE 1 | Common names for *Puma concolor* reported in Barnes (1960) in alphabetical order, plus “Florida panther.”

Number	Common name
1	American lion
2	American panther
3	bender
4	black puma
5	Brazilian cat
6	brown tiger
7	cacique
8	California lion
9	cat-o-mountain
10	catamount
11	catamountain
12	catsa
13	chaur
14	chimbica
15	coo-ot-cho-ke
16	cougar
17	couguar
18	cuguacu-ara
19	cuguacuarana
20	deer tiger
21	deer-killer
22	dos-lotch
23	e-wed-sie
24	essavagash
25	Florida panther
26	gol
27	goolen
28	great panther
29	guazuara
30	haina
31	ihutuphu-achati
32	Indian devil
33	ingronga
34	ingronga-sinda
35	inmu-tanka
36	itupa-ichtia
37	king-cat
38	le-lu
39	leo
40	leon
41	lion
42	lyon
43	Mexican lion
44	michibichi
45	mischipischu
46	mitzli
47	mnaza
48	mountain cat
49	mountain demon

(Continued)

TABLE 1 | Continued

Number	Common name
50	mountain devil
51	mountain screamer
52	mountain tiger
53	nto-i-tcho
54	onca
55	paji
56	painter
57	pampas-cat
58	panther
59	panthere
60	poltroun tiger
61	poma
62	puma
63	purple panther
64	red tiger
65	Rocky Mountain lion
66	shunta-haska
67	silver lion
68	sneak-cat
69	sussurana
70	swo-wah
71	tham-menka
72	tiger
73	to-qua-to-hoo-oo
74	tokovitc
75	toyaduko
76	trapial
77	tyger
78	tyger of America
79	varmint
80	wachtsa
81	wild cat
82	yagua-pita
83	yaguati
84	yutin

Note that Barnes reports “puma” twice, because it was used in two languages (English and an indigenous language in Peru); here, we only list it once.

To gather a suitable sample of published research on *P. concolor*, we conducted searches of ISI Web of Science and Google Scholar for empirical papers presenting new data that were published between 1950 and 2020. This search excluded book chapters, conference proceedings, state reports, reviews and student theses and dissertations. We selected search terms that reflected broad interests in ecology, but our searches were not exhaustive. We searched for 23 topics (food web, ecosystem, landscape of fear, keystone, ecosystem engineer, apex predator, trophic cascade, regulation, carrion, biodiversity, disease, risk effect, prey, social, dispersal, home range, territory, fragmentation, urban, suburban, survival, mortality, behavior) in combination with each vernacular (cougar, puma, mountain lion, panther).

We lumped our results into 5-year bins for analyses. We plotted the proportional use of each vernacular over time and tested whether the slope of any line differed from zero, as evidence of proportional change in their representation in the literature. We did this separately for papers about *P. concolor* populations in the US and Canada, and for populations in Latin America.

Sentiment Analysis

We measured sentiment associated with the four names for *P. concolor* in two ways. First, we employed a black box social listening sentiment analysis tool via Mediatoolkit (2020) to quantify and analyze social “impressions,” defined as the frequency with which content is seen, and “mentions” (i.e. use of the names in social posts) as positive, neutral, negative or unclassified. The benefits of using online social listening tools is that they simultaneously search a huge amount of internet traffic, building large sample data, and calculate numerous metrics useful to understanding the salience and sentiment associated with words and phrases. Mediatoolkit, to our knowledge, offers the largest amount of historic search data during a free trial.

We conducted searches and gathered analytical data for each *P. concolor* vernacular name and its plural variations to capture the breadth of relevant mentions from Sept 1–December 1, 2020; most importantly, this method included online noise (i.e., search results unrelated to *P. concolor*) associated with each vernacular. We combined search variations into our main categorical vernacular names as follows: “puma” represented searches for puma and pumas, “mountain lion” for mountain lion + mountainlion + mountain lions + mountainlions, “panther” for panther + panthers, and “cougar” for cougar + cougars. Then we applied a k-proportions test to determine whether one or more of these vernaculars were associated with more positive or negative sentiment than the others. When Chi-square statistics revealed that there were differences between categories, we applied a *post-hoc* Marascuilo procedure (i.e., contrasts; Marascuilo, 1971) to determine which proportions differed from others.

Second, we analyzed news media content from 2000–2015 archived on Newspapers.com and Google News. We searched for the four vernacular names, and then selected only those articles about *P. concolor*, and for which only one vernacular was used. In other words, we screened news media for biological relevance and removed potential noise before conducting any analyses. Then we determined whether articles were positive, neutral or negative based upon the lexicon employed, and sentence structure and punctuation that relays tone in the article (Table 2). We employed the same statistical procedures as described above for assessing whether there were differences in the proportion of articles with positive or negative sentiment associated with the four vernacular names.

RESULTS

Cultural Salience and Biological Relevance

In terms of raw content identified by querying each of the four vernacular names, “puma” was by far the most often found

on Google and Instagram, followed by “panther,” “cougar” and “mountain lion” (Table 3). Nevertheless, when viewed in terms of biological relevance, their performance was almost an exact mirror image, with “mountain lion” yielding the most relevant material across Google searches and social media, followed by “cougar.” “Panther” and “puma” were the noisiest, as the majority of content inclusive of these terms referred to theronyms (e.g., the brand PUMA) and homonyms (e.g., Black Panther, the Marvel character).

Google Trends

A comparison of Google Trends analyses for each name with and without the Pets and Animals subcategory illustrated the noise associated with “puma” and “cougar” as compared to “mountain lion,” and the influence of mountain lion-human conflict on interest for the species (Figure 1). When we sampled only data within the “Pets and Animals” category to increase biological relevance, we found clear biogeographical patterns to the use of the four names (Figure 2). In short, Canada predominantly uses “cougar,” the United States predominantly uses “mountain lion” and all Latin countries predominantly use “puma” (Supplementary Table 1). In other parts of the world, “puma” is predominant among countries for which there are Trends data (Supplementary Table 1).

Use in Peer-Reviewed Science

Our search resulted in 190 peer-reviewed articles (Supplementary Appendix 1) published in scientific journals about *P. concolor* in the United States and Canada, and an additional 65 papers about populations in Latin America. The number of articles produced for all vernaculars in the US increased over time (Figure 3), indicating increasing scientific attention for the species overall. Nevertheless, only “puma” showed a positive slope different than zero ($F = 11.02$, $p = 0.01$, $R^2 = 0.58$) indicating an increase in use over time as compared to the proportion of papers using other names. Both “cougar” ($F = 1.15$, $p = 0.31$, $R^2 = 0.13$) and “mountain lion” ($F = 0.30$, $p = 0.60$, $R^2 = 0.04$) did not change their proportional representation in published, peer-reviewed literature over time.

The first paper on a Latin American population identified by our search criteria was published in 1987, and the first to use a vernacular other than puma was published in 2002 (mountain lion in Bank et al., 2002). Puma was used in 91% of science papers covering *P. concolor* populations in Latin America, cougar in 6%, and mountain lion in 3%. Based upon a cut off of 0.05, the proportional predominant usage of puma did not change over time ($F = 4.11$, $p = 0.10$, $R^2 = 0.46$), despite the imbalance of usage due to the late use of alternate vernaculars other than puma.

Sentiment

Our search for the vernacular names on Mediatoolkit yielded 563,367,467 impressions and 65,910 mentions with different proportional sentiment (Table 4). Impressions and mentions yielded different patterns; for example, “mountain lion” exhibited the second highest number of impressions but the least mentions. Sentiment varied with vernacular (Figure 4). Cougar and panther mentions exhibited significantly more positive sentiment

TABLE 2 | Example news article excerpts and associated sentiment, as determined by lexicon, sentence structure and punctuation.

Source	Article Name	Date	Positive, Negative or Neutral?	Excerpts with keywords
Corvallis Gazette-Times (Corvallis, Oregon)	Hey, those aren't Disney cougars out there	8/20/00	negative	1. cougars are loosing their fear of humans
Chicago Tribune (Chicago, Illinois)	Lion mystery brewing in Milwaukee	7/28/15	negative	1. "She was snooping down with her head, like she was fixing to attack somebody." 2. "Having an animal like this in a small Milwaukee home is not remotely a good idea."
Honolulu Star-Advertiser	News from across the USA: Oregon	4/1/15	neutral	1. Wildlife advocates have criticized local police for shooting a cougar.
Honolulu Star-Advertiser	News from across the USA: Montana	8/17/15	neutral	1. A mountain lion eluded Fish, Wildlife and Parks game wardens.
The Eagle Valley News	Cougar caution for Malakwa school	1/17/01	negative	"These animals can pose a very real threat to people, especially in the lean winter months."
Santa Cruz Sentinel	Cougar shot and killed near Redding high school	1/18/01	negative	1. "Killing the cougar was the only option, officials said, because of the danger it posed to people living in the neighborhood." 2. "A mountain lion is a killing machine...It's very good at it and it's very dangerous."
The Paducah Sun	Cougar killed in Kentucky likely a captive	9/12/15	neutral	1. The mountain lion, once a native predator in the East, even in this region, but wildlife managers doubt a natural population exists today.
Fort Collins Coloradoan	Mountain lion spotted in city	5/11/11	positive	1. "He was so graceful and beautiful. He was really a deep brown color."
Journal and Courier	Cougar sought in White County	11/4/09	positive	1. The cougar, about the size of a German shepherd dog, is not dangerous, said Rob Craig, executive director of Great Cats of Indiana. 2. "Cougars are very, very shy and they're more scared of people than we are of them," he said.
Jackson Hole News and Guide	Ecologist tracks the return of the cougar	1/9/13	positive	1. "It's important to understand that cougars aren't just something to be killed on sight."
The Los Angeles Times	Groups call for wildlife crossing	9/19/14	positive	1. P22, the cougar celebrated for having traversed two freeways to find his own turf, "has become a great symbol of this nation wide issue.
Albuquerque Journal	Governor, board declare war on wildlife	12/15/15	positive	1. There is no research indicating the need for more cougars and bear to die.

than puma and mountain lion mentions ($X^2 = 1,797.34$, $df = 3$, $p < 0.001$) (Supplementary Figure 1). Each vernacular name exhibited statistically distinct proportions of negative mentions ($X^2 = 1,460.60$, $df = 3$, $p < 0.001$). From least to largest, "panther" exhibited the smallest proportion of negative mentions, followed by "cougar," "puma," and then "mountain lion" (Supplementary Figure 2).

We identified and quantified sentiment for 2221 biologically-relevant newspaper articles that used one vernacular ($n = 1122$ cougar, 992 mountain lion, 85 puma, 22 Florida panther) (Supplementary Materials, Appendix 2). In news media, "mountain lion" yielded disproportionately fewer articles with positive sentiment ($X^2 = 45.92$, $df = 3$, $p < 0.001$) (Figure 4), whereas the other vernacular names were statistically equivalent.

We did not detect any difference in the percentage of negative articles for any of the vernaculars ($X^2 = 4.31$, $df = 3$, $p = 0.23$), which may have been influenced by the comparatively small sample of articles for "Florida panther." In other words, when noise was removed, sentiment was nearly identical across *P. concolor* vernaculars.

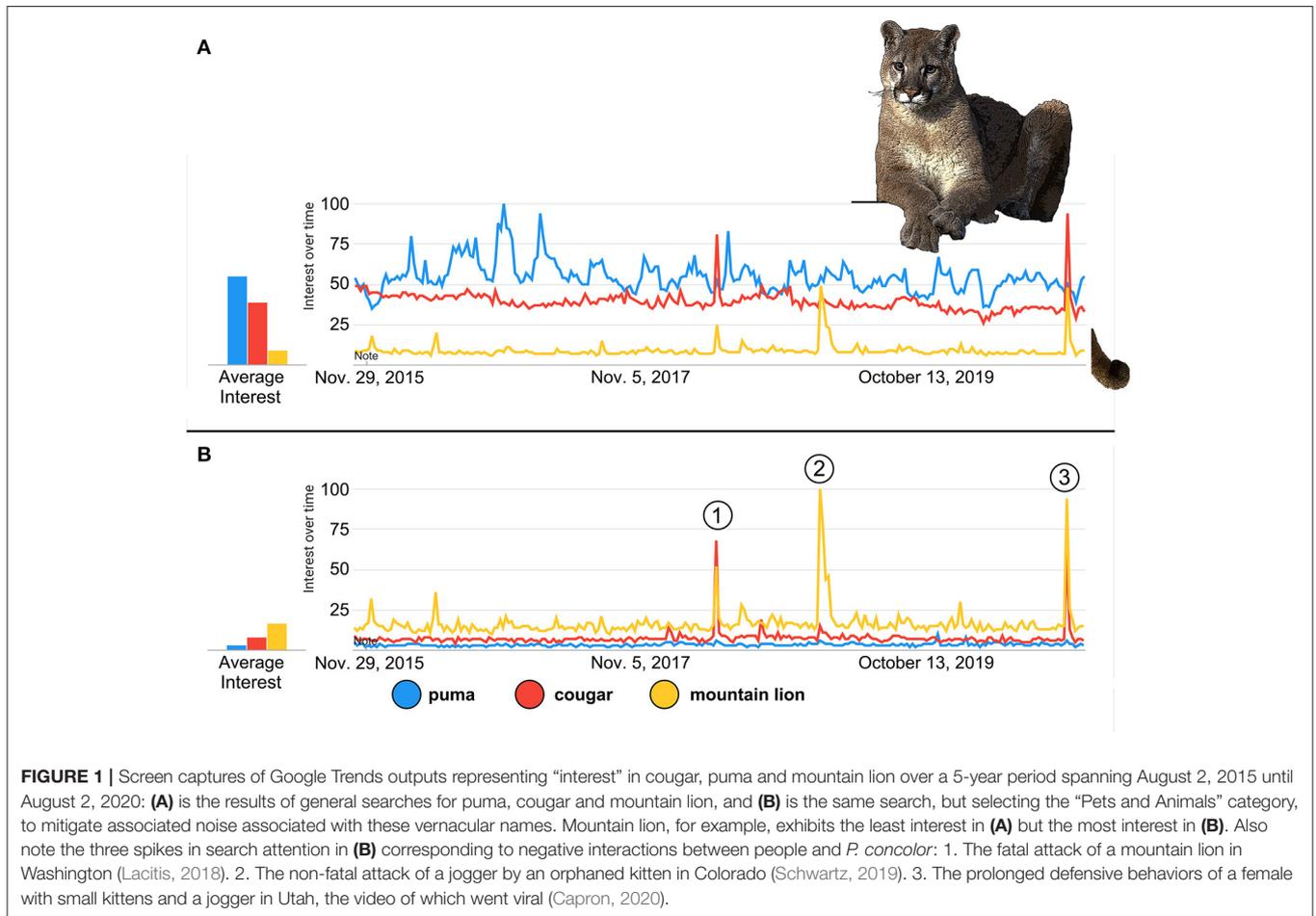
DISCUSSION

As conservation practitioners with specialized knowledge of specific conservation issues, we must recognize that public outreach is part of our scientific agenda (Bik et al., 2015) and be conscious of crafting communication that reaches and

TABLE 3 | Cultural salience and biological relevance for *P. concolor* vernaculars in web and social media searches.

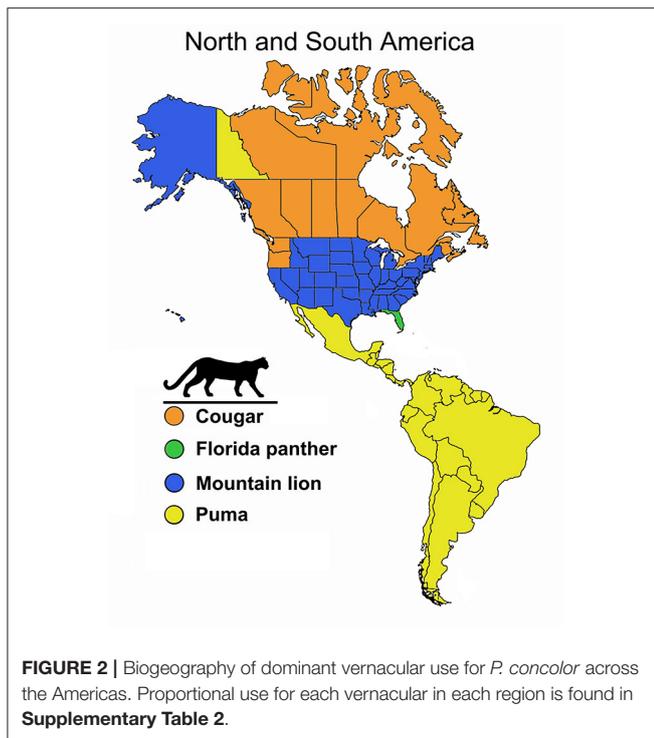
	Cultural salience		Biological relevance (%)				
	Google Search (total)	Instagram (total)	Google Search	Image Search	Twitter	Facebook	YouTube
Puma	637,000,000	14,781,154	0	12	5	10	30
Panther	304,000,000	946,862	8	22	7	7	0
Cougar	311,000,000	687,252	75	99	2	38	52
Mountain lion	319,000,000	308,023	100	100	80	92	96

On the left, the vernacular names are listed in order from most used to least (cultural salience = total Google web search hits + Instagram hits). On the right, the percentage of Google web, Google Image, Twitter, Facebook and YouTube content for each of the four vernacular names that referred to *P. concolor*, as evidence of biological relevance.



resonates with our intended audiences. In our case study, *P. concolor* suffers from what Ladle et al. (2016) called the “-onym challenge” (p. 273), meaning that the animal’s many vernacular names create substantial misleading “noise.” Across internet searches, social media channels and news outlets, “puma” and “panther” exhibited higher cultural salience than “cougar” or “mountain lion.” In terms of biological relevance, however, “mountain lion” yielded the best search results. Nevertheless, geographic preference for different vernaculars complicates making just one recommendation for conservation practitioners wishing to communicate about *P. concolor* to as wide an

audience as possible across multiple platforms. Further, our analyses of sentiment associated with *P. concolor* highlighted the need for increased public education about the positive roles this animal plays in natural ecosystems and human well-being, and for potential proactive outreach strategies to offset negative media coverage that spikes following conflicts between *P. concolor* and humans, pets and livestock (e.g. Wolch et al., 1997; Bombieri et al., 2018). Ultimately, an awareness of online noise can make conservation communication, ranging from education to fundraising campaigns, more intentional and effective.



As a vernacular polyonymous species (Correia et al., 2017), it may be that a single communication strategy cannot be applied for *P. concolor* across audiences, communication platforms and geographies. The most culturally salient English vernaculars for *P. concolor* were the noisiest. “Puma” and “panther,” for example, were used most often but yielded very little biological relevance across web searches and social media (Table 2). “Cougar” exhibited excellent biological relevance on image searches but only 2% accuracy on Twitter. The high volume of noise attributed to the slang use of “cougar,” particularly on Twitter, may warrant limiting its use on social media to local situations. “Mountain lion” outperformed every other vernacular, in terms of biological relevance, and is the most commonly used vernacular referring to the animal in the United States. “Mountain lion” also best captured spikes in internet traffic about *P. concolor* (Figure 1). On the other hand, mountain lion was a vernacular derived by settlers, and puma is the only one of these four vernaculars that was derived by American indigenous people (Peru). Perhaps promoting the use of puma could aid in mitigating ongoing injustices stemming from settler colonialism (e.g. Hendlin, 2014; Eichler and Baumeister, 2018). Further, puma is the predominant vernacular used for the species around the world.

Clear geographic patterns of vernacular use (Figure 2) may ultimately decide word choice for conservation practitioners communicating to targeted audiences. Likely, people in specific regions will exhibit inertia in terms of adopting new vernaculars if one is already widely used. Florida media outlets, for example, would be wise to follow the lead of their local conservation organizations and wildlife authorities and use

“panther” in their coverage about *P. concolor* populations in their state. Similarly, Washington State media outlets should use “cougar” to communicate about *P. concolor* to their audiences. However, because most local media today can find a larger audience online, they should consider also including the most biologically relevant vernacular, “mountain lion,” and the most common vernacular at the global scale, “puma,” in their reporting and promotion to broaden the reach of their coverage and knowledge about the species.

Some highly regarded sources of information likely influence the cultural salience and biological relevance of search results. Google’s default name for *P. concolor* is “cougar,” and is linked to the Wikipedia page for *P. concolor*; Google’s decision may influence both Google Trends and web data. For example, searches for “cougar” were more biologically relevant on Google than unrelated social media channels. The genus for the animal was changed from *Felis* to *Puma* in 1996 (Nowell and Jackson, 1996), and the prominent International Union for Conservation of Nature’s (IUCN) Red List of Threatened Species uses “puma” (Nielsen et al., 2015). The only professional conference dedicated to the species, which is held in the United States every three years, is called the Mountain Lion Workshop. In published science, “puma” appears to be gaining favor over other vernacular names, and perhaps with time, this trend will influence media and other public discourse as well.

Online negative sentiment among vernaculars appeared positively correlated with biological relevance, meaning that more biologically relevant results yielded higher proportions of negative sentiment and lower proportions of positive sentiment. In part, noisy vernaculars should generate more positive sentiment because theonyms are associated products that are meant to represent the positive attributes of the animal (Ladle et al., 2016). In our study, negative sentiment likely reflected the reality of print and social media patterns that follow conflicts between people and *P. concolor*. Puma-human conflict, including pet and livestock losses, result in real costs and trauma for the people involved, and factual reporting reflects these hardships. Occasionally, however, reporting on these conflicts include misinformation, or are framed in such a way as to propagate negative sentiment (Wolch et al., 1997; Bombieri et al., 2018). For these reasons, we would emphasize the need for conservation practitioners to engage in proactive media and education campaigns to increase positive sentiment associated with *P. concolor*. In India, for example, conservation biologists provided the media with training on leopard ecology, after which the portrayal of leopards in the media was more accurate and positive (Hathaway et al., 2017). We did not study the spikes in our Google Trends data that corresponded with major news about *P. concolor* encounters, but a future study could evaluate the attention around those particular events to quantify the broader effect of negative media on sentiment as well.

The proliferation of noise across digital platforms is uniquely evident in the case of mountain lions, but it has considerable implications for the broader conservation community. We

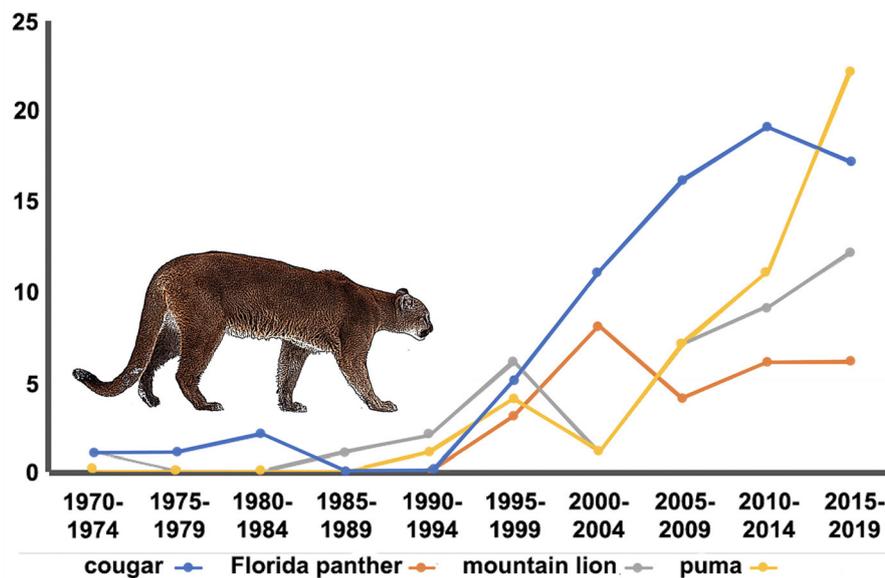


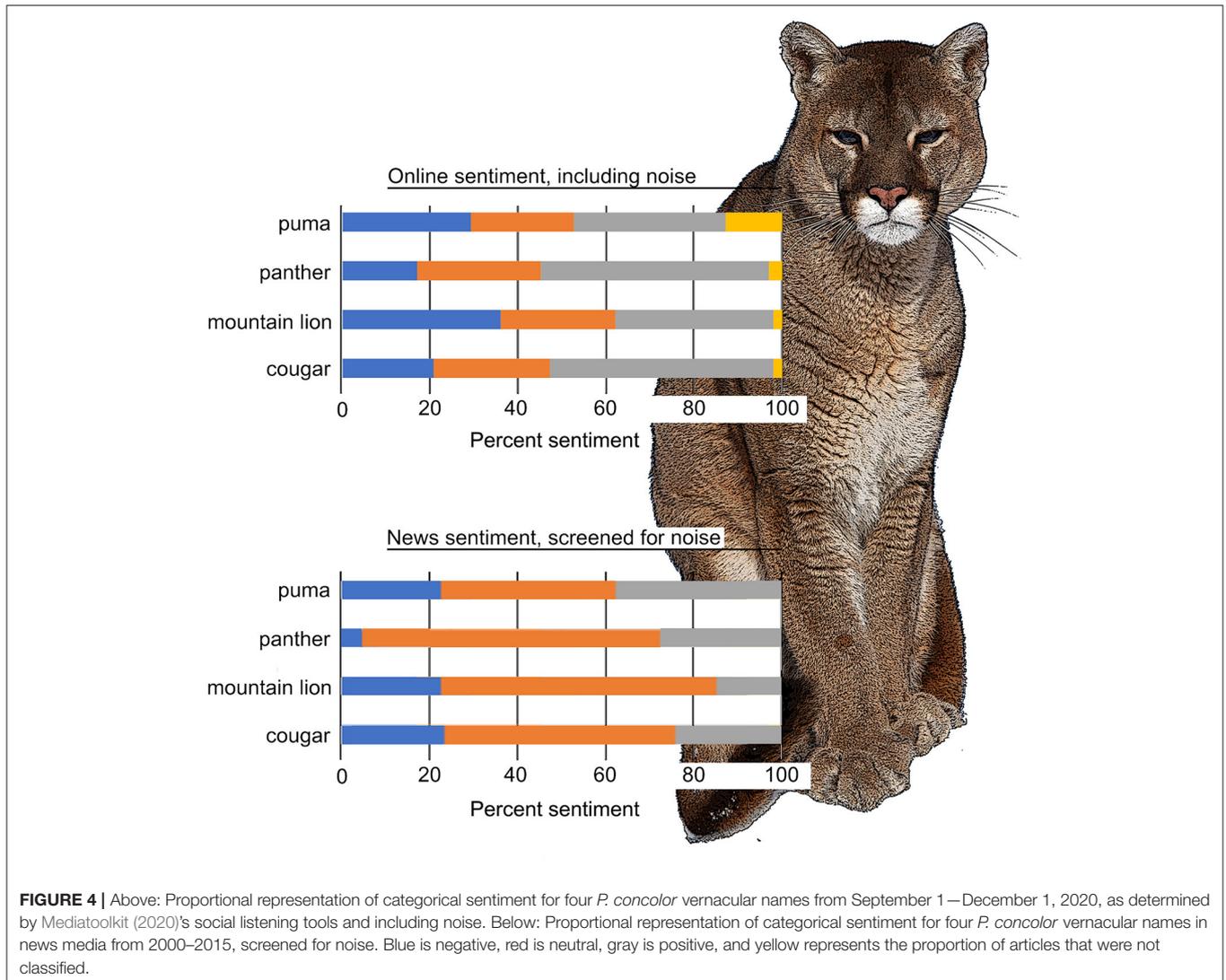
FIGURE 3 | Number of peer-reviewed science articles published using each of four *P. concolor* vernaculars from 1970–2020.

TABLE 4 | Social impressions, mentions and associated sentiment for mentions for each *P. concolor* vernacular and associated variations, determined by Mediatoolkit (2020).

Search	Impressions	Mentions	Positive	Negative	Neutral	Unclassified
Cougar	64,922,471	5,439	2,746	1,149	1,364	180
Cougars	32,414,069	5,249	2,693	1,077	1,457	22
Mountainlion	1,594,862	407	237	45	84	41
Mountainlions	23,157	46	28	0	0	18
Mountain lion	98,699,093	4,377	1,638	1,543	1,155	41
Mountain lions	21,536,254	3,048	928	1,248	825	47
Panther	39,268,803	8,824	5,087	1,202	2,266	269
Panthers	29,283,814	8,043	3,646	1,654	2,494	249
Puma	55,232,243	11,823	4,729	1,434	2,467	3,193
Pumas	220,392,701	18,654	5,843	7,495	4,598	718

encourage readers to utilize available resources that provide guidance on how to get involved and how to build rapport with potential audiences (Parsons et al., 2014; Wilson et al., 2016; Cooke et al., 2017). Ultimately, an important next step is to determine whether noise is impacting conservation outcomes through either misdirecting conservation communication so that audiences never receive it or obscuring conservation communication so that misinformation is difficult to disentangle from fact. Inconsistencies in shared vernaculars for species within the conservation community, for example, may hinder conservation success (Jarić et al., 2016). On the other hand, such insights might be leveraged into campaigns to reclaim noisy names or increase the frequency of use for a less-popular one. Further, if conservation practitioners could capitalize

upon online noise, such as the popularity of theonyms, they may be able to initiate a positive feedback loop wherein a subject of conservation receives greater attention than it would have otherwise, leading to a more educated audience and increased positive sentiment about the topic. We believe an awareness of noise will not only help conservation practitioners become more effective communicators, but also create opportunities to ride the wave of popularity and positive sentiment attributed to the idea of wildlife and natural processes, to improve public understanding and people's perceptions of the real ones. Ultimately, when we as conservation practitioners are informed about and intentional with word choice, the messages and the organisms we want to promote can receive unprecedented visibility.



DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

LE, EW, and AA conceived the project. AA, EW, and LE designed the methods. EW, CD, WO'M, and AS gathered the data. EW

and LE conducted the analyses. LE, EW, and KW wrote the manuscript. All authors provided feedback and approved the final draft.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fcsc.2021.692607/full#supplementary-material>

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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