'Man-eaters' in the Media: Representation of Human-leopard Interactions in India Across Local, National, and International Media

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Abstract

Interactions between humans and wildlife are frequent in India, requiring stakeholders to devise mitigation strategies that benefit both humans and wildlife. Success of such initiatives can be impacted by stakeholders' perceptions of species and related issues, which may be unduly influenced by the media. This paper explores media representation of Human-Leopard Interactions (HLI) in India, focusing on detecting agenda-setting and framing in articles, and whether these differ with the level of association with HLI. To accomplish this, we coded articles (n=291) from three media-distribution levels with increasing detachment to HLI events: local news, Indian national news, and international news, and compared the types of agenda-setting and framing found across the three. Overall, international media had the most negative portrayal of leopards and HLI, while national had the most balanced. Local and international media included 'man-eater' framing in the majority of their stories; whereas stories of leopards as victims were most prominent in local news, and victim framing was most frequent in national. These results suggest that agenda-setting and framing may vary with association with HLI. Despite differences between sources, our findings suggest that all media distributions focused primarily on stories of leopards causing trouble (e.g., attacks and incursions), or in ways viewed as troublesome (e.g. incursions) with few stories of leopards as victims or informational pieces. The largely negative depiction, and differences in representation between geographic locations, could hinder mitigation strategies and policy through presenting stakeholders with incomplete information.

Keywords: human dimension, human–wildlife conflict, risk communication, *Panthera pardus fusca*

INTRODUCTION

In this paper, we examine how the media represents interactions between humans and leopards, as well as how leopards themselves are portrayed in such articles. The interactions focused on, for this paper, are those that are commonly termed 'conflict' by the media, which include sightings in human settlements, attacks (animal-on-human and human-on-animal), and livestock predation. We refrain from using the term 'conflict' because many of these events are not conflicts in the traditional sense, as they do not involve contact between parties. Instead, we will be employing the terms Human-Leopard Interactions (HLI) and Human-Wildlife Interactions (HWI) throughout this paper to more accurately represent the scope of issues covered.

Interactions between humans and wildlife in India are widespread, and consequently ever-present in scientific literature (Treves and Karanth 2003; Athreya et al. 2011; Goswami et al. 2015), and the news media. However, the formal body of literature and the stories presented by the media are not always congruent; the latter often presents a biased, incomplete story (Boissonneault et al. 2005; Muter et al. 2013; Athreya and Vasudev 2015), which has the potential to

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influence public opinion on the issue. Such biased reporting is not specific to HLI in India; it is also common in news concerning other high 'conflict' species, namely sharks, for which this phenomenon has been studied in greater detail (Muter et al. 2013; O'Bryhim and Parsons 2015). Biased reporting is problematic since the media is the foremost way for messages to reach the public (Hesselink et al. 2007), including policy makers and international interest groups (Barua 2010). The importance of the media's influence on perception of HWI is acknowledged within the conservation community, where programmes to educate journalists on responsible reporting are being planned and implemented (Chaturvedula 2014; Land 2015); though few papers have quantified the content of news articles, with notable exceptions from Barua (2010) and Bhatia et al. (2013).

Increasing human population, habitat loss, and loss of wild prey are the most frequently cited causes for leopards entering human-dominated areas (Athreya et al. 2013; Chaudhari et al. 2013). Leopards are further attracted to human settlements due to the presence of high numbers of livestock and domestic dogs (Goyal et al. 2000; Butler et al. 2014; Athreya et al. 2016). Leopard presence in human habitations results in negative interactions such as livestock depredation and attacks (leopard-on-human, and human-on-leopard), and non-negative interactions such as sightings; though non-negative interactions are rarely studied (Ghosal and Kjosavik 2015). Retaliation toward leopards also occurs, with 'problem' leopards sometimes injured or killed by people (Karanth and Madhusudan 2002); illegal killing of leopards, retaliatory and otherwise, occurs in high numbers with an estimated four leopards killed every week over the last 10 years (Raza et al. 2012).

The media can play an instrumental role in influencing public agenda via the types of stories they choose to cover. This process is called 'agenda-setting,' in which certain issues or events are focused on for the purpose of influencing public opinion (McCombs and Shaw 1972). Media also guides people's value judgments through variations in word choice and representation, a process called 'framing'. This is defined as "the process of culling a few elements of perceived reality and assembling a narrative that highlights connections among them to promote a particular interpretation" (Entman 2007: 164). Agenda-setting and framing leave the public with an incomplete understanding of the issue at hand (McCombs 2013). This may lead to increased perceptions of risk (McComas 2006), and development of fear and stigmas around the events or actors in events (e.g., leopards) (Flynn et al. 2001). These effects are important since public opinion can have a strong influence on policy making (Burstein 2003) in the form of public support for policies (de Vreese and Boomgaarden 2003; Gore and Knuth 2009; Powell 2014).

In this paper, we conduct a media analysis on a set of news articles (n=291) focused on HLI in India sourced from local, national, and international news. We examine what is presented to the public (agenda-setting), how it is presented (framing), and if this presentation changes with proximity to locations of frequent HLI events. Based on the tenet of proximity in journalism, which suggests that stories that are more culturally or geographically proximate to the reader will have greater newsworthiness, we hypothesise that the local news (the most proximate) will cover diverse subject matter, including the most stories of less severe interactions, such as leopard sightings, and instances of mitigation, since such stories are more relevant to those living alongside leopards than those who live farther away. In the same vein, we expect the international media (the least proximate distribution), for which leopards are much less relevant, to focus primarily on high-impact stories, such as attacks. For national media, we expect the subject matter to fall somewhere between these two.

In addition to differences in subject matter at different distribution levels, we also expect to find differences in how leopards are framed, and how often the notion of coexistence is presented. However, the differences we expect to find in these variables are harder to predict because of the varied social and cultural factors involved. For example, research has shown that audiences tend to show more sympathy for endangered/threatened megafauna (e.g., whales and tigers) in distant locations (Ducarme et al. 2013). Additionally, these audiences tend to frame the human actors in issues of 'man vs. wildlife' as uncivilised people harming defenseless animals (victim framing of the species) (Shaffer 2015), as is the case with the issue of whaling (pro-whaling groups vs. whale protectionists) (Kalland 2009). These findings would generally lead us to expect the international media to frame leopards as victims, and promote coexistence more-so than the local or national media in India, which are geared toward an audience with members who suffer direct repercussions due to their proximity to leopards. However, such results may not be found due to the majority of India's citizens practicing Hinduism-- a religion whose texts directly promote coexistence between humans and wildlife, and state that human and nonhuman lives are of equal value (Dwivedi 1990). In light of this, India's media, both local and national, may be expected to show more sympathy toward leopards and by promoting coexistence and presentation of leopards as victims.

To conduct this research, both authors coded a total of 291 HLI focused articles from local (n=100), national (n=100), and international (n=91) media, and conducted Chi-square tests to determine if the distribution of agenda setting and framing variables differed significantly between distribution levels.

METHODS

Materials

Following a similar formula to Barua's 2010 paper about media representation of human-elephant conflict, we grouped media sources into three categories— local, national, and international; only English-language media sources were used. To collect articles for analysis, we conducted searches through the online archives of various local, national, and international publications (a full list can be found in Table 1), restricting

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Table 1
Local, national, and international publications included in analysis

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Local
Assam Sentinel, Assam Times, Assam Tribune, eUttaranchal, Mumbai Mirror, Pune Mirror, Desh Gujarat, Kashmir Observer, Greater Kashmir, and Kashmir Times
National (India)
Times of India, Hindustan Times, and The Hindu
International
CNN, NY Times, Daily Mail, BBC, Al Jazeera, Telegraph (UK), National Post, The Guardian, Washington Post, The Independent, The Times, Washington Times, ABC, United Press International (UPI), NBC, CBS, People, and Business Insider

the time frame to January 1, 2011 to March 6, 2015 (the time coding commenced). We chose this limited time period because it was current, but long enough to give us a broad selection of relevant articles to analyse. The latter point was particularly important to enable us to collect a large enough sample size of international articles, which were published less frequently than those in national and local news.

Archives were searched for the term "leopard"; for international news archives, we also included the term "India" in all searches. Articles were then manually scanned to identify those focused on HLI. For local news, only publications from states which are mentioned as 'experiencing frequent HLI' by Marker and Sivamani (2009) were used (Assam, Uttarakhand, Maharashtra, Gujarat, Jammu and Kashmir), with the reasoning that news from these areas is more likely to reflect and influence feelings of those closest to these events. To narrow down the large number of national articles we only searched the top three English-language papers in the country; the *Times of India*, *the Hindu*, and *Hindustan Times* (Readership Studies Council of India 2013). For international news sources, the overall frequency of HLI articles was low, and as such, all relevant international articles were included (n=91). To select our local and national article datasets from the larger pool of local and national articles, we used the 'sample' function from the R *base* package, instructing it to randomly choose 100 articles from each without replacement. The total number of articles analysed from all sources combined was 291.

Variables

Agenda-setting
The two variables used to determine agenda-setting were Subject Matter and Headline Type; subtypes for these variables are outlined in Table 2.

Victim/Man-eater (aka Perpetrator) Framing
This frame is a take on the traditional victim-perpetrator framing and differs in name only. We chose to employ the term "man-eater" because of the way in which leopards were framed as perpetrators in our HLI article set. We found that perpetrator framing was carried out with the implication that

leopards weren't simply menacing, but singling out humans as prey. For instance, terms such as 'prowling,' 'stalking,' 'man-eater/man-eating,' and 'bloodthirsty' were frequent throughout the article set. Descriptions of the subtypes for this frame are outlined in Table 2.

Coexistence Framing
This frame emphasises coexistence between humans and leopards, either through mention of locations where humans and leopards share space peacefully, mentions of how coexistence with leopards is possible, or talk of how leopards are an integral, natural part of the ecosystem. This frame was coded as presence/absence.

Responsibility Framing
Semetko and Valkenburg (2000: 96) provided the idea for this frame and define it as presenting "an issue or a problem in such a way as to attribute responsibility for its cause or solution to either the government or an individual or group." We separated 'Cause Attribution' and Responsibility for Solution into separate frames. 'Cause Attribution' was determined by the causes of HLI listed in articles. This gives us insight into who, or what, is blamed for the problem. 'Responsibility for Solution' was determined by who is assigned responsibility for mitigation. Subtypes for both of these frames are listed and described in Table 2.

Coding and Analysis
To establish inter-coder reliability, both authors coded 29 articles (10% of the dataset) (De Swert 2012), and the Re-Cal inter-coder reliability web application was used to calculate Krippendorf's α (Freelon 2010). After the authors attained a high level of inter-coder reliability for each variable, each coded half of the remaining 262 articles. One author coded responsibility framing, as such, inter-coder reliability statistics were not required.

Analyses were done using R (R Development Core Team 2013). Chi-square tests were performed with the 'CrossTable' function from the R *gmodels* package to determine the relationship between media source and frames. Fisher's exact tests were substituted when expected counts were less than five; this was implemented by entering 'fisher=TRUE' in the 'CrossTable' function. To determine the most significant contribution(s) to the statistically significant result, standardised residuals (SR) were evaluated, and those greater than 2 or less than -2 were considered.

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RESULTS

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Inter-coder Reliability

As suggested by Krippendorff (2004) we obtained α > 0.800 for most variables, except victim/perpetrator and coexistence which have α's of 0.797 and 0.785 respectively, which still fit within the parameters for analysis for which tentative results are acceptable (>0.667).

Table 2
A description of frames and sub-types within each frame

Variables and subtypes
Subject matter/story trigger
Human as victim: Stories of leopards attacking humans.
Leopard as victim: Stories of humans harming leopards.
Mitigation: Stories about an act of mitigation, or mitigation plans.
Informational: Stories with the purpose of educating people about the general history/topic of HLI.
Incursion: Stories about leopards entering, or near, human dominated areas without humans or leopards being victimised by one another, these also include stories of leopards entering human areas to kill dogs or livestock.
Headline Type
Human as victim: Headlines that revolve around leopards attacking humans.
Leopard as victim: Headlines about events where leopards are victims (e.g. killed, attacked, trapped in well)
Mitigation: Headlines that revolve around an act of mitigation or mitigation planning.
Informational: Headlines that suggest a story to educate people about the general history/topic of HLI.
Incursion: Headlines that portray leopards in or near human-dominated areas.
Other: Headlines that are either a combination of other types (e.g. "leopard attacks man, caged by wildlife officials"), or those that are nondescript (e.g. "How to bell the big cat").
Victim/Man-eater Framing
Victim: articles that portrayed leopards as victims of human behavior or used words to elicit sympathy for them.
Man-eater: articles that portrayed leopards as agents that target humans as prey, or used wording to elicit such fear of them.
Victim-man-eater: articles that include elements of both the victim and man-eater sub-frames.
Neutral: articles that described leopards using neutral wording.
Cause Attribution
Actions of local People: Human actions cited as the cause for HLI. E.g. Dogs/garbage, collecting produce in areas with leopards.
Government action/inaction: HLI blamed on governmental apathy or government creating unsafe conditions.
Actions of leopards: Actions of leopards or state of the leopard's health blamed for conflict such as "looking for food" (without mention of depleted prey), or poor leopard health.
Chance occurrences: HLI attributed to chance occurrences like weather events.
"General" changes: HLI attributed to more general things like "land use changes", habitat loss, population growth.
Conservation action: HLI attributed to conservation itself. Such as hunting restrictions, translocation, or a surplus of wild animals as a result of successful conservation.
Responsibility for Solution
Individual: Articles that put the onus on the local people to alter their behavior to decrease conflict (e.g. "don't go out at night"), cleaning, or clearing trees around houses.
Governmental/group: Articles that put the onus on the government or group to enact changes to decrease conflict; such as forming response teams, trap and release, education, restoring/preserving habitat. Government and group were combined because both were often represented as needing to provide a service to the local people.

Agenda-setting and framing variables

The full results for the agenda-setting and framing variables can be found in Table 3.

Agenda-setting variables

The distribution of both agenda-setting variables (Subject Matter and Headline Type) were correlated significantly with news source (p <0.001 for both). For both variables, one sub-type showed great variance between news sources: 'leopard as victim'. The SRs for Subject Matter indicate that the significant result is due to a higher-than-expected number of 'leopard as victim' stories in local news (SR = 3.165), and a lower-than-expected number in international news (SR = -2.0). 'Leopard as victim' Subject Matter was only present in

11.3% of articles, but was found in local news three to five times more often than national or international. Similarly, for Headline Type, 'leopard as victim' headlines were present at a higher-than-expected frequency in local news (SR = 4.386), and fewer in national and international news (SR's of -2.314 and -2.172 respectively); 'leopard as victim' headlines were seen almost solely in local news, with only one occurrence in national and international media combined. Additionally, 'human as victim' headlines were present more often than expected in international news (SR = 2.143). Overall, 'human as victim' was the most prominent sub-type for both Subject Matter and Headline Type for the entire dataset, being present in 39.9% and 35% of all articles respectively; the second most common sub-type for both was 'incursion,' which was present in 26.8% and 24.4% respectively. The least common subtype

<div align="center">**Table 3**
Results for Chi-square tests and Fisher's exact tests</div>

Variable	P value	χ^2	df
Agenda Setting			
Article Subject Matter	<0.001*	27.6	8
Headline Subject Matter	<0.001*§	NA	NA
Framing			
Victim-Man-eater -- Victim, Man-eater, Victim-Man-eater, or Neutral	<0.001*	28.5	6
Coexistence -- Presence/Absence	0.086	4.9	2
Cause Attribution			
Actions of Local People -- Presence/Absence	0.041*	6.4	2
Government Action/Inaction -- Presence/Absence	0.230§	NA	NA
Actions of leopards -- Presence/Absence	0.397§	NA	NA
Conservation Plans -- Presence/Absence	0.283§	NA	NA
Chance Occurrences -- Presence/Absence	0.173§	NA	NA
General Changes -- Presence/Absence	<0.001*	1722	2
Responsibility for solution -- Individual, Government/Group, Both, or Neutral	0.01*§	15	NA

§ = Result from Fisher's exact test, df and χ^2 test statistic not relevant. * = Significant *P value*

for both Subject Matter and Headline Type was 'informational,' being present in only 8.6% and 1.4% of the article sets respectively. A bar plot depicting abundances of Subject Matter across media distributions can be found in Figure 1.

Victim/Man-Eater Framing
Victim/Man-Eater framing was found in 79.1% of all articles (21% included 'victim' framing; 47.8% employed 'man-eater' framing, and 10.3% included 'both'), the remaining articles were 'neutral' to this frame. This frame showed a statistically significant correlation with news source (p<0.001); the greatest contributions to this result were the lower than expected frequency of 'neutral' articles in the local dataset (SR = -2.6), and lower than expected frequency of 'victim' framing in the international dataset (SR = -2.8). Presence of 'victim' framing was roughly equal for sources within India (local and national media, 26% and 28% of those distribution's articles respectively), though was present much less frequently in the international dataset (7.7%). 'Man-eater' framing showed a different pattern, being present in international and local media with similar frequency (57.1% and 51% respectively), though showing lower frequency in national news (36%). A bar plot depicting the distribution of this frame across media sources can be found in Figure 2.

Coexistence frame
The correlation between this frame and news source was marginally significant (p= 0.086), being most prevalent in national news, and least prevalent in local. Coexistence framing was found in 11.6% of all articles; 7% of local, 17% of national, and 11% of international. The largest contributor to this marginally significant result was the higher than expected number of occurrences in national news (SR = 1.56), and lower than expected number of occurrences in local news (SR = -1.37).

Responsibility Framing
Cause Attribution: Only the 'local people' and 'general' causes sub-frames correlated significantly with news source
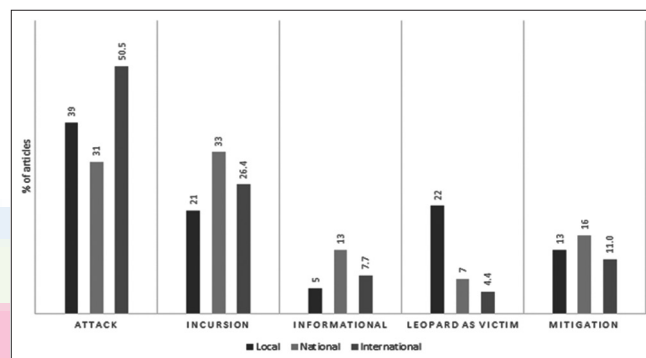

<div align="center">**Figure 1**
Distribution of subject matter types within the different media distribution levels</div>

(p=0.041 and <0.001 respectively); both increased with decreasing proximity to areas of high HLI. The former was present in 12% of local media articles, 15% of national, and 25.3% of international (17.2% of total articles); the latter was present in 8%, 16%, and 30.8% respectively (17.9% of total articles). These two causes were also the most frequently cited. The largest contributor to the significant result for 'local people' its overrepresentation in international news (SR = 1.86). A similar result was found for 'general' causes, which was also overrepresented in international news (SR = 3.05), but also underrepresented in local news (SR = -2.39). Though not statistically significant, the third most common cause listed in articles was the 'actions of leopards' (6.5% of total articles). No other cause examined was present in >5% of articles in the dataset, or within a distribution level.

Responsibility for Solution: This frame showed a statistically significant correlation with news source (p<0.01). Overall, 17% of local articles, 22% of national articles, and 4.4% of international articles mention an entity that should be responsible for mitigating HLI (14.8% of total articles). The statistically significant result for this frame was due to the lower than expected number of articles within international
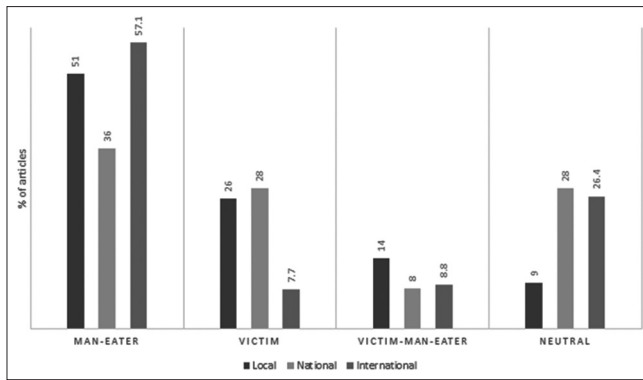
Figure 2
Relative distribution of Victim/Man-Eater framing sub-types between distribution levels

news for both 'individual' and 'government/group' sub-types (SR's of -2.08 and -2.0 respectively).

DISCUSSION AND CONCLUSION

Our results suggest that there is a strong man-eater narrative in much of the news covering human-leopard interactions. Overall, articles that nurture fearful thoughts of leopards through words and portrayal ('man-eater' sub-frame), or subject matter (e.g., 'human as victim' Subject Matter and Headline Type) were by far the most common throughout the entire data-set. 'Human as victim' headlines were also the most common within each distribution level, and 'human as victim' subject matter the most prevalent of any subject matter for both local and international news. Similarly, 'man-eater' framing was more common than 'victim' framing of leopards at all distribution levels. There was also an overall lack of 'informational' articles (8.6% of all articles), and a tendency for all media distributions to include 'Cause Attribution' (blame) more frequently than 'Responsibility for Solution'.

Research has determined that the agenda-setting process has 'accessibility effects' by which media influences opinion formation by making some types of information more accessible. In our dataset, the accessible information would be that concerning leopards causing trouble. Our results further indicate presence of 'applicability effects' (Scheufele and Tewksbury 2007), which refers to the result of a message that suggests a link between two concepts such that, after exposure to the message, audiences accept that they are linked concepts (Price and Tewksbury 1997). These effects can influence the types of relationships the reader sees as plausible between actors (Kühne 2014), and affect their judgment of a situation. In our dataset, the relationship presented is one where humans are victims and leopards are perpetrators or man-eaters.

Though portrayal of leopards was largely negative, differences in representation were observed between distribution levels. National news was unique in that 13% of articles had 'informational' Subject Matter, and 17% included Coexistence framing; though these are objectively low percentages, both were the highest prevalence of all

the distribution levels. Additionally, this distribution level included the most Victim/Man-Eater 'neutral' articles (28%) and 'mitigation' Subject Matter (16%). National news also included 'man-eater' framing in only 8% more articles than 'victim' framing (36% and 28% respectively); for other distribution levels, the proportions of 'man-eater' and 'victim' framing were much less balanced, being highly skewed toward 'man-eater' framing. The most common Subject Matter for the national distribution level was 'incursion' (33%), followed by 'human as victim' (31%), making this the only distribution level without 'human as victim' as the dominant Subject Matter. Overall, national news provided the most balanced representation of events.

Local news stood out by including the most 'leopard as victim' Subject Hatter and Headline Type of all, and included 'victim' framing in similar frequency to national news (26% of articles). This suggests that those closest to the areas where humans and leopards come into contact are placing importance on these facets, which we expected due to the proximity of these news sources to HLI events. However, it should also be noted that this distribution level included 'man-eater' framing in the majority of articles (51%), the fewest Victim/Man-Eater 'neutral' articles (8%), and the fewest stories with 'informational' Subject Matter (5%). This is potentially problematic since previous research (Wanta et al. 2004; O'Bryhim and Parsons 2015) suggests that information, not positive portrayal, is the most successful way to counteract negative feelings. This could indicate that though this distribution level included a fair amount of 'victim' framing and 'leopard as victim' Subject Matter and Headline Type, it may not be effective to counteract the 'man-eater' framing. Additionally, due to these media sources proximity to HLI events (and consequently, their reader's proximity), this is the distribution level where such negative portrayal could have the most impact by directly influencing responses during leopard encounters.

Lastly, the international article selection presented what Quammen (2004) refers to as 'toothy porn'; articles reminiscent of some ancient battle between large carnivores and the humans that sometimes end up as their prey. Here we see the highest usage of 'man-eater' framing (53% of articles), and the lowest prevalence of 'victim' framing (7.7%). Additionally, the international news published the fewest 'leopard as victim' stories (4.4%), while 'human as victim' stories made up 50.5% of the dataset. Though the prevalence of 'human-as-victim' stories, and low prevalence of less-impacting story types were expected at this distribution level, the highly negative portrayal of leopards did not fit in with previous research that suggests people show more sympathy for endangered and threatened megafauna in distant places (Ducarme et al. 2013). Also, though international media was the most likely to include 'Cause Attribution', it was least likely to include 'Responsibility for Solution'. Representation of HLI in the international media has potentially far-reaching implications, as the readership of these media outlets are largely unfamiliar with leopards, giving the media that much

more power to mold the HLI narrative and readers' opinions of leopards.

An individual receiving all of their HLI information from the news would only be reading a small sample of this type of article, and consequently only be presented with a subset of the elements presented here. This implies that despite the differences in representation between media distribution levels, articles that present leopards negatively are more prominent and more likely to be seen than articles that present information in an unbiased manner, and further, that readers are unlikely to encounter informational articles. This latter point is problematic because research suggests that the best way to counteract such negative attitudes is through the dissemination of information (O'Bryhim and Parsons 2015). Additionally, a study by Gullo et al. (1998) found that media coverage both reflected and reinforced public attitudes toward a 'high conflict' species (cougars), which suggests that at the very least, more responsible reporting could interrupt the cycle by not amplifying already negative feelings.

The overall prevalence of negative framing and subject matter found throughout the article set is in line with previous research which suggests that issues of conflict are more interesting to the public than stories of harmony (Weigold 2001), and potentially more impacting. Wanta et al. (2004) found that negative information provided by the media fostered negative attitudes toward the subject matter (foreign nations), but positive information did not foster positive attitudes. Similar research on attitudes toward climate change found that fear-mongering served to attract people's interest, but failed to inspire personal engagement (O'Neill and Nicholson-Cole 2009). Framing of HLI by the news media could have the same effect of inspiring people to focus on the problem but not engage in proactive behaviour (mitigation). This could be exacerbated by the focus on cause attribution (blame) over responsibility for solution-- a trend seen at every media distribution level. Such findings are important to note when formulating ways to counteract such negative representation. Ultimately, research suggests that dissemination of information on leopards and HLI (O'Bryhim and Parsons 2015) may be more useful to counteract negative perceptions than publishing positive or sympathetic stories (Wanta et al. 2004), and that further, those who possess positive attitudes toward a species are less likely to engage in destructive behavior toward that species (Barney et al. 2005).

The 'man-eater' narrative we found throughout our dataset, though disheartening, is not new and not specific to media focused on HLI. The authors have spotted it in historical Indian wildlife and hunting literature, with more serious accounts of HLI going back a century in the *Journal of Bombay Natural History Society* (JBNHS) *(*several HLI accounts can be found in former JBNHS curator J.C. Daniel's book: *The Leopard in India* (2009)). Perhaps the most famous usage of the term 'man-eater' was narrated in Jim Corbett's book *The Man-Eating Leopard of Rudraprayag*--though it is worth noting that he stated leopards aren't inherently man-eaters (Corbett 1948). The man-eater narrative is also found in

fictional tales, and news stories about leopards that do not feature any interactions between humans and leopards. An example of the latter is a short article from *The Telegraph*, featuring a photo by a professional wildlife photographer of two leopards in a tree. The opening sentence asks readers— "would you spot the leopard hiding in the distance? or, would you be eaten for lunch?" (Molloy 2016: 1). Such inferences that leopards deliberately and frequently prey on humans are misleading, and the authors argue could ultimately harm the public image of the species by invoking unnecessary fear in readers. Bentrupperbäumber (2005: 98) warns that "the way people build up their knowledge of wildlife through media representation … will strongly influence their expectation of and response to future wild encounters." If this statement is accurate, the current framing and agenda setting present in HLI-focused media has the potential to inflame responses to leopards, and therefore the potential to increase instances of negative human-leopard interactions.

While there is no current research quantifying how much fear is directly provoked by HLI-focused media, research has clearly demonstrated that negative media coverage can increase negative feelings toward the subject (Wanta et al. 2004), and that disproportionate fear of leopards can result in negative courses of action. For example, Athreya et al. (2016) note that human attacks on leopards, such as beating or poisoning, are often carried out by people who fear leopards foraging in close proximity to their homes. However, research has shown that people's fears may be disproportionate to the risks that leopards pose. At worst, when such fears can result in rash action, and lead to negative interactions between humans and leopards. Inskip and Zimmerman (2009) note that in most cases, instances of leopard attacks are a consequence of other determinants of conflict, such as decreased habitat or prey availability, livestock husbandry, human behaviour, and activity patterns, rather than man-eating tendencies. Athreya et al. (2016) also suggest that risks to livestock may be disproportionately feared in some localities, with their research showing that leopard predation on valuable livestock was lower than expected with high percentages of domestic dogs and cats making up their prey base. If our article set is representative of the scope of HLI media, we can confidently say that readers are being presented with a very different narrative than is presented in the scientific literature; one that suggests to them that man-eating leopards are common and something to fear.

A similar man-eater narrative has been built around sharks. Research suggests that negative stereotypes surrounding sharks are one of the greatest hindrances to their conservation, and that the media has played an instrumental role in fostering these stereotypes. Specifically, O'Bryhim and Parsons (2015: 1) state that "inaccurate information and melodramatic depictions" lead the public to greatly misunderstand, and consequently fear, sharks. Other research found that something as simple as the type of music played when people are viewing footage of sharks can have an effect on how they feel about them. Nosal et al. (2016) found that the dramatic background music that

often accompanies shark footage causes people to view them more negatively, though positive music or silence led to more positive opinions. Though television/film is a different type of media than written news articles, such research is a testament to how easily public opinion can be swayed to the negative.

This study highlights that what is currently being presented to the public is not representative of the full scope of HLI, though how skewed, and in what manner depends on media source. Our three distribution levels had varied levels of association with HLI events; as such, the authors suggest that the differences in representation found are likely related to how intimately connected the media source and its readers are to HLI. These results could be useful for informing wildlife managers and proactive journalists of how knowledge of HWI is deficient in different locations, and consequently, what steps to take to fix these biases. Conservation academics such as the authors must be active in providing findings such as these to media outlets. This type of collaborative work between academics, managers, and media is exemplified by a series of seven media workshops held in April 2015 across several high-conflict states in India by Wildlife Conservation Society, India (Athreya and Vasudev 2015). The results of this paper can also be particularly useful at the local level, where improved HWI reporting could be integrated into mitigation strategies, in conjunction with more standard mitigation plans (e.g., response teams, trap and release).

This study had several shortcomings. First and foremost, a complete focus on English-language articles gives us only a glimpse into how HLI is being presented in India. For a better understanding, further research should be conducted using local-language publications, as it is likely issues are treated differently. Secondly, combining all of the local articles together did not allow us to look at differences between regions. A new study will need to be done to understand local differences in reporting, with a special focus on Assam. Careful inspection of the data suggests that many of the local *leopard as victim* and *sympathy inducing* stories are sourced from this state, suggesting they may be uniquely sympathetic. However, since 40% of our local articles were from Assam, it is hard to determine if this is an artifact of Assam's overrepresentation within this dataset. Third, the news is disseminated not only by large news outlets but evermore by web-based formats such as micro-blogging sites. The inclusion of these types of web-based outlets should be part of future related research that will likely show differences to other more traditional types of news outlets. Lastly, clear attempts to prescribe emotions to readers were prominent in our data-set, though we cannot say how this affects readers, we can only infer possible effects based on existing research. Future studies should be devised to determine how the media is functionally influencing people.

The Indian landscape has historically supported a wide assemblage and diversity of wildlife, while many other countries are experiencing the colonisation of past territories by wildlife (Chapron et al. 2014). However, our knowledge of human-wildlife interactions is extremely poor (Ghosal et al. 2013) and we need to adopt an interdisciplinary framework to be able to mitigate interactions in a manner that is inclusive of human dimensions-- part of which concerns changing how those affected think about interactions with leopards, as well as those outside of HLI areas who have power as policy-makers or donors.

REFERENCES

Athreya, V., M. Odden, J.D.C. Linnell, and K.U. Karanth. 2011. Translocation as a tool for mitigating conflict with leopards in human dominated landscapes of India. *Conservation Biology* 25(1):133–141.

Athreya, V., M. Odden, J.D.C. Linnell, J. Krishnaswamy, and U.K. Karanth. 2013. Big cats in our backyards: persistence of large carnivores in a human dominated landscape in India. *Public Library of Science ONE* 8: e57872.

Athreya, V. and D. Vasudev 2015. Media workshops to improve reporting of human–wildlife interactions. *Oryx* 49(4): 579–580.

Athreya, V., M. Odden, J.D.C. Linnell, J. Krishnaswamy, and U.K. Karanth. 2016. A cat among the dogs: *leopard Panthera pardus* diet in a human-dominated landscape in western Maharashtra, India. *Oryx* 50(1): 156–162.

Barney, E.C., J.J. Mintzes, and C.F. Yen. 2005. Assessing knowledge, attitudes, and behavior toward charismatic megafauna: the case of dolphins. *The Journal of Environmental Education* 36(2): 41–55.

Barua, M. 2010. Whose issue? representations of human-elephant conflict in Indian and international media. *Science Communication* 32(1): 55–75.

Bhatia, S., V. Athreya, R. Grenyer, and D.W. Macdonald. 2013. Understanding the role of representations of human–leopard conflict in Mumbai through media-content analysis. *Conservation Biology* 27(3): 588–594.

Boissonneault, M.F., W. Gladstone, P. Scott, and N. Cushing. 2005. Grey nurse shark human interactions and portrayals: a study of newspaper portrayals of the grey nurse shark from 1969-2003. *Electronic Green Journal* 1(22).

Burstein, P. 2003. The impact of public opinion on public policy: a review and an agenda. *Political Research Quarterly* 56(1): 29–40.

Bentrupperbäumber, J. 2005. Human dimension of wildlife interactions. In: *Wildlife tourism*. (eds. Newsome, D., R. Dowling, and S. Moore). Pp. 82–112. Clevedon: Channel View Publications.

Butler, J.A., J.D.C. Linnell, D. Morrant, V. Athreya, N. Lescureux, and A. McKeown. 2014. Dog eats dog, cat eats dog: socio-ecological dimensions of dog predation by wild carnivores. In: *Free-ranging dogs and wildlife conservation*. (ed. Gompper, M). Oxford: Oxford University Press.

Chapron, G., P. Kaczensky, J.D. Linnell, M. Von Arx, D. Huber, H. Andrén, L. Balčiauskas et al. 2014. Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science* 346 (6216): 1517–1519.

Chaturvedula, S. 2014. Study on the leopard human conflict in Andhra Pradesh and implementing mitigation measures by spreading awareness. http://www.rufford.org/files/Study%20on%20the%20Leopard%20Human%20Conflict%20in%20Andhra%20Pradesh.pdf. Accessed on April 17, 2015.

Chaudhari, R.D., A.N. Khadse, and P.C. Mane. 2013. Changing scenario of the leopard, *Panthra pardus fusca* (Myer, 1794) population in ghod project forest division, Junnar, Maharashtra, India. *European Journal of Zoological Research* 2(6): 16–21.

Corbett, J. 1948. *The man-eating leopard of Rudraprayag*. Oxford: Oxford University Press.

Daniel, J.C. 2009. *The leopard in India: a natural history*. Dehradun, India: Natraj Publishers.

De Swert, K. 2012. Calculating inter-coder reliability in media content analysis using Krippendorff's Alpha. Accessed on March 15, 2015.

de Vreese, C. and H. Boomgaarden. 2003. Valenced news frames and public support for the EU. *Communications* 28(4): 361–381.

Ducarme, F., G.M. Luque, and F. Courchamp. 2013. What are "charismatic species" for conservation biologists. *BioSciences Master Reviews* 10: 1–8.

Dwivedi, O.P. 1990. Satyagraha for conservation: awakening the spirit of Hinduism. In: *Ethics of environment and development: global challenge, international response* (eds. Engel, J.R. and J.G. Engel) Pp. 201–212. London: Belhaven Press

Entman, R.M. 2007. Framing bias: media in the distribution of power. *Journal of Communication* 57(1): 163–173.

Flynn, J., P. Slovic, and H. Kunreuther (eds.). 2001. *Risk, media and stigma: understanding public challenges to modern science and technology*. London: Earthscan.

Freelon, D. and G. ReCal. 2010. Intercoder reliability calculation as a web service. *International Journal of Internet Science* 5(1): 20–33.

Gore, M. L. and. B.A. Knuth. 2009. Mass media effect on the operating environment of a wildlife related-risk-communication campaign. *Journal of Wildlife Management* 73(8): 1407–1413.

Goswami, V.R., K. Medhi, J.D. Nichols, and M.K. Oli. 2015. Mechanistic understanding of human–wildlife conflict through a novel application of dynamic occupancy models. *Conservation Biology* 00: 1–11.

Goyal, S.P., D.S. Chauhan, M.K. Agrawal, and R. Thapa. 2000. *A study on distribution, relative abundance and food habits of leopard (Panthera pardus) in Garhwal Himalayas*. Technical report. Dehradun, India: Wildlife Institute of India.

Gullo, A., U. Lassiter, and J. Wolch. 1998. The cougar's tale. In: *Animal geographies: place, politics and identity in the nature-culture borderlands* (eds. Wolch, J. and J. Emel). Pp 139–140. New York, NY: Verso.

Ghosal, S., V.R. Athreya, J.D. Linnell, and P.O. Vedeld. 2013. An ontological crisis? a review of large felid conservation in India. *Biodiversity and Conservation* 22(11): 2665–2681.

Ghosal, S. and D.J. Kjosavik. 2015. Living with leopards: negotiating morality and modernity in Western India. *Society & Natural Resources* 28(10): 1092–1107.

Hesselink, F., W. Goldestein, P.P. van Kempen, T. Garnett, and J. Dela. 2007. Communication, education and public awareness (CEPA). In: *A toolkit for National Focal Points and NBSAP Coordinators*. Pp. 310. Montreal, Canada: Secretariat of the Convention on Biological Diversity and IUCN.

Inskip, C. and A. Zimmermann. 2009. Human–felid conflict: a review of patterns and priorities worldwide. *Oryx* 43(1): 18–34.

Kalland, A. 2009. *Unveiling the whale: discourses on whales and whaling*. Oxford: Berghahn Books.

Karanth, K.U. and M.D. Madhusudan. 2002. Mitigating human - wildlife conflicts in Southern Asia. In: *Making parks work: identifying key factors to implementing parks in the tropics* (eds. Terborgh, J., C.P. van Schaik, M. Rao and L.C. Davenport). Pp. 250–264. Covelo, CA: Island Press.

Krippendorff, K. 2004. Reliability in content analysis. *Human Communication Research* 30(3): 411–433.

Kühne, R. 2014. Political news, emotions, and opinion formation: toward a model of emotional framing effects. In: *Annual Conference of the International Communication Association (ICA), Phoenix, AZ*. http://130.60.130.4/publications/workingpaper/pdf/wp_68.pdf. Accessed on June 2, 2016.

Land, G. 2015 India: The challenge of living with leopards. http://asiancorrespondent.com/129783/india-the-challenge-of-living-with-leopards/. Accessed on April 17, 2015.

Marker, L. and S. Sivamani. 2009. Policy for human-leopard conflict management in India. *CAT News* 50: 23–26.

McComas, K. 2006. Defining moments in risk communication research: 1996-2005. *Journal of Health Communication* 11(1):75–91.

McCombs, M. 2013. *Setting the agenda: the mass media and public opinion*. Cambridge, MA: John Wiley & Sons.

McCombs, M.E. and D.L. Shaw. 1972. The agenda-setting function of mass media. *Public Opinion Quarterly* 36(2): 176–187.

Molloy, M. 2016. Can you spot the sneaky leopard hiding in this photo? http://www.telegraph.co.uk/news/2016/04/06/can-you-spot-the-sneaky-leopards-hiding-in-this-photo/. Accessed on April 1, 2016.

Muter, B.A., M.L. Gore, K.S. Gledhill, C. Lamont, and C. Huveneers. 2013. Australian and U. S. news media portrayal of sharks and their conservation. *Conservation Biology* 27(1):187–196.

Nosal, A.P., E.A. Keenan, P.A. Hastings, A. Gneezy. 2016. The effect of background music in shark documentaries on viewers' perceptions of sharks. *Public Library of Science ONE* 11(8): e0159279.

O'Bryhim, J.R. and E.C.M. Parsons. 2015. Increased knowledge about sharks increases public concern about their conservation. *Marine Policy* 56(2):43–47.

O'Neill, S. and S. Nicholson-Cole. 2009. "Fear won't do it" promoting positive engagement with climate change through visual and iconic representations. *Science Communication* 30(3): 355–379.

Price, V. and D. Tewksbury. 1997. News values and public opinion: a theoretical account of media priming and framing. *Progress in Communication Sciences* 13(1): 173–212.

Quammen, D. 2004. *Monsters of God: the man-eating predator in the jungles of history and the mind*. New York,NY: W. W. Norton & Company.

R Development Core Team. 2013. *R: a language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0. http://www.R-project.org. Accessed on March 15, 2015.

Raza, R.H., D.S. Chauhan, M.K.S. Pasha, and S. Sinha. 2012. *Illuminating the blind spot: a study on illegal trade in leopard parts in India (2001-2010)*. New Delhi: TRAFFIC India/WWF India.

Scheufele, D.A. and D. Tewksbury. 2007. Framing, agenda setting, and priming: the evolution of three media effects models. *Journal of Communication* 57(1): 9–20.

Semetko, H.A. and P.M. Valkenburg. 2000. Framing European politics: a content analysis of press and television news. *Journal of Communication* 50(2): 93–109.

Shaffer, M.S. 2015. A transnational wildlife drama: Dian Fossey, popular environmentalism, and the origins of gorilla tourism. *American Quarterly* 67(2): 317–352.

Treves, A. and K.U. Karanth. 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology* 17(6): 1491–1499.

Wanta, W., G. Golan, and C. Lee. 2004. Agenda setting and international news: media influence on public perceptions of foreign nations. *Journalism & Mass Communication Quarterly* 81(2): 364–377.

Weigold, M. F. 2001. Communicating science: a review of the literature. *Science Communication* 23(2): 164–193.