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Refining Online Communication Strategies for Domestic Cat Management

Lynette J. McLeod[*]**, Aaron B. Driver**[*†]**,
Andrew J. Bengsen**[‡]**, and Donald W. Hine**[*]

[*]*School of Behavioural, Cognitive and Social Sciences, University of New England, Armidale, Australia*
[†]*ContentLogic, 1/173A Beardy Street, Armidale, Australia*
[‡]*Vertebrate Pest Research Unit, NSW Department of Primary Industries, Orange, Australia*

*Address for correspondence:
Lynette McLeod,
School of Behavioural,
Cognitive and Social
Sciences,
University of New England,
NSW 2351, Australia.
E-mail:
lmcleod7@une.edu.au*

*Supplemental files for this
paper are available online.*

ABSTRACT Management of the domestic cat (*Felis catus*) relies on community members adopting appropriate management practices toward both companion and unowned (stray, free-living) animals. Getting people to change their behavior and sustain these changes over time can be a challenging process. To date, very few studies have evaluated the effectiveness of interventions aimed at changing people's behavior toward these cats. This study provides a quantitative and qualitative content analysis of a sample of online cat management communications from 40 different organizations sourced using a general English language web search in 2014/2015. The potential effectiveness of these interventions was assessed using identified best-practice principles of behavior change and persuasive communication. Education through the provision of fact-based information to persuade individuals to change their current behaviors was the most popular behavior-change strategy (88%). Three-quarters of the interventions only scored average or below on the scales that described the ease of use and ability to promote action. Persuasive communication techniques such as commitment, prompts, goal setting, story-telling, descriptive norms, and likable and identifiable messengers were under-used. Other techniques such as the debunking of misinformation and framing of messages were not used effectively. We make suggestions on how to improve the behavioral effectiveness of cat management intervention designs.

Keywords: communication audit, content analysis, *Felis catus*, human behavior change, persuasive communication

Creating sustained human behavior change is rarely a simple process. Increasing awareness and educating people about an issue and providing behavioral instruction is seldom enough (Andreasen, 1995; Hini, Gendall, & Kearns, 1995; Kollmuss & Agyeman, 2002). There are many theories of human behavior that provide a deep understanding of factors that influence human decision-making, behavior choice, and behavior change. This knowledge can be used to identify leverage points to initiate and sustain change, and has been successfully applied to develop interventions across many disciplines and contexts such as human health (e.g., smoking and exercise interventions) and pro-environmental behavior (e.g., recycling and water conservation) (Darnton, 2008; McKenzie-Mohr, 2011; Michie & Johnston, 2012; Prochaska & DiClemente, 1983; Schultz, 1999; Syme, Nancarrow, & Seligman, 2000; Valois, Desharnais, & Godin, 1988).

Specific intervention strategies and behavior-change techniques work best with certain behavior factors. For example, people may not be able perform a particular behavior because they don't have the skills, therefore a training course would be a suitable choice intervention strategy. Whereas for people who do not behave appropriately because they often just forget, then a visual cue to prompt action at the appropriate time may be all that is required. Hence, the first step in creating a behavior-change intervention is to understand the psychological and physical factors that drive or impede a particular behavior (e.g., Darnton, 2008; McKenzie-Mohr, 2011; Michie, Atkins, & West, 2014). The behavioral sciences have produced a large number of behavior theories and associated determining factors which may be applicable (for a review of specific theories associated with animal management, see McLeod, Hine, Please, & Driver (2015)). To assist the practitioner, there are frameworks available that summarize this vast wealth of knowledge and provide best-practice guidelines for intervention design (e.g., Behaviour Change Wheel: Michie et al., 2014; Community-based Social Marketing: McKenzie-Mohr, 2011; Mindspace: Dolan et al., 2012).

Crucial to the success of any behavior-change intervention is a good communication strategy. It not only creates awareness about the intervention, but can be a component of the behavior-change strategy itself through persuasive communication techniques (Hine, Please, McLeod, & Driver, 2015). There are two main components of a communication strategy: content—the substantive material covered in the communication (i.e., the subject, ideas or messages), and its delivery—the means of presenting and distributing this content to the target audience (e.g., mass media broadcast, printed material, online video clip, word of mouth). While there has been rapid development and innovation in communication devices and distribution channels in recent decades, well-conceived content remains at the core of an effective communication strategy (Halvorson & Rach, 2012).

Content for persuasive communication goes beyond just providing factual information and/or instruction on the desired behavior (Michie, van Stralen, & West, 2011). It needs to engage the audience so that they become motivated and empowered to change their behavior and adopt new practices. Table 1 provides a summary of commonly used best-practice persuasive communication techniques to increase audience engagement and facilitate behavior change.

Managing Domestic Cats

As awareness of the negative impacts (e.g., predation, competition, and disease transmission) of the domestic cat (*Felis catus*) has grown, the demand for better management practices has intensified (Dickman, 2014). Management of this animal relies on community members adopting "responsible" management practices toward both pets/companion animals and

Table 1. Potential best-practice persuasive communication techniques for cat management communications.

Principle	Description
Framing	Information emphasized in an appropriate way so recipient can connect with the issue (e.g., local context, or what will be lost)
Credible messenger	Information given from a trusted, respected source
Issue/behavior information	Information about the issue and desired behavior
Consequence information	Information on the effects of performing or not performing desired/undesired behavior
Feedback	Information on behavior performance by others and/or the positive outcomes attained
Pros and cons	Information on the benefits and disadvantages of behaviors
Debunking misinformation	Emphasis on correct information
Social comparison	Information on what other like-minded people are doing and achieving
Social approval	Information on what other people/authorities think should be done
Goal setting	Agreement on target defined in terms of either the behavior or outcomes/impacts to be achieved
Commitment	Written or verbal affirmation to perform a desired behavior or attain a specified outcome
Prompts	Visual and auditory aids used as reminders to perform a desired behavior at the appropriate time
Use of narratives	Presentation of information as a story using imagery and emotional devices

References: Hine et al. (2015); McKenzie-Mohr (2011); Michie et al. (2014).

unowned animals (i.e., those cats that are not totally reliant on humans to survive and do not have a recognized carer that takes full responsibility for their welfare—often referred to as stray cats or colony cats, and feral or free-living cats) (Dickman, 2014; Moodie, 1995). These responsible practices include behaviors that protect the cats from harm and improve welfare outcomes, as well as reduce unwanted breeding and lessen the impact of this species on the community, the environment, and other animals.

As the demand for better management practices of domestic cats has intensified, there has been pressure on cat owners and carers to change their behavior. Major changes associated with responsible cat ownership include compulsory de-sexing to prevent unwanted breeding, registration, and permanent identification using microchips to assist in ownership issues. Additionally, in some areas cat owners are encouraged to keep their pets contained within their house and yard, either at night or all the time, to reduce predation, disease transmission, and injury risk (e.g., Lilith, Calver, Styles, & Garkaklis, 2006, MacDonald, Milfont, & Gavin, 2015; Stewar, 1997).

Effective cat management also relies on community members practicing responsible behaviors toward unowned cats. People who feed unowned cats (e.g., strays, ferals, cat colony members) are encouraged to take full responsibility of these animals (i.e., display all responsible ownership behaviors) so as to improve the animal's overall welfare and reduce the harm they cause (Lord, 2008; Toukhsati, Bennett, & Coleman, 2007; Toukhsati, Young, Bennett, & Coleman, 2012; Zito, Vankan, Bennett, Paterson, & Phillips, 2015). When this is not

possible, people are encouraged to report these animals to the appropriate authorities so they can be removed and either rehomed or destroyed (e.g., Webb, 2008). In some circumstances, such as for pre-existing cat colonies, cats can be given appropriate veterinary care (including de-sexing) and returned to the colony (Barrows, 2004; Winter, 2004).

Assessing Strategy Effectiveness

On-going changes to cat management policies mean that associated outreach programs and education campaigns have needed to evolve, both in terms of content and delivery, to better engage the public in responsible cat management behavior. But how effective have these cat management interventions been in creating sustained behavioral change? Few interventions have been effectively evaluated to determine whether they have actually changed targeted behaviors or improved environmental or welfare outcomes (Coleman, Sindel, & Stayner, 2017). Thus, there is little feedback available to inform and further refine the development of interventions and associated communication strategies to promote new cat management policies and expectations of responsible cat management behavior.

The audit method is an approach to assess an intervention's communication strategy (Booth, 1989). Auditing employs both quantitative and qualitative methods to examine the many aspects of communication strategies and products; to describe what there is, where it is, and what format it is in, as well as to assess the quality and whether it can achieve its desired outcomes (Booth, 1989; Halvorson & Rach, 2012). Audits are commonly used to improve the efficiency and effectiveness of business communications, but they have not been widely applied to any domestic animal or wildlife management outcomes.

The aim of this study was to audit a representative sample of the communications from recent cat management interventions delivered online, and assess the content against best-practice behavior-change methods. By comparing the evaluations of current practice with behavior-change theory, and with experience from interventions in fields other than animal management, we can infer the likely value of current practice for achieving long-term human behavior change and improving cat management outcomes. The results from this audit will help identify potentially effective techniques that can be incorporated and tested in communications for future interventions.

Methods

Search Strategy

A general English-language web search was conducted between September 2014 and July 2015 to locate communications aimed at the management of the domestic cat, both owned and unowned (owned cats—humans totally responsible for their welfare/survival, i.e., companion animals/pets, and unowned cats—not totally reliant on humans to survive and do not have a recognized carer that takes full responsibility for their welfare, i.e., stray, feral, free-living cats) (Moodie, 1995). This search was performed using the meta-search engines www.dogpile.com and www.ixquick.com and used the search terms and resources detailed below. The first 50 hits from each search term were examined for appropriate data. The following search terms were used (* indicates a wildcard):

- cat* (cat OR cats) AND manag* (manage OR managed OR managing)
- cat* AND welfare
- cat* AND control* (control OR controlled OR controlling)
- cat* AND impact* (impact OR impacts OR impacted OR impacting)

These results were supplemented by contact with, and searches through, relevant animal welfare and environmental organizations (e.g., Cat Alliance, Richmond Animal League, RSPCA/SPCA, Conservation Council ACT, American Bird Conservancy, PestSmart), and regulatory and government agencies (e.g., South Australian Dog and Cat Management Board, Australian Department of the Environment).

Interventions were accepted as relevant and included in the audit if they contained sufficient communications (at least two HTML or PDF pages) aimed at any domestic cat management. Web links for each intervention and associated electronic documentation were clipped and stored in an electronic database.

Audit Procedure

An individual HTML page or PDF document covering a particular topic was defined as a single piece of content. For each piece of content, the target behavior, the messenger, and the intended audience were identified. Content was then coded using pre-defined lists of categories for type of cat targeted (owned and unowned cats), format (text, video, audio), style (narrative, factual, legal), and type of information (about behavior, instruction, consequences, pros and cons, feedback, debunking: Michie et al., 2011). Message framing was coded using categories developed from the content itself (Miles, Huberman, & Saldana, 2014). The use of metaphors (Sopory & Dillard, 2002), goal setting, commitments, and prompts (Cialdini, 2009; McKenzie-Mohr, 2011), and types of social norms (descriptive or injunctive: Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007) were also recorded.

The content's quality was assessed using the metrics of "usability" (how the content was structured and presented, how easy it was to read and the appropriateness of the language), and "actionability" (how well the content told the user "what to do next" through calls to action, directions to following steps and links) (Halvorson & Rach, 2012). Both usability and actionability were rated using the scale 1 to 5 (1 = poor, 5 = excellent) (Table 2). Coding of the first 25% of intervention content (randomly selected) was conducted by two authors independently (LM and AD) and checked for reliability before progressing.

Table 2. Coding categories used in the usability and actionability quality assessments.

Ranking	Description
Usability	
1	Poor readability (verbose sentences, poor paragraph structure, lots of jargon) and presentation (no headings, graphics or images)
2	Below average readability and presentation
3	Average readability and presentation
4	Above average readability and presentation
5	Excellent readability (concise sentences, structured paragraphs, plain English) and presentation (good use of headings, graphics, images)
Actionability	
1	No action calls, does not direct user to next steps, no links
2	Weak direction to next steps, poor links to further information
3	Some direction to next steps, a few links to further information
4	Sound direction to next steps, adequate links to further information
5	Clear calls for action, clearly directs user to next step, helpful links

Inter-rater reliability was assessed using Intraclass Correlation coefficient (ICC) in SPSS (Version 22, IBM, Armonk, NY, USA).

Results

We identified 40 different organizations that had interventions aimed at free-roaming cat management on their websites. These included both government and non-government organizations from eight different countries (Australia, Canada, Hong Kong, Italy, New Zealand, South Africa, United Kingdom, and the United States), including federal, state, and local authorities, welfare organizations, universities, and cat-advocacy groups. Fifteen of these organizations had interventions aimed specifically at owned pet cats, 10 targeted unowned cats (i.e., strays, feral, or free-living cats), and 15 targeted both owned and unowned cats.

Content Coding

Overall, 159 separate pieces of online content from the 40 organizations were coded (84 targeted owned cats, 51 unowned cats, 24 both types). A minimum of two pieces and a maximum of eight pieces were coded for each intervention. Text (either in html web pages or PDF downloadable documents) was by far the most prominent format, comprising 92% of the content audited, with embedded videos making up the remaining 8%.

Identified target behaviors, messengers, and audience are shown in Table 3. Nearly a quarter of the content pieces focused on "responsible cat ownership behavior," a suite of individual behaviors that cat owners are expected to perform (e.g., vaccination, parasite control, de-sexing, identification, and containment). Some pieces of content focused just on the specific behaviors of de-sexing and containment, with containment further refined to just indoor containment. Other behaviors have been grouped together for ease of presentation as they occurred in small numbers. Cat population control refers to those behaviors (e.g., shooting, poisoning) that are aimed at limiting unowned cat population numbers, other than lethal/relocation trapping and trap-neuter-release (TNR). Improving shelter outcomes includes behaviors associated with administration, caring standards, adoption, and surrendering

Table 3. Identified target behavior, messenger, and audience categories.

Target Behaviors	Messenger	Audience
Cat ownership behaviors: combination (23%) just de-sexing (11%) just containment (13%) just indoor containment (6%)	Government/local authority (34%)	Cat owner (47%)
	Researcher (17%)	General public (37%)
	Cat advocacy group (16%)	Land manager (6%)
	Welfare organization (12%)	Animal shelter (5%)
Semi-ownership (3%)	Conservation group (11%)	Semi-carer[2] (2%)
Cat population control (11%)	Combination[1] (4%)	Veterinarian (2%)
Lethal trapping (2.5%)	Veterinarian (3%)	Policy maker (1%)
Trap-neuter-release (TNR) (7%)	Individual activist (3%)	
Reporting feral cats (0.5%)		
Cat predation (7%)		
Support to run cat programs (6%)		
Improving shelter outcomes (4%)		
Improving welfare outcomes (3%)		

[1]Combination of government, welfare, and cat advocacy groups. [2]People who feed unowned cats.
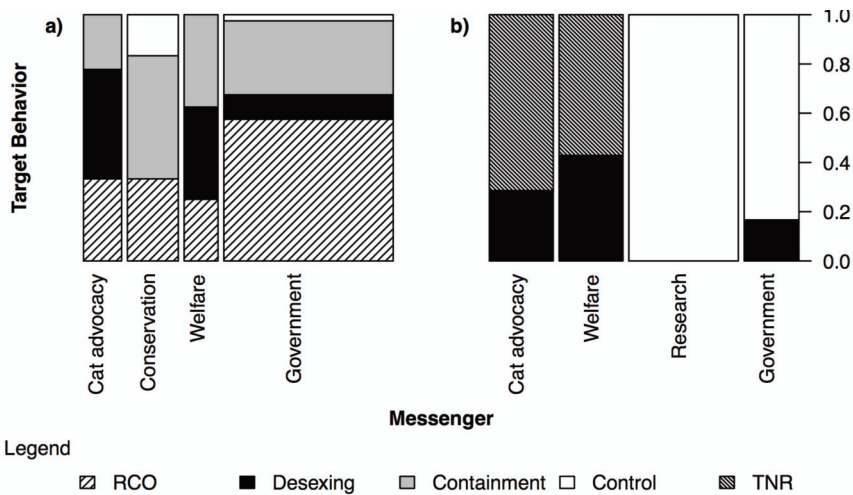
Figure 1. Relationships between cat management behaviors targeted in human behavior-change interventions and the type of messenger delivering the interventions, found in online material aiming to improve the management of a) owned and b) unowned cats (RCO = responsible cat ownership, TNR = trap-neuter-release). Column width represents the relative sample size for each type of messenger. The height of each rectangle represents the proportional distribution of cat management behaviors targeted by each type of messenger. Sample size for owned cats (a) was 84, and unowned cats (b) was 51.

alternatives, while improving welfare outcomes includes behaviors aimed specifically at animal welfare and ease of suffering of unowned cats.

Just under half of the content was aimed at cat owners, the most common target audience (47%). Over a third of the remaining content was targeted at the general public (37%). Government/local authorities (i.e., governing bodies) were the most common messenger, delivering a third of the content. We found no instances of organizations using a specific spokesperson to champion their cause. Clear differences were identified in the types of behaviors targeted for owned and unowned cats (Figure 1). For unowned cats, research and governing messengers focused largely on cat population control behaviors, whereas cat advocacy and welfare messengers focused on TNR and de-sexing behaviors (Figure 1(b)).

Most of the content (88%) was written in a factual style, recommending behaviors using logical, evidence-based arguments. A further 9% contained legally-structured documents such as Acts and Regulations. The use of narrative-style or story-telling was limited to 3% of the content. The use of metaphors was only identified in two pieces of content, one comparing cats to serial killers, and another comparing cat owners to parents of bullies (who do not believe "that their little Johnny would behave like that"). These were associated with cat predation issues and both came from individual activist messengers.

Information about an issue or behavior and behavioral instructions were used in 69% and 63% of content, respectively. Information about the consequences of not using specific cat management behaviors was found in 30% of content. Twelve pieces gave feedback, providing information on behavior performance or outcomes already obtained, and two pieces directly compared the benefits and disadvantages of behavior performance, one addressing TNR and the other, indoor containment.

The debunking of misinformation occurred in 13 pieces of content. Best-practice debunking methods recommend not mentioning the incorrect information at all, or if this is not possible, to at least lead with the correct facts. This best-practice method occurred in only three of the cases. The other 10 instances mentioned the misinformation first, followed by the correct information.

Eight pieces contained setting of goals to motivate participation. Only one instance of the use of a public commitment was found, asking cat owners to pledge their support for better pet cat management. No instances of prompts were recorded. Injunctive norms, describing what people should be doing, occurred in 85% of the content, while descriptive norms, describing what other people are doing, appeared in 6% of the content.

There are many ways messages can be framed to be more engaging for a target audience (Kahneman & Tversky, 1984). Frames used in the reviewed messages fell into eight broad categories; benefit, loss, risk, fear, animal rights, rights of people, owner obligation, and local frames. Benefit frames (message emphasis on what will be gained) were the most prominent, in particular benefits for the cat (e.g., health, safety, happy environment) (61 instances), the community (8 instances), and to wildlife or the environment (6 instances). Frames around the rights of the cat were commonly employed: animal welfare was most common (55 instances), while 19 cases implied that cats had diminished rights because of their non-native status. These frames are categorized as deep frames, operating at a subconscious level and priming values such as benevolence and universalism (Blackmore, Underhill, McQuilkin, & Leach, 2013; Darnton & Kirk, 2011; Lakoff, 2010). Framing around cat owners' responsibilities and legal obligations occurred in 32 instances. Loss of wildlife was another popular frame occurring in 26 cases. Risk frames included risk to wildlife, the environment, the community, to livestock,
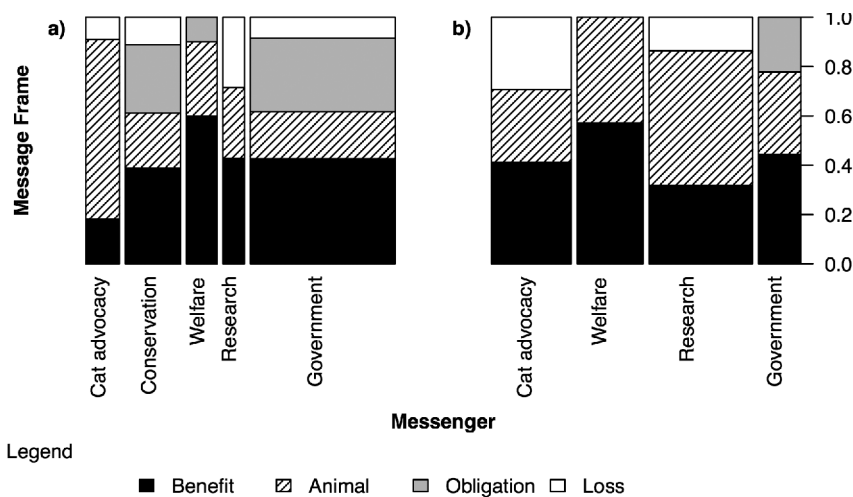

Figure 2. Relationships between the types of message frames used in human behavior-change interventions and the type of messenger delivering the interventions, found in online material aiming to improve the management of a) owned and b) unowned cats. Column width represents the relative sample size for each type of messenger. The height of each rectangle represents the proportional distribution of message frames used by each type of messenger. Total sample size for owned cats (a) was 106 (note: multiple frames were recorded for some content), and unowned cats (b) was 51.
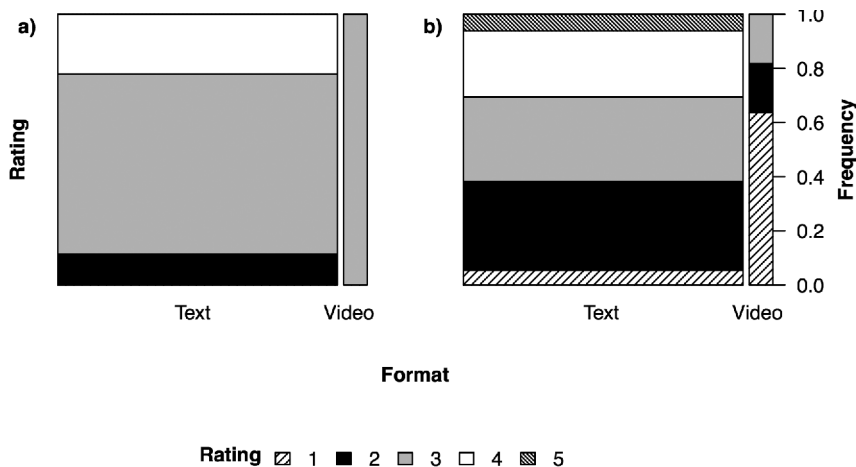
Figure 3. Distribution of ratings (on a scale of 1 [poor] to 5 [excellent]) for a) usability and b) actionability of text and video material from 159 audited cat management pieces of content. Usability refers to the quality of the material in terms of its ease of consumption whereas actionability refers to the expectation of the material to facilitate further action by the consumer. Areas of rectangles in the plot are proportional to frequencies in contingency table cells.

and the risk of the outdoors to cats (altogether 12 instances). There were nine instances of local frames (specific community attitudes and issues), six instances of framing around people (citizen rights, shelter worker's welfare), and two instances of fear/crisis appeals. The four most frequently-used frames (benefit, cat rights, owner obligation and loss) were used for both owned and unowned cats (Figure 2), and by all messengers, with the exception of welfare organizations who never used loss-frames.

Content Quality

The inter-rater reliability for scoring usability was ICC = 0.80 ($p < 0.001$) 95% CI (0.41, 0.92), and actionability was ICC = 0.93 ($p < 0.001$) 95% CI (0.87, 0.96), which demonstrated high-level agreement between the two independent coders (Shrout & Fleiss, 1979). The average usability of the text content was rated as 3.02, ($SD = 0.62$), and all embedded video content was rated as 3.0 (Figure 3). The average actionability was rated low at 1.60 ($SD = 0.77$). The average actionability of the text content was a little higher at 2.90 ($SD = 0.98$). These results indicate the content generally failed to direct users to what they should do next.

Discussion

This study provides a quantitative and qualitative content analysis of a representative sample of 40 organizations' recent online communications for cat management interventions from eight different English-speaking countries. We found a number of persuasive communication techniques, demonstrated to be effective in other disciplines, were underused in the cat management communications we reviewed. Most content that we examined depended heavily on the presentation of information in logical, evidence-based arguments to educate and persuade individuals to modify their current behaviors or encourage the adoption of new ones. Although the provision of information in any behavior-change intervention is important in increasing

awareness and sharing knowledge, education alone is usually insufficient to change behavior (e.g., Andreasen, 1995; Hini et al., 1995; McKenzie-Mohr, 2011).

Trust is an important element for behavior change, and selecting the right messenger is an important way to build trust and rapport with the targeted audience (Cialdini, 2009). We found governing bodies and researchers were the main source of cat management communications. However, in general, people respond more favorably to messengers who they can identify with, who appear honest and open, and who are perceived as caring about the issue and who have relevant experience and competence. These qualities are not necessarily equated with government or scientific advice (e.g., Blackman, Corcoran, & Sarre, 2013). Cat advocacy groups and welfare organizations may provide some audiences with a more trusted source of information, or alternatively governing bodies could turn to local organizations and "trusted local champions" to spread their message.

Debunking myths and misinformation requires more than just giving the right information. Over three-quarters of the cases that attempted to debunk misinformation may have inadvertently reinforced the myths by mentioning them before attempting to correct the misinformation with the right information. Cook and Lewandowsky (2011) refer to this as the "familiarity backfire effect" where the myth is repeated first, thus making it more familiar and more likely to be accepted. To prevent this problem, Cook and Lewandowsky suggest avoiding mentioning the myth entirely, or when this is not plausible, lead with a core fact immediately followed by strong, clearly stated evidence before acknowledging the misinformation. Other pitfalls to avoid include "overkill backfire effect," where presented counter-arguments are too complex and difficult to understand, and "worldview backfire effect," where people with strong beliefs tend to ignore any information that does not support their views, and develop detailed arguments to counter any opposition (Cook & Lewandowsky, 2011).

Behavioral theory indicates that loss-frames (emphasis on what will be lost) tend to be more persuasive than benefit-frames (emphasis on what will be gained), and frames that emphasize local and immediate consequences tend to increase a person's sense of connection to an issue and trigger more immediate action than issues occurring further away, or sometime in the future (Kahneman & Tversky, 1984; O'Keefe & Jensen, 2009). Most of the recent cat management content used benefit (or gain) framing. Only a small number of messages featured loss or local framing of issues. Although the framing of this content may have been developed for the perceived needs of their target audience, intervention designers should consider using the more effective types of frames (i.e., loss and local framing) in future communications.

To achieve cat management outcomes, a coordinated social response is required. Deep framing primes values such as benevolence and universalism promote beneficial actions for the community and the environment (Blackmore, Underhill, McQuilkin, & Leach, 2013; Darnton & Kirk, 2011; Lakoff, 2010). A common deep frame across the cat management content was that of animal welfare. Using words such as caring and humane often will prime intrinsic values within the audience, ensuring these values become more important over time and encourage the audience to become more benevolent and work together to achieve the management outcomes.

People do not always make decisions based on evidence and the logical consistency of arguments (Fisher, 1989; Jackson, 2005). Narratives with compelling storylines and characters, that match a person's pre-existing beliefs and values can emotionally engage a person in a fundamentally deeper way than rational arguments (Mar, 2011). Hence, stories have the

potential to be a powerful persuasive communication tool in cat management communications, and their use should be explored further.

In a meta-analysis of pro-environmental behavior interventions, it was found that the use of goal setting, prompts, and the use of social norms provided the greatest effect sizes overall (Osbaldiston & Schott, 2012). Goal setting was evident in a small number of interventions (8 instances); examples include the Million Cat Challenge's goal of saving the lives of one million cats in North America over five years, or the Kangaroo Island Council's long-term goal of eradicating feral cats from Kangaroo Island by 2030. Prompts were absent from the programs we examined. Under circumstances where forgetfulness can be a barrier to the success of an intervention (such as remembering to shut the gate to prevent the cat from escaping the yard), prompts have been shown to be extremely useful (McKenzie-Mohr, 2011; Schultz, 2014). Only 6% of the cat interventions incorporated descriptive social norms (e.g., "90% of cat owners in your neighborhood have their cats de-sexed," "35% (of cat-owners) keep their cats indoors all of the time," or "38% of Kiwis said they would make this cat their last to help save NZ's wildlife"). Good evidence from a range of studies suggests that descriptive social norms can be more persuasive than injunctive ones, that is, people tend to do as you do rather than do as you say (Cialdini et al., 2006; Schultz et al., 2007), so the incorporation of more descriptive norms stands out as one area for improvement in future communications.

Commitments work in two ways, firstly by altering the way people perceive themselves, and secondly by tapping into people's desire for consistency, a highly valued principle in our society (Cialdini, 2009; Festinger, 1957). Commitments have been used successfully for encouraging a range of pro-environmental behaviors, such as water conservation, recycling, and picking up pet-dog feces in local parks, with those that are public and enduring having the most success (e.g., Katzev & Wang, 1994; Lokhorst, Werner, Staats, van Dijk, & Gale, 2013; McKenzie-Mohr, 2011). We found only one campaign using the commitment tool. The Humane Society of the United States offered cat owners a chance to sign a pledge that they would take as many steps as possible to protect both cats and wildlife. This pledge was then sent to the Society, but could also be shared on social media sites such as Facebook and Twitter. The effectiveness of this technique should be trialed in future cat management interventions.

The choice of persuasive communication techniques used to elicit change in cat management behavior will make an important contribution to the success or failure of an intervention program. However, the quality of the content, and its availability to the user, is also critical. For the most part, the general quality of the content audited in this study was rated as average or below. On the usability metric, which rated presentation, language, and structure, the average score was 3 out of 5, making it difficult for the audience to engage with the material and its messages. There tended to be many words per page, many lines per paragraph, and few subheadings to break up the text into digestible portions (when faced with a large unbroken block of text, testing shows that users will skim it or skip it altogether) (Halvorson & Rach, 2012).

The actionability metric, or how well the content directs the audience to the next step, returned a slightly lower average than usability. If these interventions aim to change behaviors, they must give clear and concise instructions to the audience about the next steps. There should be clear calls to action and an indication how the user should prioritize consumption of the various resources on offer. Without a clear path to content consumption and actions, the audience will be inclined to give up, or look elsewhere for information that requires less cognitive load (Halvorson & Rach, 2012). The poor user-friendliness and common failure to direct

users toward action is particularly problematic given the heavy reliance on information provision as a behavior-change technique in most cat management interventions.

A surprising result was the minimal use of video content (either embedded or directly linked to video content on external video platforms) within any of the interventions audited. With the advances in technology, the growing use of "edutainment" videos in teaching (Okan, 2003), and the popularity of instructional content developed by individuals and businesses that are uploaded to video-based websites such as YouTube and howcast.com, this format seems an ideal way to enhance the content, particularly for instruction and story-telling. The use of videos in multimedia instruction is known to improve learning outcomes, performance, and satisfaction (Ljubojevic, Vaskovic, Stankovic, & Vaskovic, 2014), so their potential for inclusion and tailoring for cat management interventions should be explored.

Millions of dollars are spent annually to research, develop, promote, and implement animal management programs (e.g., Stavinsky, Brennan, Downes, & Dean, 2012). Fewer resources and less effort appear to be allocated to developing effective behavior-change interventions, and even less consideration is given to measuring behavioral outcomes to allow interventions to be effectively evaluated (as evidenced by the paucity of evaluations in the literature). This seems irrational when the outcome of most animal management programs relies on the participation and behavior of large numbers of people in the community. Adequate resources and training are required if the effectiveness of cat management interventions are to be improved. Importantly, more emphasis is needed on meaningful evaluations of the behavioral outcomes of interventions, rather than just measurements of key performance indicators based on outputs, such as the number of factsheets produced, or the number of hits on a web site (McKenzie-Mohr, 2011).

Study Limitation

The objective of this paper was to use the novel audit procedure to assess a representative sample of current cat interventions to gain a general understanding of their potential effectiveness to change people's behavior. It does not claim to provide a systematic review of all available cat management interventions (we acknowledge that there are shortcomings in our search procedure), or attempt to evaluate the on-ground effectiveness of any one particular intervention (this would require information which is not publicly available or attainable). Instead, it is hoped to provoke thought and discussion around the benefits of incorporating behavioral sciences into the future development of animal management interventions, and the need for better evaluation to enhance this process.

Conclusion

The majority of the cat management communications reviewed in this paper relied on outmoded and ineffectual persuasive communication techniques. We identified a broad range of alternative approaches, informed by the behavior-change literature, to create more effective cat management communications that are better able to enhance cat welfare and reduce the detrimental impacts of cats on wildlife and the community. Although these techniques have been successfully applied in other contexts, particularly health and environmental sustainability (e.g., McKenzie-Mohr, 2011; Michie et al., 2014), to-date there has been limited application in animal management (Elsheikha, 2016; McLeod et al., 2015; Weary, Venture, & von Keyserlingk, 2015). We believe the behavior-change literature holds great promise for advancing animal management outcomes, by providing theory-driven and empirically grounded frameworks for developing behavior-change interventions, and engaging more effectively with targeted audiences.

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Conflicts of Interest

The authors declare there are no conflicts of interest.

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