

Media coverage of management of the black bear *Ursus thibetanus* in Japan

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Abstract Asiatic black bears *Ursus thibetanus* are threatened in Japan but are generally considered to be nuisance animals because of the damage they cause to agriculture and property, and because they cause human casualties. We analysed media coverage of black bears in Japan to understand social discourse and potential influences on public perceptions about conservation of bears. Content analysis of a total of 348 articles in a local and a national newspaper revealed that the number of articles regarding black bears and the proportion of negative articles that describe the risks posed by bears increased concomitant with a rise in sightings of bears. Local newspapers included more articles about the risks posed by bears than national newspapers. This potentially reflects and can amplify local residents' perceptions of risk. The proportion of thematic and episodic articles was unrelated to increases in bear appearances. More extensive communications with media representatives by biologists, government officials and police are needed to enhance public knowledge of bears and lead to broader perspectives on their management.

Keywords Asiatic black bear, conflict, content analysis, Japan, media, newspaper, risk, *Ursus thibetanus*

Introduction

The Asiatic black bear *Ursus thibetanus* is categorized as Vulnerable on the IUCN Red List (Garshelis & Steinmetz, 2008) and has an estimated population of 8,400–12,600 in Japan (based on data obtained before 2000; Japan Bear Network, 2007). In rural areas of Japan human–bear conflicts include damage to agriculture and forestry crops as well as human casualties (Japan Bear Network, 2007; Ministry of the Environment, 2008). Previous studies have found that people living near bear habitat in Japan tend to fear bears and have negative

attitudes toward them, preferring to destroy bears that appear near a village (Kameda et al., 2007; Ministry of the Environment, 2007; Uchikoshi, 2007). In the drought of 2006, when large numbers of bears appeared around human settlements, 4,846 black bears were captured and most (4,340) were killed (Ministry of the Environment, 2008). This mortality may have accounted for c. 50% of the total population (Japan Bear Network, 2007). In the same year 142 people were injured and three were killed by black bears (Ministry of the Environment, 2008). In general, residents' response when they see bears near settlements is to call local government officials or police who in turn ask licensed hunters to kill the bears (Huygens et al., 2001, 2004; Japan Bear Network, 2007). Because there are few local or prefectural agencies that deal with wildlife issues in Japan, police officers handle most wildlife issues (Yamanaka, 2006). Residents' negative attitudes and perception of risks from bears have been identified as obstacles to conservation and sustainable management of bears in Japan (Roy, 1998; Sakurai & Jacobson, 2011).

Factors that influence people's perceptions about an issue include social norms (Manfredo, 2008), value (Decker et al., 2001), knowledge (Hungerford & Volk, 1990), direct and indirect experience (Millar & Millar, 1996), and media coverage (Slovic, 1987; Detjen, 1995; Muter et al., 2009). News stories can potentially affect public perception of wildlife and how it should be managed (Siemer et al., 2007). Wildlife species often become newsworthy when their management becomes controversial, or tragic incidents, such as a wildlife-related fatality, occur (Gore et al., 2005; Siemer et al., 2007). Human–wildlife conflicts are frequently covered in newspapers (Muter et al., 2009) and in Japan wildlife controversies routinely appear in the press (Knight, 2003). As described below, the media have a dual role in both framing and reflecting public opinion.

Risk perception is the instinctive judgement that people generally form through learning about a hazard (Slovic, 1987) and can influence people's attitudes, beliefs and behaviours (Gore et al., 2005). The social amplification of risk is a concept based on a combination of the consequence of actual events and psychological, social and cultural processes (Jaeger et al., 2001). This concept suggests that mass media can amplify people's concern about a specific risk event even when the actual risk is relatively low (Gore et al., 2005). The media's tendency to describe a situation as more dangerous than it really is can increase people's perception of risk; e.g. crime reporting can lead to short-term panic about crime (McQuail, 2005).

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Received 7 January 2012. Revision requested 2 March 2012.

Accepted 8 June 2012.

The media have a dual role in influencing public opinion and reflecting public perception and political agendas (Boykoff & Rajan, 2007). In general, the media influence people's perception and opinion through agenda-setting and framing effects (Price et al., 1997). An agenda-setting effect refers to the selection of newsworthy stories that can lead audiences to a specific 'media-induced' view (Price et al., 1997). For example, the number of stories or the length of articles published about a topic can influence whether the public think that an issue is important or not. The framing effect describes how media framing (the way incidents and issues are portrayed) affects how audiences understand them (Price et al., 1997).

Although television and the Internet have become the main sources for news, newspapers are still an important way for the public to learn about social issues (Pew Research Center, 2008). In Japan most citizens depend on newspapers for general information. Japan is known as the 'newspaper country', with the world's three largest circulation newspapers: *Yomiuri* with a circulation of 14,067,000, *Asahi* with 12,121,000, and *Mainichi* with 5,587,000 (Pharr & Krauss, 1996; World Association of Newspapers, 2005). Japan's newspapers can be expected to influence people's awareness and attitudes towards a specific topic because of agenda-setting and framing effects (Mikami et al., 1995). A survey of rural residents in Japan revealed that newspapers were an important source of information regarding bears and bear issues (Sakurai et al., 2012). The negative attitudes of rural Japanese towards bears (Uchikoshi, 2007; Ministry of the Environment, 2007; Sakurai & Jacobson, 2009) emphasize the importance of analysing how newspapers are reporting about bears.

Although news stories can influence people's perception of human-wildlife interactions, few studies have attempted to understand news coverage of wildlife problems and their influence on public opinion (Siemer et al., 2007). Gore et al. (2005) found that mass media reports of the first fatality caused by a bear *Ursus americanus* in New York did not affect people's risk perception after the incident and suggested this might be because the media reported the incident with statistical data showing how rare the incident was. A study of news coverage about cougars *Puma concolor* in California found that during the 1990s, when human-cougar conflicts increased, news articles became negative, yet editorial coverage remained supportive of cougar conservation (Wolch et al., 1997). Another study found that news coverage of bears in New York tended to be episodic rather than thematic (i.e. focusing on specific incidents rather than providing information about general management activities) and that coverage blamed problems on residents rather than the wildlife agency (Siemer et al., 2007). News coverage of the Florida panther *Puma concolor coryi* found more reports about the risks from panthers in

local newspapers published near panther habitat but overall risks from panthers were portrayed as consistently low (Jacobson et al., 2012). The question of whether the media cause social amplification of risk from wildlife is still largely unanswered and more research is needed in this area. One of a few studies on media coverage of environmental issues in Japan suggested that agenda-setting effects of newspapers on public perception are long-term and cumulative in nature (Mikami et al., 1995).

In Japan biologists have contended that mass media negatively affect how people perceive bears (e.g. causing them to assume bears are always dangerous) by featuring only fatal attacks by bears (Japan Bear Network, 2007; Yokoyama, 2009). However, little research has been conducted to analyse the actual characteristics of media coverage regarding bear-related issues and risk amplification in the country.

This study used a content analysis of media coverage of bears to assess how newspapers portray bears and bear-related incidents, and the implications of these matters for better management. Content analysis is a systematic evaluation of text or images used in the communication context that can be replicable using valid measurement methods (Lombard et al., 2002; Riffe et al., 2005). We compared coverage during years with high and low bear appearance rates and between local coverage (in bear habitat) and national coverage, for 2005–2007. To understand how black bears are portrayed and bear incidents are reported we selected 2006 (actually April 2006–March 2007) because of the large number of bears that appeared in and near towns because of lack of food in forests (Japan Bear Network, 2007), which resulted in some of the highest numbers of bears captured and killed, as well as human injuries, on record (Ministry of the Environment, 2008). In contrast, 2005 (actually April 2005–March 2006) had relatively few bears appearing around residential areas, with a typical annual number of human injuries ($n = 56$) and bears being culled ($n = 719$) (Ministry of the Environment, 2008). Understanding how the media portrayed the bear incidents as public issues can help wildlife managers improve public outreach and collaboration with stakeholders and residents in the management and policy-making processes.

Our study tested two hypotheses based on predicted differences in newspaper coverage related to the frequency of bear appearances and proximity to risk. These were (Hypothesis 1) during years of high bear appearances, newspapers will publish (a) more (b) longer (c) more episodic, and (d) more negative articles than in years with low bear appearances, and (Hypothesis 2) the local newspaper with a circulation in areas in close proximity to bear risk will publish more negative articles emphasizing risk than the national newspaper.

Methods

We examined and coded newspaper articles on bear-related issues published from April 2005 to the end of March 2007. We chose the *Yomiuri*, the largest newspaper in the world by circulation, which is published nationally (World Association of Newspapers, 2005) and *Shinano Daily*, the most popular newspaper in Nagano prefecture, with a circulation of c. 488,000 (Hamada et al., 2009). We chose Nagano because the prefecture had the highest number of bears captured (704 bears) and human injuries (16 cases) in 2006.

The majority of articles that discussed bears in the *Yomiuri* used the word クマ (the Japanese Katakana character for 'bear') to refer to both Asiatic black bear and brown bear *Ursus arctos*, which also inhabits Japan. We used an electronic search engine to identify those articles that included クマ in the text and identified 1,046 articles in 2005 (from April 2005 to March 2006) and 1,462 articles in 2006 (from April 2006 to March 2007). Articles in the *Shinano Daily* used 熊 (the Chinese character meaning bear) to refer to both Asiatic black bear and brown bear. We searched the *Shinano Daily* for articles that included 熊 in the text and identified 764 articles in 2005 (from April 2005 to March 2006) and 913 articles in 2006 (from April 2006 to March 2007). We eliminated articles that did not mention the Asiatic black bear specifically in the headline. This narrowed the samples to 194 articles in 2005 and 624 articles in 2006 in *Yomiuri* and 31 articles in 2005 and 118 articles in 2006 in *Shinano Daily*. For an adequate sample size (Lombard et al., 2002) we randomly chose 100 articles each from 2005 and 2006 in the *Yomiuri* and included all the articles from the *Shinano Daily*. Of the 100 *Yomiuri* articles selected from 2005 we had to eliminate one article during analysis because of a lack of context.

A coding sheet explaining categories and criteria for coding articles was created based on prior content analysis of bear-related media coverage in the USA (Gore et al., 2005; Siemer et al., 2007). Two coders were trained to use this coding sheet and record their responses in a spreadsheet. Categories of code included 'topics discussed', 'impact of bear issues covered' (e.g. economic, health and safety, psychological, ecological, and social), 'types of solutions discussed', 'risks portrayed', and 'sources used for the information'.

To assess reliability between coders we used both percentage agreement and Scott's Pi, which attempts to account for random agreement between coders (Riffe et al., 2005). After training the coders evaluated 10 dummy articles about black bears published in a different newspaper (*Asahi*) in 2005 and reached 92.4% agreement. Coders reviewed each variable that had different coding results to improve coding and increase the agreement level. A second evaluation, using 10 different dummy articles, resulted in 93.0% agreement.

We also conducted Scott's Pi test for the sample articles ($n = 29$) of *Yomiuri* (from 2005) that both coders evaluated for this study. Overall, the Scott's Pi value was 0.74. Both the Scott's Pi and percent agreement reliability tests indicated adequate reliability for this study.

We used analysis of variance (ANOVA) and χ^2 tests to identify differences between comparison groups, with a probability of < 0.05 to designate significance. SPSS v. 18 (SPSS Inc., Chicago, USA) was used for these analyses.

Results

Article length and frames

The mean number of words per article was $332 \pm \text{SD } 297$ for the national newspaper in 2005 and $365 \pm \text{SD } 261$ in 2006. The mean number of words in the local newspaper was $380 \pm \text{SD } 156$ in 2005 and $499 \pm \text{SD } 236$ in 2006. Articles in the local newspaper were significantly longer than in the national newspaper ($F = 7.966, P < 0.01$), and articles in the high bear appearance year (2006) were significantly longer in both newspapers ($F = 5.545, P < 0.05$), supporting Hypothesis 1.

The majority of articles used episodic frames (65%) more often than thematic frames (26%). The national newspaper published significantly more episodic stories than the local newspaper ($F = 6.538, P < 0.05$). The percentage of episodic articles decreased from 77% in 2005 to 68% in 2006 but this difference was not significant, although the difference within each newspaper was. The percentage of episodic articles in the national newspaper in 2006 (89%) was significantly higher than in 2005 (75%; $\chi^2 = 4.798, P < 0.05$). For the local newspaper the percentage of episodic articles in 2006 (50%) was significantly lower than in 2005 (85%; $\chi^2 = 9.453, P < 0.01$). The results for the national newspaper, but not for the local newspaper, therefore support Hypothesis 1 (that the year with fewer bear appearances would result in articles with more thematic frames).

Coverage of bear-related risks

Articles that mentioned the probability of threats or attack by bears increased from 36% in 2005 to 61% in 2006 ($\chi^2 = 18.440, P < 0.01$). More articles referred to increased bear-related risk in 2006 than in 2005 ($\chi^2 = 26.832, P < 0.01$). This finding supports the last prediction of Hypothesis 1 (that the year of high bear appearances would have more negative articles about bears). Articles mentioning that bear-related risk was unacceptable increased from 58% in 2005 to 62% in 2006 but this increase was not statistically significant.

The local newspaper published more articles that mentioned the probability of threats or attack by bears

TABLE 1 Percentage frequencies of the most mentioned topics, effects of bears, solutions, and sources of information in national and local newspapers in Japan in 2005 (April 2005–March 2006) and 2006 (April 2006–March 2007). The three most common items are presented in each group.

	National newspaper		Local newspaper		Mean
	2005 (n = 99)	2006 (n = 100)	2005 (n = 31)	2006 (n = 118)	
Most mentioned topic					
A problem interaction with bears	49	57	32	69	56
Government's response to a bear incident	40	43	58	59	49
Bear sighting	40	54	58	43	47
Most mentioned effect & interaction					
Worry or fear about human injuries caused by bear	46	46	52	61	51
Damage caused by bears to either property or humans	38	29	32	49	39
Human injuries or deaths caused by black bears	35	24	23	42	33
Most mentioned solution					
Teach people how to live with bears	51	45	61	54	51
Increase warnings & be more careful	49	43	52	44	46
Trapping & moving bears	5	8	23	32	17
Most mentioned source of information					
Police	46	45	19	10	31
Local government	19	14	45	33	25
Prefectural government	23	19	10	25	22

($\chi^2 = 13.355$, $P < 0.01$), bear-related risk as unacceptable ($\chi^2 = 11.297$, $P < 0.01$), and bear-related risk as increasing ($\chi^2 = 19.357$, $P < 0.01$) than the national newspaper. Also, the local newspaper had more articles that used negative words (*kowai*: scary; *osoroshii*: awful; *kiken*: dangerous; *abunai*: dangerous) than the national newspaper ($\chi^2 = 9.212$, $P < 0.01$). These findings support Hypothesis 2.

Topics covered in articles

The three most common topics were: 'a problem interaction with bears', 'government's response to a bear incident', and 'bear sighting' (Table 1). Topics about 'education' or 'bear conservation' were mentioned in < 20% of articles. There were more articles about 'a problem interaction with bears' in 2006 than in 2005 ($F = 14.004$, $P < 0.01$). The national newspaper had more articles regarding 'police response to a bear incident' ($F = 13.882$, $P < 0.01$) and the local newspaper had more articles about 'relocation of bears' ($F = 15.963$, $P < 0.01$).

Commonly mentioned impacts of bears included 'worry or fear about human injuries caused by bears', 'damage caused by bears to either property or humans', and 'human injuries or deaths caused by black bears' (Table 1). Neither newspaper location nor year had a significant effect on portrayal of bear impacts. Ecological issues such as concern about maintaining a viable bear population were mentioned in only 7% of articles.

The most mentioned solutions to human–bear conflicts presented in the articles were 'teach people how to live with

bears', and 'increase warnings and be more careful' (Table 1). More than 10% of articles mentioned: 'trap and move bears' (17%), 'lethal control of individual problem bears' (15%), 'make noise while walking in the mountain' (13%), and 'capture and release with aversive conditioning to let bears become afraid of people' (11%). Among those solutions, 'trapping and moving bears' ($F = 22.751$, $P < 0.01$) and 'capture and release with aversive conditioning to let bears become afraid of people' ($F = 14.201$, $P < 0.01$) were mentioned more frequently in the local newspaper than in the national newspaper. 'Lethal control of individual problem bears' ($F = 13.572$, $P < 0.01$) and 'capture and release with aversive conditioning to let bears become afraid of people' ($F = 4.866$, $P < 0.05$) were mentioned more often in 2006 than in 2005.

The probability of threats or attacks was discussed in 51% of articles but only 1% provided supporting statistics. Most articles mentioned that 'the level of bear-related risk is unacceptable' (61%), and 17% of articles mentioned that 'bear-related risk is increasing' (Table 2).

Sources of information in the articles were mostly from the 'police' (31%), 'local government' (25%), 'prefectural government' (22%), 'regular citizens' (19%), 'researchers' (16%), and 'hunters' (10%; Table 1). Among these information sources, 'police' was mentioned more frequently in the national newspaper ($F = 32.340$, $P < 0.01$) whereas 'local government' ($F = 18.733$, $P < 0.01$), 'regular citizens' ($F = 6.856$, $P < 0.01$), and 'researchers' ($F = 16.655$, $P < 0.01$) were mentioned more often in the local newspaper.

TABLE 2 Percentages of reports of risk and negative wording regarding bears in national and local newspapers in 2005 (April 2005–March 2006) and 2006 (April 2006–March 2007).

	National newspaper		Local newspaper		Mean
	2005 (n = 99)	2006 (n = 100)	2005 (n = 31)	2006 (n = 118)	
Probability of threats or attack by bears	32.3	53.0	48.3	66.9	51
Increase of bear-related risk	2.0	16.0	6.5	33.1	17
Bear-related risk is unacceptable	52.5	53.0	74.2	70.3	61
Articles with negative words (see text)	3.0	1.0	6.5	11.0	5

Discussion

Japan is known as one of the ‘most media-saturated societies in the world’ (Pharr & Krauss, 1996). Newspapers are important for the majority of citizens (Minami, 2009) and are one of the most important sources of information regarding wildlife and wildlife issues in the country (Sakurai et al., 2012). Because of this saturation, public perception of black bears and conflicts with bears both influence and could be influenced by how newspapers report these issues.

We found that most articles about black bears related to problematic interactions with bears, worry or fear about injuries by bears, and damage by bears to property or humans; i.e. most articles were about human–bear conflicts. These findings are similar to those of Gore et al. (2005) and Siemer et al. (2007), who found that wildlife topics appear in the news most often when wildlife causes problems for humans. The majority of articles mentioned ‘teaching people how to live with bears’ and ‘increasing warnings to be careful’ as potential solutions to the problems; thus, more articles explained the need to change human behaviour rather than the need to eliminate bears to reduce the conflicts. However, most bears that appeared or were captured in 2006 were destroyed (Ministry of the Environment, 2008). This discrepancy shows that although the importance of human actions (e.g. increasing residents’ knowledge and conducting interventions to reduce human–bear conflicts) was emphasized in the media, in reality destroying bears remained the primary management action. This could be related to various factors such as lack of staff to educate residents and/or lack of government resources to translocate bears (Japan Bear Network, 2007), or it may reflect residents’ negative attitudes and intolerance towards bears (Sakurai & Jacobson, 2011).

Bear-related risk was mentioned more in the high bear appearance year (2006) and in the local rather than national newspaper, as predicted. It is likely that the more often newspapers mention the risk of bears, the higher readers’ perception of the risks posed by bears becomes, potentially affecting people’s attitudes toward the animals (Muter et al., 2009). The fact that people’s attitudes towards bears tend to be more negative in rural than urban areas (Hosoda et al.,

2009; Tsubota & Yamazaki, 2011) may simply reflect their closer proximity to the threat but may also be explained by the potential influence of the media in amplifying the perception of risk (Gore et al., 2005).

Less than 2% of the articles identified the risk with any supporting statistics about the frequency of risk. This finding is different from a study in New York, in which 60% of bear-related articles explained risk with supporting statistics; e.g. ‘1 out of 5 million encounters with bears generates a fatal attack’ (Gore et al., 2005). However, people’s risk perception may not change even if they are aware of experts’ assessment of the real possibility of threats, especially if the hazard is not controllable (Slovic, 1987; Thornton & Quinn, 2010).

The primary information sources about bears cited in Japanese newspapers were the police, rather than government environmental personnel or wildlife experts at universities or NGOs. In Japan it is usually the police who resolve wildlife-related problems and discuss the conflict with the press, as local or prefectural agencies do not specifically deal with wildlife issues. This can result in reporting that does not cover the full range of management or conservation options and issues.

The proportion of thematic and episodic frames presented in the articles changed from 2005 to 2006. Episodic articles increased in the national newspaper, which supported our hypothesis and mirrored the result of a study in New York that found more bear encounters would result in more episodic articles (Siemer et al., 2007). In contrast, thematic articles increased in the local newspaper. Thematic articles, explaining why bear incidents are increasing and how general human–bear conflicts occur around the country, also increased in the year of high bear appearance. This may be because the local risks made the topics more salient for reporters, editors and the public. This was also found in a study in Florida, where newspapers published thematic articles about panthers, reflecting public interest in this issue (Jacobson et al., 2012).

Previous studies have found that local residents living adjacent to bear habitats in Japan tend to have negative attitudes towards bears, preferring them to be killed (Huygens et al., 2001; Uchikoshi, 2007; Sakurai & Jacobson, 2011). Most of the bears captured in 2006 were

killed, which seemed to address local residents' demands, although the high mortality may have affected the bear population (Tsubota & Yamazaki, 2011). Newspapers have the potential to influence people's perception of a topic (Detjen, 1995; Muter et al., 2009), and officials in the Ministry of the Environment could reach out to reporters to ensure that bear incidents are accurately reported and that the conservation context and full range of management issues become part of public discourse about bears.

Currently, articles about bears appear in newspapers when bears cause problems, and articles that explain the ecological aspects of bears are limited. To improve public knowledge about bears and present broader perspectives about bear-related issues, researchers and government officials must work together to provide objective, scientifically based information to the press. When reporting bear incidents newspapers need to receive appropriate statistics regarding the possibilities of risk. Although understanding the frequency of a threat does not necessarily prevent people from having negative responses to dramatic incidents (Riley & Decker, 2000), scientific data can nevertheless help people have a more accurate perception of the risks. Newspapers can play a role in disseminating accurate information from reliable sources (Mikami et al., 1995). Conservation of bears in Japan will depend in part on the effective use of newspapers as a means of outreach by biologists and government officials.

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