‘I learn each day.’ The informational lifeworld of dog and cat guardians in New Zealand

Niloofar Solhjoo, Maja Krtalić and Anne Goulding

Abstract

Introduction. *Recognising the importance of information in understanding and living with companion animals, this paper investigates cat and dog guardians’ opinions on how they learn new things and update themselves. It identifies a range of information, practices, and contexts within their everyday life.*
Methods. *An anonymous online survey consisting of close-ended and open-ended questions was distributed to cat and dog guardians in New Zealand between October and December 2021.*
Analysis. *Response frequencies and descriptive statistics of quantitative data were generated. The qualitative data were open-coded with an information experience lens to identify the categories of information forms and practices.*
Results. *Quantitative data indicate personal experiences and memories of guardians (75%), and casual conversations with other guardians (73%) as the most common resources for learning, after experts (e.g. veterinarians) (93%). Qualitative data analysis categorized these as two main themes of external and internal forms of information. External information consisted of social information in verbal and nonverbal communication with other humans and animals, recorded information in digital and physical mediums, and embedded information held in artifacts and animals’ body. Internal information related to guardians’ memory and personal knowledge (cognitive information), values and emotions (affective information), and bodily feelings and subjective interpretation of their senses (embodied information).*
Conclusions. *The informational lifeworld of the participants was made of their external interactions and internal values, which appears as interwoven concepts in their daily lives with dogs and cats.*

Keywords*: information behaviour, everyday life, animal care, New Zealand, information environment, dog and cat guardian*

Introduction

Cats are the most popular companion animal in New Zealand (NZ), with 41% of families sharing their homes with at least one cat while a third of NZ families share their homes with dogs, making them the second most popular companion animal here. About 2.5 million companion cats and dogs play an important role in the everyday activities of New Zealanders, and approximately 75% of dog and cat lovers (guardians) consider them to be important members of their family (Companion Animals New Zealand, 2020). NZ recognises cats and dogs as sentient beings (the Animal Welfare Act, 1999) and advocates a good life for them (New Zealand Companion Animal Conference, 2021). Living with them in everyday life requires knowledge (e.g., responsibilities of guardianship, and understanding the animal's body language) (Philpotts, et al., 2019; Grigg and Kogan, 2019) and information practices are interwoven in different aspects of caring for and living with companion animals (Solhjoo, et al., 2021). A guardian's lack of understanding about their companion animal could affect the human-animal relationship (Grigg and Kogan, 2019) and client-veterinarian relations (Coe, et al., 2008), and cause animal health issues and problematic animal behaviour (e.g., separation anxiety, or inappropriate elimination) which in turn can have a negative effect on the care that the animal receives from the guardian (e.g. insufficient veterinary services, or abandonment of pet) (Bouma, et al., 2020).

The duty of care is related to the human's internal values and intentions, and external interactions and experiences (Glanville, et al., 2020). To understand the needs of other species and become a good guardian, individuals experience information interactions with and about their animals in all aspects of everyday life (problem-oriented and pleasure-oriented) (Solhjoo, et al., 2021). In this context, both human and animal experience different forms of information, beyond recorded and textual forms, to understand each other and undertake their activities in all aspects of everyday life together.

Recognising the invisible substrate of information in all human practices (here caring for companion animals), and the importance of information phenomena in understanding and living with companion animals, the authors are conducting research into the information experience of NZ multispecies families as a PhD project. The first stage of the fieldwork for the research was an online survey undertaken in NZ in 2021. The original intention of the survey was to find participants with suitable characteristics for the qualitative PhD study. However, the high response rate and rich insights into dog/cat guardians' opinions and practices provide an opportunity to explore how they experience information and build understanding about their activities related to animal member(s) of their family. Therefore, this paper presents selected results from the survey focusing on the range of different information forms and practices within human everyday life with companion animals among New Zealanders.

Companion animal information research: Information needs and sources

The extent of research about information practices related to living/caring animals is notably scant in comparison to that focused on a human domain (e.g., family/parental information practices). A cross-sectional survey about NZ pet guardianship in 2019 reported that pet guardians engage with a diverse range of information sources. Veterinarians were the most trusted source of animal health information (72%), and the Internet was second (50%). The Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA), pet shops, books, breeders, and friends were also selected as information sources by a smaller percentage of animal guardians (Gates, et al., 2019). Other studies have investigated guardians' information seeking all around the world (Kogan et al., 2012, 2018, 2019; Oxley and Kogan, 2018; Solhjoo, et al., 2019; Prata, 2020; Küper and Merle 2020; Kuhl, et al., 2021). In these studies, which were all focused on *pet health information*, the Internet (e.g., random searches, websites, social media) and animal professionals (e.g., veterinarians, nurses, breeders) were the most common sources of information. The information needs of guardians in these studies were identified as *disease and treatment*, such as certain medical procedures or alternative medicines and treatments, and *health and prevention*, such as diets, environment, nutrition, vaccinations, or fitness. There is also some previous research on guardians'' information activity. Studies report that some guardians first search online to check if their companion animal needs a veterinarian (Volk, et al., 2011), or sometimes they search to better understand the information provided by a vet and as a second opinion

(Kogan, et al., 2010, 2012). Previous studies have thus explored how online pet health information seeking influences guardians' interactions and relationships with veterinarians (see Solhjoo, et al., 2019; Küper and Merle, 2020; Kogan and Oxley, 2020, Lai, et al., 2021), finding that guardians were sometimes unable to identify trustworthy information, especially online, because of insufficient information skills (Solhjoo, et al., 2018), and lack of reliable indicators of information quality (Kuhl, et al., 2022). In their study, Solhjoo et al. argued that the outcomes of animal healthcare behaviours are related to guardians' contextual and background variables such as health literacy, previous health care experiences, and health information seeking behaviours (2018) and found services such as client education and information prescription to be effective in these circumstances (2019).

The research gaps

The studies discussed are mostly expanded reports, outside the information field, and are built on a limited view of the nature of information, overlooking many contexts and practices in the everyday (e.g., animal day-to-day care, enrichment activities, and socializing). They tend to focus only on objective information (what Bates (2006) classified as *exosomatic* information) or they discuss the mechanical aspects of information practices with recorded information, with no attention to internal and subjective information experiences. There is also a dominant focus on the animal health domain, such as explicit health information needs, or health information seeking behaviour. This could be because of the concerns that have arisen in the past two decades or so in animal health science and practice about the internet and online sources as a widely used and unreliable source. As a result, veterinarian and veterinary librarians started to study the use and quality of animal health information (Rey et al., 2015). As argued by Ocepek (2018), the everyday world is filled with information behaviour that may not depend on what have traditionally been regarded as information sources, but this does not mean they are not worth researching (p. 401), and this is the gap that this research seeks to address.

Theoretical frames

In the previous section, to highlight the significance of this study, we reviewed the literature on animal-related information behaviour research. This section reviews research on the nature of information and information practice that directly influenced the development of our study.

Several theories in INFORMATION SCIENCE regard information as incorporating both external/objective and internal/subjective forms (Capurro and Hjørland, 2003). The objective view sees information as a thing (e.g. number of bits) but the subjective view considers information as internal senses, cognition and affect (Lupton, 2014). In a more comprehensive view, Bates (2006) suggested that all matter and energy in the universe contains information, termed "natural information", divided into fundamental forms: the subclass of represented information (i.e., the subjective view of information) and exosomatic information (i.e., information stored in durable form). Bruce (2008, 2014) introduced the concept of *information experience* as anything we experience as informing in a special context. Here information is transformative between data, information and meaning (Bruce, 2008; Gorichanaz, 2020), and it is holistic in acknowledging internal information as well as documentary and external forms of information in the information sphere of the lifeworld (Lupton, 2014; Pollak 2016; Savolainen, 2019). A recent concept analysis by Yu and Lui (2022) showed that the existence of two contrasting views of information (i.e., objective/subjective) within INFORMATION SCIENCE has given rise to two fundamentally different conceptions of information experience, with the one taking the objective view of information performing better in designating integrative experiential units for research. Although internal and subjective information interactions are difficult to identify and measure (Capurro and Hjørland, 2003; Savolienen, 2019; Yu and Lui 2022), some studies have aimed to translate information from abstract feelings and intellectual order into meaningful units and signals (e.g., Bates, 2006; Lloyd, 2006; Lupton 2014).

In information science when we study people, we do so with the purpose of understanding information engagement within human activities: '*red thread of information in the social texture of people's lives*' (Bates, 1999). All human work has an information component and assumes some degree of information processing (Huvila, 2009, p. 697). However, McKenzie and Dalmer (2020) noted that

many activities that are central to the enactment of information practices are less visible to researchers and sometimes even to the people undertaking them, and suggested strategies to bring hidden everyday information practices to light (McKenzie and Dalmer, 2020). In our context, an example may be to see how animal care is done in the home in relation to that undertaken outside the household such as at the vet clinic or dog park, or a focus on relevant artefacts aside from documents as information in everyday animal care and enrichment activities. Similarly, Polkinghorne (2021) found that information practices are constructed across a lifetime and in ways that are difficult to capture with a model and instead, we need a holistic approach (p. 171). The concept of information experience gives a holistic lens to view humans as inseparable from their informational world (Bruce et al., 2014), and investigate information from creation to understanding in human practices (Gorichanaz, 2020). Therefore, to explore information practices within daily animal care activities, the authors applied information experience as their framework that involves three components: (1) *information*- that could encompass anything in the eyes of the individuals, (2) *interaction*-lived experiences of active and passive activities with information, (3) *context*-a container within which information activities take place (Solhjoo et al., 2021).

Methods

Questionnaire design and layout

A questionnaire was developed using Qualtrics online questionnaire software. It was developed primarily to recruit and select a group of NZ families with companion cats or dogs to participate in a qualitative PhD study. The original questionnaire was created based on the aggregation of relevant surveys from the literature (e.g., Gates, et al. (2019) for human-animal demographic questions; Johnson, et al. (1992) for human-animal bond questions), tested by the authors and then piloted by a small group of companion animal guardians. The final questionnaire layout comprised 27 questions across six sections— (1) consent, (2) primary questions (inclusion criteria), (3) animal demographic questions, (4) information-related questions, (5) human-animal relationship questions, and (6) human demographic questions. A copy of the original questionnaire is provided as supplementary material. The study was approved by the Human Ethics Committee of Victoria University of Wellington.

In this paper, only the results of the information-related section of the questionnaire are presented composed of two checkboxes and a text box. To ensure that the gathered data came from the respondents' experiences and that they were not limited by conventional conceptualisations of information (i.e., textual and documentary) we excluded the word information from the questionnaire as far as possible. Thus, in two multiple checkboxes, we asked them to select resources, and gadgets that they use in relation to their cat/dog. There were options such as personal experiences and memories, and casual conversations with others, as well as different types of material and documentary forms of information. Also, without explicitly mentioning information, we asked an open-ended question about a situation in their life when they needed to update themselves or learn something new about their cat/dog.

Defining the target population and study recruitment

For inclusion in the survey phase, respondents had to be an NZ adult (between 20 and 65 years of age) who kept a companion cat(s) or/and dog(s). A convenience sample and snowballing technique were used whereby respondents were recruited via online posts. A hyperlink took participants to the Qualtrics website which provided information, a consent form, and the questionnaire. The questionnaire was promoted over a two-month data collection period, 7 October- 27 December 2021, on a total of 33 Facebook groups categorized under Animals and Pets and located in NZ regions, two national cat and dog-related organizations (Dogs NZ, and NZ Cat Fancy), two Twitter feeds of the PhD student and supervisor, and a webpage supported by the university. The respondents were free to share the link for the survey on social media or through email. A total of 1048 responses were received.

Statistical and Textual Analysis

The final data were downloaded into Microsoft Excel. The dataset was cleaned; any participants outside the inclusion criteria (not being adult, keeping dog/cat and living in NZ) or who had accessed the questionnaire without answering the information-related section were removed. Response frequencies and descriptive statistics of the quantitative data (closed questions) were generated in Microsoft Excel. For questions where participants were able to provide multiple answers to a question, the responses were presented as the total (n) of the whole dataset and as a percentage of all responses. Responses to the open-ended question '*Can you recall a time when you tried to update yourself or learn something new about your pet? Please describe what it was and how you went about learning it*' were analysed using NVIVO software (version 12) to code open-ended qualitative responses into categories. The length of responses ranged from a word (e.g., Google) to a full page (approximately 1000 words describing a life story). The content analysis of responses started deductively based on the research framework (Solhjoo, et al., 2021) that involved identifying three components (or set of groups): (1) information: what is the information here? (2) interaction: how is it interacted with? and (3) context: what is it about? Subsequently, sub-codes were identified through hybrid mode (inductively and deductively) through reading the references in each node (group) (the code book is available in Appendix 2). Subcodes for the first two groups were developed with attention to all possible information forms (e.g., Bates, 2006; Lloyd, 2006; Lupton 2014; Olsson and Lloyd, 2017; Savolainen, 2019) and information actions (e.g., Hektor, 2001; Bates, 2002; Savolainen, 2016, 2019); and the sub-sets for the context of guardian's everyday information behaviour were identified with attention to various domains of companion animal welfare (see Solhjoo, et al., 2021). Case nodes (units of analysis) for each respondent were built to help us to relate the qualitative data (people's experiences) to demographic data (who they are).

Characteristics of the study participants

Of the total responses received, 746 were useable for analysis, of which 283, 233, 230 were completed by people living with dog(s), cat(s), and both animals (dog and cat), respectively. The number of cat(s)/dog(s) living with the study participants ranged from 1 to 19 with average of 1.5. Almost 93% (n=693) of the participants considered these cat(s)/dog(s) as their family members. More than half the participants had lived for more than five years with their companion animals with 31% (n= 234) stating they had lived with them for 10 years and more. 95% of participants reported that they cared for or owned a companion animal before the current one.

The study participants were living in different types of families. About 46% (n= 337) were couples without children (childless couples and couples with adult children not living with them), 37% (n= 274) were parents or single parents with children, and about 17% (n=123) were single people. Almost half of the participants stated that they are the main carer of the animal and the other half share animal caring activities with other adults or children in the family. More than three quarters of the participants (n=610) spend between 2-8 hours a day attending to the needs of their cat(s)/dog(s) (e.g., healthcare and physical health, nutrition, physical activities). When asked about the amount of time they (human and animal) spend together in total (i.e., cohabit and interact in a same place), 33% (n=245) and 34% (n=249) stated all-day-long and 9-12 hours a day, respectively. Further information on the background of the study participants is presented in Table 1.

Results and Discussion

The questionnaire contains three questions in relation to information sources and activities, two checkboxes (most used resources, most used technologies) and an open-ended question (how they learn and update themselves). Through quantitative and qualitative analysis of the questionnaire, we have outlined the information forms and actions described by the cat(s)/dog(s) guardians to illustrate the role of information in their everyday life.

Interacting with external information

We asked participants to select the resources that they use the most in relation to their cat(s)/dog(s) (table 2). Analysis showed that personal experiences and memories of guardians (75%), as well as casual conversations with other guardians (73%) were reported as the most common resources among the sample, after experts (e.g. veterinarians) (93%), followed by the internet (70%). Most items on the list selected by participants (except *previous experiences and personal memories*) were external types of information. We also coded 632 references for different forms of external information in the open-ended answers of participants. The range of external information types used by participants listed below have been described elsewhere in the literature (Lloyd, 2006; Bates 2006).

- Social information: communication and observation (in-person or remote)
- Recorded information: textual and non-textual mediums (digital and physical)
- Embedded information: manmade or natural objects

These forms of external information were evident in different contexts relating to the everyday life of cat/dog guardians:

- emotionalization and bonding,
- healthcare and physical health,
- managing the environment,
- mental wellbeing,
- nutrition,
- recreation and enrichment,
- socialization, and
- training (see Table 3)

Social information

The data in Table 2 show that expert opinions (a veterinarian, a veterinary nurse) were the most popular information resource reported by participants (93%, n= 691), while 73% (n=541) selected casual conversations with other animal guardians, making it the third most popular resource. Approximately 60% and 50% reported using social media (e.g. Facebook groups) and online forums/discussion groups, respectively. Friends and families were reported as a resource for a considerable number of participants, 55% and 46%, separately. Trainers were a common source of information among the dog guardians (59%, n= 307); this was less reported from the cat guardians (28%, n=130). All these resources are an example of social information.

Some participants wrote about their active information seeking via communicating with others (both peers and experts) or sometimes they described it as an incidental acquisition of information through random discussions or observation (we coded 253 references for social information). In Table 3, some examples of social information in different contexts of everyday living with companion animals is presented. 102 references were for interactions with experts (e.g., veterinarians, behaviourists, trainers) and we coded 33 and 44 references for interactions with other guardians in-person and online, respectively. Some examples are:

> '*I wanted to learn how to manage her asthma beyond just the medication the vets could supply... see if anyone had a cat with feline asthma and how they manage or monitor their cats condition.'* (participant 454).
>
> *'...follows the treatment plan set out by the vet. I also searched for other on the internet that has or was dealing with the same issue to talk to them about what else might be helpful like diet, supplements, setting up a calm environment'* (participant 581).

These participants indicated that they seek information beyond experts and the medical domain (e.g., alternative methods). Social information gathering from non-experts was noted as being for various

reasons, from the emotional and mental state of the guardian in a specific situation, to the common values and interests between guardians, to the lack of interest or ability of the experts to provide understandable information.

Attending in-person and online courses/classes was another type of social information in the lifeworld of the participants, (21 references). Through classes, they gained knowledge of animal care and animal behaviour from the learning content, instructor interactions, as well as observing or communicating with other attendees.

Interestingly, social information was not only acquired and interpreted via human-human verbal/nonverbal interactions, but the responses of participants showed signs of social information acquisition from observing and communicating with the companion animals present (53 references). All stories were about or related to their dogs and cats. Some presented the guardians as highly interactive with the cats and dogs as members of the house/family. Social information therefore sometimes presented as human information gathering through observing the animal (and other human's interaction with animal):

> *'[in the training courses] each dog has his/her individual tell tales and characters and we learn each time more about how to recognise and communicate with all the dogs'* (participant 322).

From observing the body movement of the dog, this participant acquired codified knowledge of dog communication signals. Social information between participants and their dog/cat was also described as verbal communication, using vocalization or speech. For example, participant 14 commented:

> *'...[I make a] distraction or give her something else to think about [to stop barking at runners] so I talk to her and keep repeating 'friend' 'friend Sophie'* (participant 14)

From all these different types of social information, participants acquired/shaped a form of knowledge:

> '*...I came across an amazing trainer in Auckland…But even before then I ran into someone at a dog beach who made some incredible recommendations on day-care and training which 3 years later, I'm still using. As a result of that particular interaction I'm now becoming a dog trainer*' (participant 9).
>
> or
>
> *'Deciding whether to feed a raw diet for dog. I spoke to dog carers I knew to gauge their opinions and get advice. I also spoke to and went into my vet and raw pet food shops where I amassed information through conversations, pamphlets and other clients who were present at that time. But decided the frozen mix, although more expensive, was easier and tastier for my dog'* (participant 203).

Recorded information

Recorded information was found in textual and visual mode and preserved in digital and physical mediums. We coded 334 references for recorded information, also known as documentary information, in participants' descriptions and these references were described in a variety of situations, from problems with the healthcare and nutrition of the animals to playing and socialization with them.

According to the quantitative data on most common resources , the use of books, journals/magazines, pamphlets/flyers was reported by 40%, 21%, 11% of the participants, respectively. In the qualitative analysis, we coded 22 references for physical recorded information in participants' responses. But when participants wrote about these sources, they mostly mentioned an exact source (e.g. the title of a book), rather than mentioning a type of source in general. This was less common for information recorded in digital mediums. In addition, the actions related to physical recorded information were about activities of using the information to fulfil a specific needs or do their practices (not presentes as a day-to-day information seeking and gathering). For example, a participant wrote:

> *I was trying to do a bit of research on the best food for my new kitten. First, I read the Total Cat Mojo book, and raw food was mentioned there. I watched a bunch of My Cat from Hell episodes where cat feeding was discussed quite a few times. I also subscribed to a Purina newsletter for kitten owners* (participant 257).

Commenting about digital recorded information, a high portion of participants (70% n=524) selected searches on the Internet as a common source of information, and the internet was rated fourth, after social information (veterinarians, and casual conversations with other animal guardians) and internal information (their previous experiences) (see Table 2). More than 30% reported using the websites of animal hospitals and veterinarians (n=280), and commercial websites (n=222). Among the websites of national organizations and bodies of animal welfare in NZ, the Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA) was the most reported by the study participants (23%, n=168).

We coded references for seeking and gathering information on Google (36 references), online articles (63 references), online videos (37 references), and websites (37 references). Overall, when they turned to digitally recorded information, participants described it as a container for a variety of objects that helped them to acquire information. For example,

> *When we got our puppy we spent a lot of time online researching how to settle our puppy into the house…We spent a lot of time on YouTube, reading online books and searching the internet for tips and tricks* (participant 11).

Or

> *Learning how to trim dog's nails and groom dog. Referred to websites, YouTube, online chat with dog groomer. Bought equipment based on online reviews, later bought a book online. Sought advice from online community* (participant 26).

Sometimes using the digitally recorded information (e.g. reading a blog post, or watching a video) led to information seeking from a more accurate source (e.g., advice from an expert). As a participate wrote: '*I frequently google symptoms and decide whether or not it is a vet worthy trip or not*' (participant 250). In contrast, sometimes the digital recorded information was used to test the information that had already been acquired or received from another resource: '*I look to see the same information repeated across multiple sites as it can be hard to know what is correct*' (participant 98).

Embedded information

Participants mentioned artefacts in their daily household containing information for their animal caring activities. In the checkbox question, we asked about participants' technology environment. The majority (81%, n=604) reported mobile/smart phones, and half of them reported laptop/PC (n=351) and camera (n=342) as the most common technology objects in their daily animal-related activities. Almost 25% (n=185) report using interactive and automatic toys for their animals. Some other less common devices were smart/automatic doors, automatic pet feeders, activity tracking/monitoring tools, and remote communication tools. the embedded and recorded information held in these devices were important for their pet guardian practices. They mentioned animal-related services and applications on their smartphones, such as veterinary medical records, or an app to find dog-friendly places. Some explained how they use these artifacts, for example: '*we use technology to monitor what she [the cat] eats and when she poops to help the vet make more informed decisions'* (participant 29).

Overall, there were 46 references in open-ended answers for embedded information in four contexts: training, nutrition, physical health, and environment. In table 3, examples related to each context are presented.

Embedded information in the form of artifacts or natural objects were acquired intentionally and incidentally in relation to other forms of information (e.g., recorded information), and shaped the guardians' understanding or decision-making. A participant described how she leash-trained her cat from an early age to allow the cat to go outdoors safely without harming birds. She stated that she used

textual descriptions (e.g. Google searches and YouTube videos) about cat leash training, and then had hands on practice. The cat leash skills were learnt with observing the embedded information held in the objects in the practice environment (e.g., equipment, cat's behaviour and actions), and of course, in relation to online resources (as a form of recorded information). Embedded information in the environment that guardian and animal interact with was also presented in the story of the dog chasing and barking at runners: '*I look closely about when it happens. Realised it is mostly when she has run after a ball or…, occasionally when on lead on a footpath and a runner comes past*' (participant 14).

In the context of animal nutrition, some participants (14 references) mentioned embedded information held in foods. For example, '*…I looked up all the brands and options available at the pet store, selected two, tested by my dog, had allergy to one, I still keep the other as her main diet*' (participant 55). In this example, the guardian scanned the textual and embedded information in the objects (e.g., the descriptions, appearance, packaging of different brands). Then, her decision was shaped by the information embedded in the food which she acquired from the dog's bodily reaction.

Sometimes embedded information is held in the body of the companion animal (as a natural object and living thing): '*My cat was acting really strangely. Very agitated and trying to urinate but was unable do so. So*', or '*My dog kept throwing up after having treats*', or '*One of my dogs had some lumps on her back'*. We coded 39 references that mentioned the body acting as embedded information and which was the basis for routine information gathering (monitoring), or incidental acquisition of information (being aware).

Interacting with internal information

Personal experiences and memories of similar pet-related issues was the second most reported resources by participants (75%, n=559) (see Table 2). We also found evidence of subjective information in open-ended responses. Participants wrote about their thoughts, emotions, bodily feelings and senses as part of information practices. The number of references coded under the internal information theme was less than a quarter of the references for the external information theme (103 references). This could be because of the difficulty to recognise and explain practices from the inside. The types of internal information identified were: (see Table 4):

- Embodied information: somatic experiences and subjective interpretation of senses
- Cognitive information: personal knowledge, thoughts and memories
- Affective information: personal feelings, emotions, moods and values

These subjective and affective aspects have been identified or described previously in the information studies research literature (Lupton 2014; Olsson and Lloyd, 2017; Savolainen, 2015, 2019). Because of the low rate of references coded for internal themes, we cannot illustrate this discussion with examples in different contexts. In what follows, we have illustrated the general picture of interacting with embodied, cognitive and affective information in daily animal care practices.

Looking back to the story of the dog chasing and barking at runners (participant 14), the guardian said they '*look closely'* to when it happened and acquired information from observing the dog, ball, and surrounding area. Then, shaped by personal knowledge: '*decided my dog was guarding me rather than nervous of their [runner] presence'* they decided how to act: '*make distraction and talk to her*'. In this example, apart from references to objects and external information (e.g., the dog, the ball and surrounding area), the participant described information as a process of making meaning. She described two types of information from the inside. *Embodied information,* the guardian's personal senses and subjective interpretation of the information received from her senses; and *cognitive information,* knowledge of her dog characteristics and behaviour, or experiences shaped by previous encounters.

Although we categorized the verbal and nonverbal communication between humans and animal as social information seeking and sharing (which is objective and external), during the communication

process, humans also subjectively interpret signals (information) through personal knowledge and experiences. Participant 103 wrote:

> '*How to learn the commands for a new rescue we had. We did not know her call signals, and went online and brought books to understand different commands. Sadly the previous abuse she suffered meant irrespective of how hard we tried, she did not respond*'.

Another dog guardian drew on her previous experiences (as a form of memory-based cognitive information) to recognize a change in her dog socialization '*exhibited fear meeting new people*'. She also mentioned her attention to the state of mind her dog was in at the moment of fear. In some situations, participants described their *affective information* experiences (e.g., emotional reaction that affect their understanding or action). Participant 48 wrote about a cat with asthma and described the information that he used including first-hand experience from other guardians in the same situation; this affective information gathering reassured him during the ups and downs of the treatment process. Participant 716 described communication with the veterinarian as a form of acquiring codified knowledge, while her own active information browsing served to bolster her self-confidence '*feel in control of the situation'*, and information exchange on online animal groups gave her the emotional and mental support she needed to undergo activities of daily pet care.

Concluding discussion: significance, implications, and limitations

The results of the survey of cat/dog guardians in NZ suggest that they learn and update themselves drawing on a range of information, practices, and contexts within their everyday life that have not been explored in previous animal information-related studies. All the previous reports in NZ and around the world have identified conventional forms of information (e.g., Internet , veterinarians) (Kogan et al., 2012, 2018, 2019; Oxley and Kogan, 2018; Solhjoo et al., 2019; Gates et al., 2019; Prata, 2020; Küper and Merle 2020; Kuhl et al., 2021). But our project, with a broader conceptualization of the nature of information and the experience of being informed, aimed to categorize these external forms of information, as well as legitimise and highlight the importance of internal information in human-animal everyday life. The contributions and implications, as well as the limitation of the current study is in its holistic focus on three components emerging from our research framework.

(1) Information: We identified certain external and internal things that cat/dog guardians regard as informative in their everyday pet care and enrichment activities. The results brought examples of *social information* in verbal and nonverbal communication with other humans and animals, *recorded information* in digital and physical mediums, *embedded information* held in artifacts and the animal's body*, embodied information* from the human's own bodily feelings and senses, *cognitive information* and *affective information* acquired from humans' feelings and moods, and memories. One of the limitations on our ability to identify internal aspects of information was participants' restricted descriptions about their subjective state of feeling informed. In surveys generally, respondents rarely refer to their inner feelings or bodily feelings (Nonis et al., 2020) unless they are directed to. In addition, there are few holistic measurements of emotion and cognition, and the more accurate ones are based on observing or monitoring approaches (Lopatovska and Arapakis, 2011). Our findings represent Gorichanaz's (2020) view of information experience that is experience of all things regarded as informative in certain situation, categorised as the *posterior conception* of information experience by Yu and Lui (2022). Yu and Lui argued this perspective as '*when we call anything in the world information, we are already on our way to conflating information experience with experience of anything*' (2022, p 15). But we showed that experience of "anything" informative in human shared lives with animal is information experience (not just any experience), as long as these things fit within accurate and holistic categories of information phenomena consisting of meanings or data. From this, the identified phenomena could be explored in-depth as information entities or meaningful research objects in future studies focused on human-animal information behaviour.
(2) Interaction: We presented the above types of information within active or passive actions (including information searching, browsing and scanning, routine information gathering,

incidental acquisition of information, monitoring, information testing and evaluating, information sharing, information use) within the participants' experiences. However, we could not codify all the guardians' information activities as described in their open-ended answers, especially those that were invisible and more implicit. The descriptions of the participants presented external and internal information as interwoven not discreet groups. Their stories of routine or incidental acquisition of information comes from inside and outside— such as casual talks and bodily experiences on a daily dog walk— and were communicated and interpreted inwardly and outwardly. Mackenzie and Dalmer (2020) also discuss how many activities that are central to the enactment of information practices are less visible to researchers and sometimes even to the people undertaking them. Qualitative methodological strategies are needed to bring hidden everyday information work to light. Future studies are also needed to identify the relationship between different information forms and their related activities, for example, how information interpreted through a memory of a deceased dog, is now used as embodied information to make sense of a new dog's action. Also suggested by Savolainen (2019), this focuses on how sensory and cognitive-affective information are interpreted as an integral part of information experience.

(3) Context: In this study, the everyday life approach is represented as a container within which information activities take place, resulted in recognizing multiple situations and actors. In contrast to previous studies that focused solely on healthcare and nutrition (known as pet health information) in dog and cat guardians' practices (Kogan, et al., 2012, 2018, 2019; Oxley and Kogan, 2018; Solhjoo, et al., 2019; Gates, et al., 2019; Prata, 2020; Küper and Merle 2020; Kuhl, et al., 2021), we identified a variety of work and nonwork domains in their everyday (information) activities, such as emotionalization, recreation and enrichment. The results mostly described the problem-solving aspect and information-needs-driven situations, but they also highlighted some pleasure-oriented situations and leisure-based information seeking. Here, the dogs and cats were represented in the information practices as a significant actor both objectively and subjectively. Their appearances and actions acted as material information for the human. The information communication between animal and human built shared meanings and knowledge (a form of social information). And sometimes the state of mind (emotions and thought) of the dog/cat was considered by guardians as a source to make meaning and decisions. These results are exactly what Ocepek (2018) suggested as the nuances of the everyday world that could enhance information behaviour studies.

Finally, this study was based on a small part (the information-related section) of the online survey. Although the high response rate, especially for the open-ended question, brought rich insights into NZ dog/cat guardians' information experiences, we need more in-depth research to understand how they experience information and build understanding about their shared daily life with dogs and cats. Understanding this is important for finding ways to guide the community towards better dog/cat guardianship, stronger human-animal bonds, and, most importantly, improve the wellbeing of cats and dogs themselves.

About the authors

Niloofar Solhjoo, is a recipient of the Wellington Doctoral Scholarship in Information Systems at Victoria University of Wellington (VUW). She is researching everyday information behavior of multispecies families in New Zealand. She has published articles about information experiences of human-animal relationship, and ehealth literacy of companion animal guardians. She can be contacted at niloofar.solhjoo@vuw.ac.nz

Maja Krtalić is a senior lecturer in Information Studies at VUW. Maja teaches and researches in the areas of information behavior and cultural heritage preservation. She is currently researching personal collections and the concept of personal cultural heritage management. She can be contacted at maja.krtalic@vuw.ac.nz

Anne Goulding is Professor of Library and Information Management at Victoria University of Wellington (VUW), New Zealand. Her research interests are library and information services, digital

literacy, teaching and learning in the information studies field. Anne is Editor of The Journal of Librarianship and Information Science. She can be contacted at anne.goulding@vuw.ac.nz

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Tables

Table 1. Demographic variables of participants

Variable	Category	Percentage	Number
gender	Female	93%	693
	Male	3%	26
	Non-binary	2%	10
	Not stated	2%	17
age	20 - 25 years	8%	59
	26 - 35 years	24%	180
	36 - 45 years	24%	176
	46-55 years	26%	193
	56-65 years	16%	123
	Not stated	2%	13
ethnicity	NZ Pākehā (New Zealander)	70%	565
	European	12%	100
	Māori	7%	53
	Other	11%	28
educational level	Secondary	30%	218
	University degree	41%	303
	Post-graduate degree	29%	211
income	Less than $40,000	6%	47
	$40,000–$70,000	14%	100
	$71,000–$90,000	12%	89
	More than $90,000	55%	404
	Prefer not to say	13%	93
location	Small town/ village	11%	83
	Rural	8%	61
	Large town	15%	107
	City	66%	482
Total number		746	

Table 2. Information sources used

#	Information resources	Percentage	Count
1	Expert opinions (a veterinarian, a veterinary nurse)	92.63%	691
2	Personal experiences and memories of similar pet-related issue	74.93%	559
3	Casual conversations with other pet owners	72.52%	541
4	Searches on the Internet (e.g., Google, or Yahoo)	70.24%	524
5	Social media (e.g., Facebook, Twitter, or Instagram)	58.98%	440
6	Friends	55.23%	412
7	Personal resources (a pet health record, personal notes)	49.87%	372
8	Pet shops and pet services	48.39%	361
9	Online forums /discussion groups	48.39%	361
10	Family	45.84%	342
11	Trainers	42.23%	315
12	Books	40.35%	301
13	Websites of animal hospitals and veterinarians	37.53%	280
14	Breeders	34.58%	258
15	YouTube videos	34.45%	257
16	Commercial websites (pet food companies, or pharmaceutical firms)	29.76%	222
17	Blogs of other pet owners	24.26%	181
18	Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA)	22.52%	168
19	Journal and magazine articles	21.45%	160
20	Pet technology (pet gadgets or mobile apps)	16.22%	121
21	Television	10.99%	82
22	New Zealand Veterinary Association	10.99%	82
23	Pamphlets/ Flyers	10.72%	80
24	Companion Animals New Zealand (CANZ)	9.52%	71
25	Newspapers	6.70%	50
26	Dogs New Zealand (Dogs NZ)	5.90%	44
27	New Zealand Cat Fancy (NZCF)	5.09%	38
28	Radio	3.75%	28
29	New Zealand Institute of Animal Management (NZIAM)	0.80%	6

Table 3. Interacting with external forms of information in different contexts of companion animal guardians' everyday life, with sample references

Information / Context	Embedded information	Social information	Recorded information
Emotionalization and bonding	No references	*The kitten was really wild when I first got her… I consulted the vet and online cat socialising sites, and slowly earned her trust and calmed her down…* (P 42)	No references
Healthcare and Physical health	*Had to treat an allergy. Found it was a reaction to a new cleaning product.* (P 510)	*One of my dogs got diagnosed with Cushings. First port of call was vet. Took 18 months to diagnose... After diagnosis joined a FB group and changed treatment significantly because of that.* (P 228)	*FIP. I was trying to find out if there were any new treatments available for FIP. I mostly used Google but was selective about the results and tried to pick legitimate sources (veterinarians etc).* (P 33)
Managing the environment	*my cat started to chew woollen socks at the start of lockdown 2020. Found some sites that said it could be an anxiety thing due to a change in environment (no one at home to everyone at home full time)… I made sure to give him a "safe place" where the kids can't pick him up so he got some peace.* (P127)	*we live rurally and lots of fleas. My dog picks them up. Investigated different ways of dealing with the issue - talked with vet, asked friends with similar housing (lots of outdoor areas).* (P 232)	*my cat was scared to go outside so I researched online how to make the place more safe and stop him peeing inside* (p 328)
Mental wellbeing	No references	*Our pet had separation anxiety. We used google at first to self-correct but ended up contacting a "dog whisperer".* (P 71)	*Trying to find new strategies to make the life better for blind cat… Read medical articles about blindness and causes* (P 293)
Nutrition	*Deciding whether to feed a raw diet for dog…. purchasing a frozen raw mix at a pet shop… and visited a local raw food supplier to purchase, but decided the frozen mix, although more expensive, was easier and tastier for my dog.* (P 203)	*To learn more about how to cook for my dogs I got in touch with friends of friends who cooked for their dogs... I always get in touch with my vet about an issue too.* (P 222)	*Wanted to shift our younger dog to different biscuits following a gastro upset, I google searched and used a website I have been to before that provides nutritional reviews of dog foods.* (P 67)
Recreation and enrichment	No references	*Sometimes we play with other dogs outdoor. … and observe each dog to ensure he/she is enjoying it without any injury or getting overly tired… we learn from each other [dog guardians] more about how to recognise and communicate with all the dogs.* (P 523)	*Brought Trick books, Googled trick courses, found one brought it, worked through the online videos and book with instructions to learn each new trick* (P 217)
Socialization	No references	*Our cat was having a tough time adjusting to having*	*Socializing a new kitten with our older cat.*

		another cat in the house… found a real mix of info…At end of day we called our local vet who had our cat records and knew our cats temperaments. He gave us sound advice and dispelled a lot of misconceptions (P 33)	*researched with several reputable websites* (P 8)
Training	*I tried to find a humane way to stop my dog from barking at people who walked past our house. …bought a device online, which gives a sound to the dog to stop barking, then we give her a treat. It worked for a while, but then we stopped doing it, so she started barking again!* (P 174)	*How to stop him barking: Asked friends… Got a trainer. In the end animal control came and told us to squirt water gun. He still barks.* (P 62)	*I wanted to learn how to train my fur child to be less demanding at dinner time. I googled how to do it and then put it into practice. Now my cat will sit before she eats dinner* (P 54)

Table 4. Interacting with internal forms of information with sample references

Information	Sample reference
Embodied information	• Somatic experience: *'My dog's stomach would gurgle as if someone was trapped inside and screaming…, she was unsettled when it did happen and sometimes vomit.'* P 631 • Interpretation of senses: '*I'm always trying new things with them. Different foods, smells, textures and … [I] observe their behaviours read body language to sense how they are doing.'* P 37
Cognitive information	• Personal knowledge: *'…follow [vet] guidance and their encouragement to adjust steroid use based on me knowing my pet and being able to monitor and adjust dosage as required.'* P 21 • Memory: '*…she was traumatised from her early months and fought and bit every time anyone went near her…But now I can cuddle her and she will snuggle in and not try to dismember me.*' P 42
Affective information	• Feelings: '*The best training we did was learning to love each other - that meant she [dog] wanted to be with me as much as possible, and she also learnt that the best way to achieve her goal of being with me was to be good.*' P 681 • Emotion: '*while doing my own research around [cat] diet helped me feel a little more in control of the situation. Joining the online groups provided the emotional/mental support I needed from people who were dealing with the same situations'* P 716