Online hunting forums identify achievement as prominent among multiple satisfactions

Alena M. Ebeling-Schuld and Chris T. Darimont

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Original Article

Online Hunting Forums Identify Achievement as Prominent Among Multiple Satisfactions

ALENA M. EBELING-SCHULD, *Department of Geography, University of Victoria, Victoria, BC, Canada V8W 2Y2*
CHRIS T. DARIMONT,[1,2] *Department of Geography, University of Victoria, Victoria, BC, Canada V8W 2Y2*

ABSTRACT Understanding hunter satisfactions can lead to improved wildlife management policy and practice. Whereas previous work has suggested that hunters often seek multiple satisfactions (achievement, affiliation, appreciation), little is known about how satisfactions might vary with target species. Additionally, past research has mostly gathered data using interviews and surveys, which might limit scope as well as introduce strategic bias for potentially provocative subjects such as hunting. To address these gaps, we analyzed data from online hunting forums, which provide an open-access source of peer-to-peer discussion that is geographically and taxonomically broad. We used directed qualitative content analysis to analyze hunting narratives for satisfactions by coding 2,864 phrases across 455 hunting "stories," and compared patterns of dominant (most frequent) and multiple satisfactions between target species type (ungulates and carnivores) using forums from 3 regions: British Columbia, Canada; Texas, USA; and North America-wide. We found that achievement was the dominant satisfaction in 81% of ungulate and 86% of carnivore stories. Appreciation was nearly absent as a dominant satisfaction in carnivore stories. We found that 62% of ungulate and 53% of carnivore stories had multiple satisfactions present, indicating that appreciation and affiliation play important secondary satisfaction roles even when achievement is dominant. If these data are broadly representative of hunters on a larger scale, management policy instruments that ignore achievement may not evoke change in hunter behavior, particularly involving carnivore target species. Despite limitations associated with online forums (e.g., nonrepresentative of all hunters), they provide a new and valuable resource for wildlife management research. © 2017 The Authors. *Wildlife Society Bulletin* published by Wiley Periodicals, Inc. on behalf of The Wildlife Society.

KEY WORDS achievement, directed qualitative content analysis, discussion forums, internet, multiple satisfactions, policy, social media, thematic coding, trophy hunting, wildlife management.

The understanding of humans and their relationships with natural systems plays a vital role in wildlife management (Decker et al., 1980, 1992; More 1984; Bath 1998). Wildlife recreation connects people with their natural surroundings and influences public values, interest, action, and investment involving wildlife and conservation issues (Cooper et al. 2015). Consumptive recreation, such as hunting, is of particular interest to wildlife managers because of its potential to directly influence wildlife populations. Of prominent importance in this realm is identifying and understanding "hunter satisfactions" (factors relating to hunt performance or experience that elicit feelings of "satisfaction" ["the congruence between expectations and outcomes"; Manning 2010]). Satisfaction plays a vital role in wildlife recreation research and can also serve as a measure of management quality (Vaske and Roemer 2013). Understanding how and when hunter satisfactions (co-)occur in different scenarios can offer insight into hunter decision-making, motivation, initiation, continuation, desertion, and other factors that can ultimately help guide sound wildlife management policy (Decker et al. 1984).

The study of hunter satisfactions has evolved considerably since the introduction of traditional theories such as the "game-bagged" approach (Hendee 1974). A number of studies have been conducted over recent decades to investigate hunter satisfactions, motivations, attitudes, and values. Specifically, Hendee's Multiple Satisfactions Theory identified hunter satisfactions other than harvest success and proposed that hunters can be satisfied by multiple factors (Hendee 1974). Kellert (1978, 1980) contributed significantly to hunter research by classifying main hunter types and attitudes, which later helped provide the basis for Decker et al.'s (1984) trichotomy of hunting goal orientations: achievement, affiliation, and appreciation (Decker et al. 1984). Their proposed framework, focused on hunter goals in terms of hunting initiation,

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[1] *E-mail: darimont@uvic.ca*
[2] *Secondary Affiliation: Raincoast Conservation Foundation, Denny Island, BC, Canada V0T 1B0*

continuation, and desertion, was based largely on hunter trends identified previously in studies by Schole et al. (1973) and Klessig (1970, 1974), among others (Decker et al. 1984, 1987). Decker et al. (1987) later expanded upon this trichotomy of orientations by providing definitions pertaining to wildlife recreation involvement more generally. These definitions are still widely used as a framework in hunter research.

Despite insight from these and similar studies, most hunter satisfactions research has limitations (e.g., Decker and Connelly 1989, Reiter et al. 1999, Miller and Graefe 2001, Grilliot and Armstrong 2005, Teel and Manfredo 2010). First, examinations are typically focused on a single type of hunting in one geographic area (e.g., deer [*Odocoileus* spp.] hunting in TX, USA), thus potentially concealing generalizable patterns. Second, past research on hunter satisfactions has primarily involved questionnaires or surveys, using a Likert scale or similar method (e.g., Decker et al. 1980, Decker and Connelly 1989, Hammitt et al. 1990, Miller and Graefe 2001). This can introduce difficulties when analyzing subconscious attitudes. Specifically, responses may be influenced or limited by question structure, existing social tensions, pressure, stigma, or the comfort level of the interviewee or respondent (Marra et al. 2004, Im and Chee 2006, Bauer and Moehle 2008). Third, past hunter satisfactions research has been developed primarily with data concerning ungulate hunting (e.g., Decker and Connelly 1989, Miller and Graefe 2001). As a result, we know little about how hunter satisfactions might differ when carnivores are targeted. This gap persists despite carnivores being subject to high kill rates and associated with conservation concern (Darimont et al. 2015), competition with humans over food and space (Treves and Karanth 2003), and controversy among human stakeholders (Kellert et al. 1996). Additionally, carnivores possess ecological and behavioral characteristics that generally make them more difficult to kill than ungulates, which could influence associated hunter satisfaction levels (Child and Darimont 2015).

Addressing these limitations, recent research has studied hunter satisfactions using an innovative data source: social media. For example, Child and Darimont (2015) investigated multiple satisfactions of trophy hunters by analyzing facial expressions of hunters when posing with their prey, using photos collected from online forums and other websites. Their results indicated that the odds of true "pleasure" smiles are greater when hunters pose 1) with versus without prey; 2) with large versus small prey; and 3) with carnivore versus ungulate targets (among older men). Child and Darimont (2015) offered a generalizable achievement-oriented hypothesis, proposing that the prospect of displaying achievement associated with killing large and dangerous prey at least in part underlies the behavior of many contemporary hunters.

Complementing this work, we demonstrate how online forums can provide a rich source of qualitative data. Specifically, online forums allow researchers to access sensitive content (e.g., regarding topics of an emotional, controversial, or personal nature) without breaching an agreement of privacy and observe long-term conversations rather than conduct questionnaires or interviews, which have a definite timeline (Im and Chee 2012, Smith and Stewart 2012). Especially relevant to potentially controversial issues such as hunting, online forums additionally offer an environment for peer-to-peer communication in which tensions and stigmas may be removed and opinions can be expressed with fewer inhibitions (Im and Chee 2006). We used this novel data source to study underexamined dimensions of hunter satisfactions. Given differences between ungulate and carnivore hunting, we predicted that satisfactions of hunters using online forums to communicate (hereafter, "hunters") would differ between these target species. Instead of making explicit predictions, however, we adopted an inductive approach.

METHODS

We collected data from 3 online hunting forums: HuntingBC.ca, TexasHuntingForum.com, and HuntingNet.com. We selected forums to examine based on 1) membership; 2) login requirements; 3) target species variation; and 4) geographic location. We selected forums that had $\geq$10,000 registered members to gain access to many relevant posts, even in the case that a proportion of accounts were inactive (HuntingBC.ca: 18,935 members; TexasHuntingForum.com: 58,872 members; HuntingNet.com: 298,841 members; statistics as of 2 May 2016). Additionally, we selected forums where no login was required to access hunting "stories" (i.e., hunt narratives) and demographic information of members. All data were therefore publicly accessible, which was a criterion for ethics clearance (University of Victoria, protocol #12-363). Finally, to avoid results that were regionally specific, we selected forums that were based in geographic areas with potentially different hunting norms, target species, wildlife management policies, and other factors. We elected not to include comparative analyses between geographic regions in our results because of the inability to differentiate between forum members that were born in, resided in, or were merely visitors in each region or forum.

We analyzed 455 stories for content across 3 forums, each detailing 1 hunt (HuntingBC.ca: $n = 163$; TexasHuntingForum.com: $n = 239$; HuntingNet.com: $n = 53$). Each forum had a similar structure in which "threads" (each consisting of an original story and a series of replies) were organized into categories (e.g., big game, deer hunting, predator hunting). We selected thread categories for story collection if their titles included the following topics: big game, carnivores, deer–ungulates, exotics, predator–varmint hunting, or bow hunting. Within these categories, we assessed 5,308 individual thread titles (e.g., "Got My First Wolf!") posted from 1 January to 31 December 2014 for study suitability across all forums. We assumed titles represented primary thread content. We examined the original (i.e., first) story within each thread, and considered stories usable if they detailed a single ungulate or carnivore hunt (single- or multiday).

We defined "carnivores" as animals in the order Carnivora, and "ungulates" as even- and odd-toed orders (Artiodactyla and Perissodactyla, respectively). We did not examine replies to original stories. Moreover, we excluded all stories written by individuals under 18 years of age, stories with ambiguous

language (bad grammar, evident sarcasm, other possibilities for misinterpretation), or stories detailing another hunter's experience. In cases where the same individual posted multiple stories on a forum, we analyzed the story that was best suited for coding (e.g., 100–500 words, explicitly stated satisfactions). After all exclusions, the 455 remaining stories contained 379 targeting ungulates and 76 targeting carnivores. In cases where stories detailed hunts targeting both ungulates and carnivores ($n = 3$), we assigned the story with the species to which the largest proportion of text was dedicated. A variety of different ungulate and carnivore target species ($n = 32$ and $n = 11$ species, respectively) were represented in the analysis (see Table 1 for a full list of species).

We coded stories using directed qualitative content analysis in NVivo software (NVivo qualitative data analysis software, Version 10, 2014; QSR International Pty Ltd., Doncaster, Victoria, Australia). Using Decker et al.'s (1984, 1987) achievement, affiliation, and appreciation framework as a baseline for identifying excerpts indicative of hunter satisfaction, we highlighted phrases within stories and assigned them with thematic labels (hereafter, "codes") that arose from the text (Fig. 1). We highlighted 2,864 key phrases (ungulate stories: $n = 2{,}546$ phrases; carnivore stories: $n = 318$ phrases) pertaining to satisfactions as they arose from the text using an open coding framework, and categorized them using a hierarchical categorization structure (Hsieh and Shannon 2005). Following coding, we organized codes into subcategories, and then into the predetermined umbrella categories of achievement, affiliation, and appreciation (hereafter, referred to as "satisfactions"; Table S1, available online in Supporting Information). A small subset of phrases ($n = 188$) were assigned more than one code and may represent more than one satisfaction; these phrases were represented twice in the final phrase count ($n = 2{,}864$).

We defined "achievement" as "feelings of satisfaction relating to performance." We categorized 1,829 phrases into 55 achievement codes. Examples of these codes included: "Accomplishment," "Best to Date," "Delicious," "Score," and "Wall-Hanger." Codes indicating lack of achievement (e.g., "Disappointed," "Lack of Success") were also considered. We then organized achievement codes into subcategories: for example, "Content with Results," "Goal–Mission," "Meat Related," and "Trophy Related." Similarly, we organized 561 phrases into 29 affiliation codes. We defined "affiliation" as "the strengthening of personal relationships or enjoyment of the company of others." Examples of affiliation codes included: "Family," "Friend," "Good Company," "In Memoriam," and "Teaching." Examples of affiliation subcategories included: "Collaboration," "Friends & Family," "Spouse," and "Teaching Others." Finally, we categorized 474 phrases into 40 appreciation codes. We defined "appreciation" as "enjoyment of the experience." Examples of appreciation codes included: "(Re)Connect," "Adventure," "Escape," "Life-Changing," "Memories," and "Spiritual." Appreciation subcategories included: "Enjoyable Experience," "Nature," "Spiritual–Meaningful Experience," and "Stress-Ease" (for a complete list of subcategories and codes see Table S1, available online in Supporting Information).

Table 1. List of ungulate and carnivore target species from hunt stories ($n = 455$) posted between 1 January and 31 December 2014 on online hunting forums from 3 regions: Texas, USA; British Columbia, Canada; and North America-wide. Percentages may exceed 100% because some hunt stories involved multiple target species (within the same species group: ungulates and carnivores). Nonnative species are present because of hunting of exotic and feral species in forum region(s).

Target species	No. of stories (n)	Percent (of species group)
Ungulates	379	
White-tailed deer (*Odocoileus virginianus*)	139	36.5
Feral hog (*Sus scrofa*)	72	18.9
Mule deer (*Odocoileus hemionus*)	65	17.1
Unknown deer (*Odocoileus* sp.)	19	5.0
Moose (*Alces alces*)	17	4.5
Elk (*Cervus canadensis*)	16	4.2
Axis deer (*Axis axis*)	9	2.4
Aoudad (*Ammotragus lervia*)	6	1.6
Blackbuck (*Antilope cervicapra*)	6	1.6
Red deer (*Cervus elaphus*)	6	1.6
Corsican sheep (mouflon hybrid; incl. black Hawaiian sheep) (*Ovis* sp.)	4	1.0
Mouflon (incl. Urial, spp. *cycloceros*) (*Ovis orientalis*)	4	1.0
No species harvested (ungulate target mentioned)	4	1.0
Caribou (*Rangifer tarandus*)	3	0.8
Fallow deer (*Dama dama*)	3	0.8
Mountain goat (*Oreamnos americanus*)	3	0.8
Sika deer (*Cervus nippon*)	3	0.8
Dall's sheep (incl. Stone's sheep, spp. *stonei*) (*Ovis dalli*)	3	0.8
Bighorn sheep (*Ovis canadensis*)	2	0.5
Feral goat (incl. Catalina) (*Capra hircus aegagrus*)	2	0.5
Unknown oryx (*Oryx* sp.)	2	0.5
Pronghorn (*Antilocapra americana*)	2	0.5
Addax (*Addax nasomaculatus*)	1	0.3
Dorset sheep (*Ovis aries* spp.)	1	0.3
Unknown ibex (*Capra* sp.)	1	0.3
Javelina (*Pecari tajacu*)	1	0.3
Musk ox (*Ovibos moschatus*)	1	0.3
Scimbok (hybrid: scimitar horned oryx [*Oryx dammah*] and gemsbok [*O. gazella*])	1	0.3
Scimitar-horned oryx (*Oryx dammah*)	1	0.3
Water buffalo (*Bubalus bubalis*)	1	0.3
Carnivores	76	
Coyote (*Canis latrans*)	28	36.8
Black bear (*Ursus americanus*)	26	34.2
Bobcat (*Lynx rufus*)	12	14.8
Gray fox (*Urocyon cinereoargenteus*)	4	5.3
Unknown bear (*Ursus* sp.)	2	2.6
Gray wolf (*Canis lupus*)	2	2.6
Grizzly bear (*Ursus arctos*)	2	2.6
Raccoon (*Procyon lotor*)	2	2.6
Unknown fox (*Vulpes vulpes* or *Urocyon cinereoargenteus*)	1	1.3
Red fox (*Vulpes vulpes*)	1	1.3
Virginia possum (*Didelphis virginiana*)	1	1.3

Once all stories were coded, we analyzed them for dominant satisfactions (occurring most frequently per story), proportion of phrases per satisfaction (across all stories), and multiple satisfactions (per story). We ran a matrix query in NVivo to observe the frequency with which satisfactions occurred within each of the 455 stories, and assigned each story with one dominant satisfaction (achievement, affiliation, appreciation).

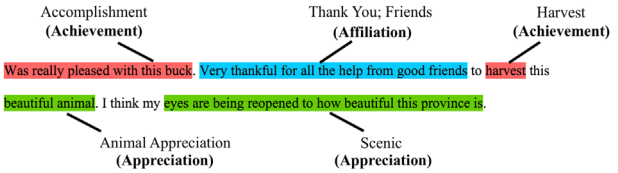

Figure 1. An example excerpt of a story coded using directed qualitative content analysis and an open coding framework. A hierarchical categorization structure was used; stories were coded for key phrases (highlighted portions); phrases were organized into thematic codes (labels, not bold); and codes were organized into satisfactions (achievement, appreciation, affiliation; bold, in brackets).

In the case of a tie ($n = 38$), we assigned the satisfaction that was mentioned first as dominant. We ran a second matrix query to observe total number of phrases per satisfaction across all ungulate and carnivore stories, and identified stories with multiple satisfactions. Finally, we used a Pearson's chi-squared test on our multiple-satisfactions data to determine whether differences observed between ungulate and carnivore stories were statistically significant ($\alpha = 0.05$).

To evaluate levels of coding reliability, we conducted 1) a precision test and 2) an inter-coder test. The original coder and a third party unaware of our study objectives were presented with an approximately 5% random subset ($n = 132$) of the 2,864 phrases coded. Phrases were organized by each party into the satisfaction categories of achievement, affiliation, and appreciation. An additional third party then compared these answers with the originals to determine coding precision. Results of the inter-coder test and precision test were 86% ($n = 121$ of 140) and 96% ($n = 134$ of 140) accurate to original coding, respectively. It is generally accepted in terms of qualitative coding reliability testing standards that accuracy of $\geq$90% would be acceptable in all situations, while $\geq$80% would be acceptable and $<$80% questionable in the majority of situations (Neuendorf 2002). We noted that 2 codes in particular were the source of several inaccuracies on both tests: "Bad Weather Conditions" ($n = 5$ test phrases total; inter-coder test: $n = 3$ inaccurate; precision test: $n = 2$ inaccurate); and "Storytelling" ($n = 3$ test phrases total; inter-coder test: $n = 3$ inaccurate; precision test: $n = 0$ inaccurate). Owing to these specific discrepancies in phrase interpretation, we omitted all "Bad Weather Conditions" and "Storytelling" phrases ($n = 47$ and $n = 65$, respectively) from our study. The adjusted results of each test were 90% (inter-coder test; $n = 119$ of 132 phrases) and 97% (precision test; $n = 128$ of 132) accurate to original coding.

Whereas we believe that online forums are a rich and valuable resource that can provide new insight into hunter satisfactions research, we recognize that they may introduce new forms of bias to the field. For example, individuals may use narcissism in online communication to improve their explicit self-esteem, presenting themselves in an exaggerated or otherwise modified light (Mehdizadeh 2010). Similarly, it is possible that people who generally exhibit higher levels of narcissism may be predisposed to post on forums. We speculate that this would mostly influence achievement satisfactions, because there is likely less incentive to share affiliation and appreciation satisfactions with peers. However, individuals might simultaneously experience a heightened sense of affiliation and appreciation due to their participation in online forums, because positive feedback and reinforcement can increase these satisfactions (Deci 1971). Additionally, because an internet connection is required, membership of online forums may not accurately represent hunters located in rural areas. Demographic factors such as age could also result in skewed hunter representation.

RESULTS

Distinct patterns emerged from our analyses. We found that achievement was the primary dominant satisfaction expressed in online hunting stories, both when ungulates and carnivores were targeted (Fig. 2a). Achievement was the dominant satisfaction in 81% of ungulate stories ($n = 308$ of 379). Affiliation ($n = 42$; 11%) and appreciation ($n = 29$; 8%) were less prevalent. Achievement was also the dominant satisfaction in 86% of carnivore stories ($n = 65$ of 76), and affiliation was less common ($n = 9$; 12%). The most striking difference when comparing dominant satisfactions between target species was that appreciation only occurred as a dominant satisfaction in 3% of carnivore stories ($n = 2$). There was no pronounced difference in affiliation satisfactions between stories targeting ungulates versus carnivores. When inspecting the proportion of phrases coded for each satisfaction across all stories, several of the above patterns persisted (Fig. 2b). Achievement phrases occurred most frequently in both target species groups (ungulates: 63%, $n = 1{,}599$ of 2,546 phrases; carnivores: 72%, $n = 230$ of 318 phrases), followed by affiliation phrases (ungulates: 20%, $n = 511$ of 2,546; carnivores: 16%, $n = 50$ of 318) and appreciation phrases (ungulates: 17%, $n = 436$ of 2,546; carnivores: 12%, $n = 38$ of 318).

When considering stories with only a single satisfaction present ($n = 180$ of 455; 40%), achievement was by far the most frequent ($n = 176$ of 180; 98%). A larger proportion of carnivore stories exhibited single satisfactions ($n = 36$ of 76; 47%) than did ungulate stories ($n = 144$ of 379; 38%). One-hundred percent of single-satisfaction carnivore stories ($n = 36$ of 36) and 97% of single-satisfaction ungulate stories ($n = 140$ of 144) expressed achievement. Affiliation and appreciation were present as single satisfactions in only a few ungulate stories ($n = 3$ of 144, 2%; $n = 1$ of 144, 1%, respectively). Accordingly, 275 of 455 stories (60%) were coded for multiple satisfactions (Fig. 2c). A greater proportion of ungulate stories ($n = 235$ of 379; 62%) showed multiple satisfactions than did carnivore stories ($n = 40$ of 76; 53%), though this difference was not significant ($\chi^2_1 = 2.33$, $P = 0.13$).

The 3-way combination of achievement, affiliation, and appreciation satisfactions was the most common multiple-satisfaction grouping, occurring in 46% of multiple-satisfaction ungulate stories ($n = 107$ of 235) and 35% of multiple-satisfaction carnivore stories ($n = 14$ of 40). Achievement and affiliation occurred as an exclusive multiple-satisfaction pair in 29% of multiple-satisfaction ungulate stories ($n = 69$ of 235) and 33% of multiple-satisfaction carnivore stories ($n = 13$ of 40). Achievement and appreciation occurred as an exclusive pair in 23% of

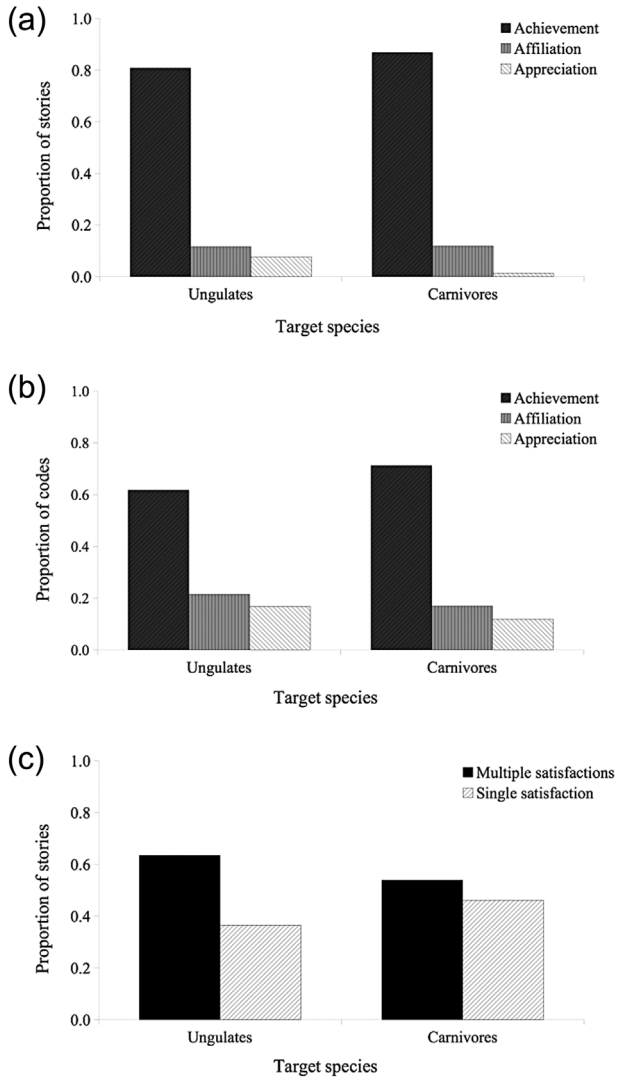

Figure 2. (a) Proportion of dominant satisfactions (achievement, affiliation, appreciation) in ungulate ($n = 379$) and carnivore ($n = 76$) stories across all forums (one satisfaction assigned per story). (b) Proportion of phrases coded for satisfactions in ungulate ($n = 379$; 2,546 phrases coded) and carnivore ($n = 76$; 318 phrases coded) stories across all forums. (c) Proportion of ungulate ($n = 379$) and carnivore ($n = 76$) stories with multiple or a single satisfactions present across all forums.

multiple-satisfaction ungulate stories ($n = 53$ of 235) and 30% of multiple-satisfaction carnivore stories ($n = 12$ of 40). Affiliation and appreciation occurred least frequently as an exclusive pair, present in 3% of multiple-satisfaction ungulate stories ($n = 6$ of 235) and 3% of multiple-satisfaction carnivore stories ($n = 1$ of 40).

DISCUSSION

Our innovative research method provides a new approach that contributes to hunter satisfactions literature. With the rapid rise in communication through social media, and associated data availability (Barbier 2011), we suspect that other researchers might adopt a similar approach to complement or replace more traditional interview and survey methodologies. Future research should, however, proceed with caution. As noted, online forum users might be neither broadly representative of the population of interest nor behave in ways that characterize typical behavior. In our case, hunting forums might elicit posts by hunters who are particularly achievement-oriented and emphasize their achievements more in relation to other aspects of a hunt. Despite these limitations, the widespread prominence of achievement in our results supports patterns seen in previous research, suggesting achievement is either the most common or the most influential hunter satisfaction (Decker et al. 1980, Decker and Connelly 1989, Grilliot and Armstrong 2005, Child and Darimont 2015).

If our data are broadly representative of the general hunting population, our analyses suggest that ignoring achievement in wildlife management would have significant consequences. For example, in cases where achievement scales positively with target species size, newly imposed size restrictions on a species may cause hunter contentment to decline (Child and Darimont 2015). Such regulations limiting achievement satisfactions may thus encourage hunter opposition toward wildlife management policies (Miller and Graefe 2001). Similarly, acknowledging and incorporating achievement satisfactions into wildlife management may increase support for new and existing policies. For example, wildlife managers looking to increase achievement satisfactions among hunters could focus on policies designed to improve the "quality" (e.g., health, body size, antler–horn size, fitness) of target species populations. Hence, management goals for larger and healthier targets could garner hunter support as well as play a role in other management prescriptions (e.g., restoring or safeguarding high-quality habitat). The more pronounced prominence of achievement we observed in carnivore stories, coupled with fewer mentions of other satisfactions, provides important insight into the differences between hunters (or hunts) that target these different taxa. Greater difficulty and price associated with carnivore hunting may explain why achievement of a successful kill (or disappointment in a failed hunt) may be relatively more important than intrinsic (nonmaterial; i.e., appreciation and affiliation) satisfactions for carnivore hunters (U.S. Fish and Wildlife Service and U.S. Census Bureau 2011, Child and Darimont 2015). These examples of heightened "costly signaling" provide benefits to hunters particularly in a social capacity, because their successful hunts display qualities of interest to others (e.g., skill, strength, or wealth; Veblen 1918, Smith et al. 2003, Darimont et al. 2017).

Owing to these differences, we speculate that management policies designed using data from ungulate hunting studies may be less effective if implemented for carnivore hunting. Recognizing achievement satisfactions may be particularly important when designing carnivore management policy. For example, when concerning carnivore species that are of conservation concern as well as commonly hunted as a trophy (e.g., grizzly bears [*Ursus arctos* ssp.], cougars [*Puma concolor*]; Kellert et al. 1996), habitat protection and sustainable management plans aimed at increasing the health and population numbers of these species could garner the support of a large hunting demographic as well as have conservation merit for ecosystems. An example of a similar paradigm that has been successfully implemented is that used by Ducks Unlimited. Founded in 1937 by waterfowl hunters and with a

continually large hunter member base, much of Ducks Unlimited's work is geared toward protecting wetland habitat to increase duck and geese (Anatidae) populations to improve and sustain waterfowl numbers for hunting (Duffus 2011). In the process, >5.6 million ha of wetlands (as of 2015) have been preserved and restored, benefiting >900 vertebrate species and improving riparian ecosystem health across the continent (Tori et al. 2002, Ducks Unlimited 2015).

Our results also provide new insight into the prevalence of multiple satisfactions among hunters. We found that achievement, appreciation, and affiliation were all present in stories exhibiting multiple satisfactions more often than was any exclusive satisfaction pair. Affiliation and appreciation likely play a greater role in hunter satisfaction than was reflected in our results, on account of the potential bias toward achievement-oriented hunters, storytelling, or language that may be created by the online forum environment. We speculate that even when not explicitly stated in stories, these intrinsic satisfactions play a crucial role in enhancing the hunting experience and reinforcing external (tangible; i.e., achievement) satisfactions (Deci 1971). For example, a hunt that ends with the kill of a large deer (achievement) might bring more satisfaction if spent surrounded by beautiful scenery (appreciation) and in the company of friends or family (affiliation) than if the location were less beautiful and time spent alone, even if the end kill result of the hunt were the same.

Whereas it has long been suggested that intrinsic satisfactions (appreciation and affiliation) play a role in most hunting experiences even when achievement is dominant (Deci 1971), the contrast exhibited in our results between all satisfactions versus only one satisfaction (predominantly achievement) being addressed is a new and meaningful finding. This suggests that although most hunters can be satisfied by multiple factors, achievement satisfactions have the strongest ability to cause other satisfactions to fade when describing hunts. We speculate that this could be a result of 1) the social recognition often associated with successful harvest (achievement; Smith et al. 2003), particularly due to the social nature of forums; 2) the vast array of satisfactions that fit into the currently used achievement category (e.g., meat quality, antler size, learning a new skill, protecting livestock–livelihood); and 3) the presence of more satisfactions that have not yet been defined in the literature and hence have not been factored into our analysis.

We recommend further research into the specifics of these satisfaction categories to gain a deeper understanding of hunter satisfactions and correlating motivating factors. Even without further investigation, we suggest that the adoption of hunter education or outreach programs that encourage multiple satisfactions could be valuable in increasing the enjoyment of the hunt experience as well as increasing hunter satisfaction at the outcome. For example, a recent analysis of ethical hunting tenets within hunter education manuals and nongovernmental organization (NGO) statements found that only NGO texts promoted being motivated to hunt by personal relationships with nature (Peterson 2014). Furthermore, we speculate that excluding appreciation and affiliation satisfactions from wildlife management considerations would have a substantial impact on the contentment of a wide range of hunters, which could in turn influence rates of hunter initiation, continuation, and desertion. For example, a common complaint of hunters is overcrowding or lack of privacy at hunt locations (Shelby and Vaske 2007), which directly influences appreciation satisfactions. Taking this into consideration by designating and protecting more wildlife management areas could improve overall hunter satisfaction as well as provide more habitat for wildlife and ecosystem conservation (of target and nontarget species).

MANAGEMENT IMPLICATIONS

If hunting satisfactions expressed in online stories represent those experienced by hunters more broadly, our results could offer significant insight into wildlife management. Specifically, understanding the prominence and co-occurrence of expressed satisfactions can directly inform managers in relation to hunter contentment, participation numbers, policy support, and more. For example, goals to develop quality habitat could see improved success if also designed with hunter satisfactions in mind, such as promoting larger target species (achievement) or hunter privacy (appreciation). If wildlife managers are looking to increase hunter contentment, our results suggest that designing regulations that focus on achievement satisfactions would be particularly successful. Hunter education and outreach programs could be used to further instill a sense of importance and acknowledgement of intrinsic satisfactions. Additionally, our results indicate that understanding satisfaction differences between ungulate and carnivore hunts is likely important to wildlife management outcomes. More research, however, is needed on carnivore hunter satisfactions. Moreover, we acknowledge that the currently accepted hunter satisfaction categories (achievement, affiliation, appreciation) are exceptionally broad, especially regarding achievement. Achievement satisfactions resulting from trophy and meat hunting, for example, are likely vastly different. We believe that exploring the nuances of these satisfactions presents another important avenue for future research, particularly given the prevalence with which all 3 satisfactions co-occurred within multiple-satisfaction stories. Finally, we suggest that these and other research questions might be addressed at least in part using online forums, which can provide an important data source with which wildlife management scholars and practitioners can interact.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web-site. Supporting information includes a table outlining the hierarchical categorization structure of satisfactions, subcategories, and codes used to categorize phrases from hunting stories across all 3 online forums.