# Ambiguity, Ambivalence and Affective Encounters: an Ethnographic Account of Medical Detection Dog–Trainer Relationships

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**Abstract**

A relatively novel application of dogs' olfactory capabilities involves training them to detect and alert to the odour of human diseases. Drawing on research using ethnographic methods of participant observation and semi-structured interviews at two medical detection dog training and research facilities, this paper examines interspecies relationships and knowledge production during the medical detection dog training process. This study aims to understand how trainers experience this work. However, the analysis moves beyond a wholly anthropocentric focus by considering the agency of both human and non-human animal. Within the medical detection dog domain, ambivalent human perceptions towards the dogs are identified. On the one hand, the dogs are perceived as machine-like extra-sensory tools that can be employed to identify odours imperceptible to the human nose. Simultaneously, however, the trainers understand the dogs as agentic individuals: a perception associated with the potential for unpredictability or ambiguity in a dog's search behaviour. To overcome such ambiguity, trainers learn to "listen" to the dogs and rely on interpretive flexibility in order to successfully interpret a dog's behaviour. The analysis finds medical detection dog training encounters to be mutually affective as both parties are changed in the process. In this context, knowledge is produced collaboratively, though not equally as attention to the power relations that underpin this interspecies work reveals asymmetries reflected in the training system. This study builds on previous literature that has shown ambivalence to be central to the relationships between humans and other species, and extends our understanding of interspecies work practices.

**Keywords:** human–animal relations, dogs, medical detection dogs, dog training.

## Introduction

Dogs' ability to detect odours is much more sophisticated than that of humans (Marshall and Moulton, 1981). This has led to their use in a variety of scent-based tasks, including detecting explosives and drugs in police and military forces (e.g., Adamkiewicz et al., 2013) and identifying endangered species in conversation activities (e.g., Matthew & Relton, 2021). A more recent application of dogs' olfactory capabilities involves training dogs to detect and alert to the odour of human diseases including bladder cancer (e.g., Willis et al., 2004). The odours that medical detection dogs are trained to identify are believed to be comprised of a combination of volatile organic compounds that originate in disease cells and are excreted in biological substances (e.g., urine, sweat, breath). The concentration of these odours is as low as parts per trillion, which Alexandra Horowitz (2010, p.72) puts into context by suggesting that "We might notice if our coffee's been sweetened with a teaspoon of sugar; a dog can detect a teaspoon of sugar in a million gallons of water: two Olympic-sized pools full." Medical detection dogs are only ever trained to detect the odour of disease in biological samples, presented to them within a controlled environment. This is in contrast with medical alert assistance dogs that are trained to detect odour "on a person", for instance alerting their human companion to changes in the human's blood glucose levels. The use of such medical alert assistance dogs by individuals with Type 1 diabetes has been explored in work by Fenella Eason (2019; 2020), who argues that these interspecies relationships are mutualistic as both parties benefit in having their needs met in the partnership. So far, however, little attention from within the humanities and social sciences has been paid to the work of medical detection dogs and their trainers. This paper addresses this gap by exploring interspecies relationships and knowledge production in the context of medical detection dog training.

Previously studied "on the margins of anthropology—as part of the landscape, as food for humans, as symbols" (Kirksey & Helmreich, 2010, p. 545), animals and other nonhuman

organisms have increasingly been "brought into" anthropology as a focus of inquiry (Haraway, 2008; Kirksey & Helmreich, 2010). Commonly under the rubric of "multispecies ethnography" (Kirksey & Helmreich, 2010), ethnographers are studying the myriad nonhuman organisms – from primates to fungi to microbes (Haraway, 2008; Tsing, 2009; Paxson, 2008) – whose lives are intertwined with those of humans. This growing body of literature illustrates that "human nature is an interspecies relationship" (Tsing, 2012, p. 141). Whilst the agency and perspective of the non-human animal is considered in this paper, my primary aim is not to conceptualize medical detection dog encounters from the animal's point of view. Rather, the main aim of this paper is to examine how trainers experience interactions with medical detection dogs.

Nevertheless, this paper draws on previous work developed in the turn towards the animal for insights that are useful in thinking through the interspecies relationships between human and animal in medical detection dog training. The use of affect theory in recent ethnographic work redirects the focus from "how humans think to how animals feel: the feelings they evoke in humans and the feelings they feel themselves" (Rutherford, 2016, p. 293). For scholars engaged in research in this vein, the notion of affect is particularly useful for the focus on the senses it can afford (Hayward, 2010). The work of Gilles Deleuze and Félix Guattari (2004) is central to much of the literature on affect in the social sciences and humanities. They argue that "we know nothing about a body until we know what it can do, in other words what its affects are, how they can or cannot enter into composition with other affects, with the affects of another body" (Ibid., p. 284). My own understanding of affect follows its use by Vinciane Despret (2004; 2013) and Bruno Latour (2004) who employ affect as a verb, highlighting affective encounters as active processes through corporeal relations. Exploring how scientists use their bodies in encounters with the animals they are studying, Despret (2013) claims that embodied communication is necessary for the development of empathy, which is subsequently critical to

the development of the scientist's understanding. Donna Haraway (2008) argues that through paying attention to each other through mutual attunement, beings of different species engage in a transformative process of "becoming with", whereby new entities are created. Focusing on dog training, Haraway employed her notion of "becoming with" to consider this activity a reciprocal endeavour in which both parties are altered. For Haraway, such becoming takes place in what she calls "contact zones": a term she uses to signify "how subjects are constituted in and by their relations to each other", even though always also "within radically asymmetrical relations of power" (2008, p.216). Cautious that Haraway's approach reduces humans with non-human animals to hybrids, Joanne Latimer (2013) offers an alternative way to consider human–animal relations that maintains an emphasis on "division and alterity as much as connectivity and unity" (p.98). Latimer's notion of "being alongside" claims that interspecies dwelling "can involve cooperating with one another, even working together, but not with the same materials and not necessarily to the same ends" (2013, p.80). Attention to difference is retained in this paper, affording space for a critical assessment of the asymmetrical power relations between the human and the animal.

Human relationships with animals are often complex, multi-layered and full of contradictions (Herzog, 2010). With a focus on relations between humans and dogs in particular, previous sociological and human geographical work (Arluke & Sanders, 1996; Fox, 2006; Greenebaum, 2010), has highlighted how dogs are commonly attributed "personhood" by their human guardians. Whilst such perceptions challenge conceptual boundaries between humans and nonhumans, this perception is often in conflict with ideas about the exceptional character of the human. In his research on K-9 Officers' relationships with their patrol dogs, Clinton Sanders (2006, p. 149) notes that "dogs and other service animals are regarded both as 'objects' that serve, protect, and assist and as individual companions with whom one interacts and

develops a shared emotional bond". Building on such work, this paper explores how ambivalence shapes human–animal relations and knowledge production in the context of medical detection dog training.

**Methods and Research Settings**

This study was approved by (institution name removed for anonymous peer-review) Research Ethics Committee (Project ID Number: 6522/002).

This paper draws on eleven months of ethnographic fieldwork with medical detection dogs and the people who train them to take part in research studies, at two dog training and research facilities. Between 2016-2017, I spent eight months with Medical Detection Dogs (henceforth MDD), a charity based in rural Buckinghamshire, UK. MDD trains dogs to detect and alert to the odour of human disease for two distinct roles: (1) medical detection and (2) medical alert assistance. This paper is focused on the training of dogs for the former application – medical detection . Working alongside hospitals and universities that provide the biological samples for training and research, the charity trains dogs to detect the odour of diseases such as prostate cancer and malaria, and bacteria including Pseudomonas aeruginosa. Following training, the charity conducts studies to assess the dogs' efficacy. Whilst the dogs are owned by the charity, throughout the course of their career they live with a local foster family who transports them to and from the training centre around four days per week, dependent on the individual dog's training program. During each day spent at the training centre, dogs typically participate in two or three training sessions that last around twenty minutes each. When not in training, the dogs are walked and rest among each other and alongside staff in an office that adjoins the training room.

In addition to MDD, in 2017, I spent three months at the Penn Vet Working Dog Center (henceforth PVWDC), part of the University of Pennsylvania's School of Veterinary Medicine in Philadelphia. PVWDC trains and conducts research with dogs in three primary areas: law enforcement (e.g., explosives and drugs), search and rescue (of both alive and deceased persons), and medical detection (e.g., cancer and bacterial infections). The organisation's research is aimed at optimising the performance, health, and welfare of detection dogs through research. Thus, whilst the everyday work and aims differ in some regards from MDD, the two organisations both practice the training of detection dogs and conducting studies to develop research in this field.

Choices around field sites were determined in part by practicality, owing to the limited number of organisations or research groups engaged in this relatively novel field. At the time of conducting my research, MDD was the only UK organisation training and studying the efficacy of dogs in medical detection. The process of negotiating formal research access to organisations can be difficult due to fears about outside scrutiny (Smith, 2001) and my own experience gaining access to MDD was not exempt from these challenges, as MDD had concerns about how the charity might be represented within my work. To mitigate such worries, I agreed to share draft publications with the charity's scientific advisor prior to publication. A draft of this paper was also shared with the PVWDC's Executive Director. This provided the opportunity for the organisations to ensure that their meanings were accurately represented, though the feedback received centered predominantly around the clarification of technical terminology. In addition, a draft of this paper was shared with several of the trainer participants, to check for accuracy and resonance with their experiences (Lincoln and Guba, 1985).

A second field site was sought to allow for the comparison of practices and to consider the potential generalizability of findings beyond one specific organisation. I became aware of PVWDC through a working dog conference hosted by the center. Acquiring access was relatively straight forward, owing to an established student internship program which I was able to align myself with. Interns are integral to the everyday operations of PVWDC, practically supporting the dog training and research activities (e.g., recording data from training activities, hiding for dogs to find during search and rescue training, exercising dogs). I embraced this role alongside a cohort of college students (earning academic credit from their participation), which provided me with the opportunity to immerse myself in the work of PVWDC. In contrast, my role at MDD was less clearly defined at the outset. Gradually, as I became less of an outsider amongst the trainers (and dogs), I adopted a role between laboratory-technician and dog-caretaker, helping to support the trainers in everyday tasks that included preparing samples, setting up equipment, recording training data and dog walking.

At both sites I gathered data through intensive participant observation. At the time of research, each organisation was comprised of six trainers. Valuable data were collected through informal conversations with the trainers, in which I talked to them about their experience working with the dogs and their understanding of the training process. Daily field notes, primarily composed of narrative descriptions of everyday practices and discussions, were recorded by hand in a pocket-sized notebook and digitised at the end of each day. I jotted methodological and theoretical reflections informed by previous literature, as well as emerging analyses and questions in a separate section of my notebook. With participant's consent I used my phone to take photographs and make video recordings which were used to develop more detailed analyses of interactions. As I became more embedded in the respective organisations, my responsibilities developed, and eventually I was entrusted to handle certain dogs during

training sessions: practical work that was invaluable in developing my understanding of the embodied nature of the work being performed by the trainers and dogs here. My field conversations were supplemented with semi-structured interviews, conducted in training rooms and offices, with eight dog trainers across the two organisations. Interviews ranged between twenty-five and sixty minutes, and were audio recorded and transcribed verbatim. Interview transcripts and field notes were thematically analysed to identify key themes. I used both deductive and inductive approaches; the latter drawing on the principles of grounded theory (Glaser & Strauss, 1967). Analysis began with several codes identified from my engagement with existing literature (Boyatzis, 1998), while allowing for additional themes to be guided by the data. Data were reviewed line by line and manually coded using margin annotations and highlights on digital copies. All human participants were invited to participate through a written informed consent process and participants were aware that they could withdraw from participation at any time.

**Training to be affected and managing interspecies affective relations**

During a typical training session at MDD for the detection of prostate cancer, a one milliliter sample of urine, donated by someone with a prostate cancer diagnosis, is poured into a sterile pot and attached to a rig. The height of the rig is adjustable to ensure that the pot sits level with the individual dog's nose, enabling the dog to sniff the headspace with ease. A dog works alongside a specific trainer who they are paired with for the course of their work with the organisation. During each search (as per the process at the time of my fieldwork), a dog typically works a line-up comprised of between four and eight positions, with one of the samples positive for the disease. A positive detection is communicated to the trainer via a conditioned alert behaviour, usually in the form of the dog staring at or sitting down in front of positive samples. This behaviour effectively "translates" the dogs' spontaneous response to the

odour into a behaviour that is readily understood by the trainer but is an "arbitrary" behaviour from the dog's perspective (Mancini et al., 2015, p.2673). The rest of the samples in the line-up are negative and the dogs are trained to walk away from these. Sometimes, line-ups known as "blank runs", containing only negative samples, are used, as the dogs are also rewarded for giving an "all clear" response.

Explaining to visiting members of the public why the dog's olfactory system makes this animal an ideal candidate for disease detection work, MDD's CEO and Co-Founder invoked the following tool-like understanding of the dog–or, more specifically, a *part* of the dog (her nose)–as a "biosensor": "Why would the dog be so good at this? It's not too hard to imagine. The dog's nose is a biosensor provided by nature." Representations of medical detection dogs as functional, machine-like objects are also observed in published accounts of research studies: one research group (that the author did not observe in the current study) makes a reference to the medical detection dogs involved in their study as a "rigorously trained canine olfactory system" (Taverna et al., 2015, p.1383).

However, knowledge about the odour samples is not produced by the dogs in isolation, for the trainer "handling" the dog is required to interpret the dog's behaviour to come to an understanding of what is in the sample. After the trainer has uttered their call of "indication" or "clear"[1], the sample's true content (i.e., whether the sample is positive or negative for the disease of interest, according to the results of laboratory testing) is confirmed by an assistant–often this is another trainer. At this point the trainer clicks and rewards the dog if they have demonstrated the appropriate behaviour during their search. The following vignette taken from a training session at MDD illustrates this process:

*On Dani's command of "Seek seek," Bertie hurries over to the first position (of eight) on the scent wheel and pauses, hovering his nose over the pot for a moment, before moving on to search the second, third and fourth positions in the same manner.[2] His agile body weaves carefully around each of the arms that jut out from the centre of the carousel-like metal structure, with his nose leading the way as he searches each pot in succession before arriving at position five. When sniffing this pot, with his nose still hovering over the top, his bottom drops to the floor, and his eyes glance up towards a one-way screen behind which Dani, his trainer, is stood watching through. Dani calls out "indication," and her assistant Ed, who is monitoring a laptop in the corner of the room, responds "correct." Dani presses down on her clicker, a small hand-held device, causing it to exert a brief, sharp sound that lets Bertie know he has made the correct decision and that a reward is imminent. Dani walks over to where Bertie is sat, his eyes fixed on her but his nose still hovering over the pot. He licks his lips as she moves closer. Feeding him some kibble treats from her hand, Dani tells Bertie he is a "good boy".*

This brief vignette illustrates how a medical detection dog, guided by their trainer's feedback over repeat training encounters, has been rendered affected in a precise way by their target odour. In Latour's (2004) analysis of a student learning to distinguish between subtly contrasting perfume scents he uses the notion of affect to consider the body of the perfume student as an entity that, guided by a teacher, is undergoing "training to be affected". Similarly, the trainers can be understood as gradually teaching the dogs to become affected in particular ways when they are presented with certain odours, which prior to their training would not have prompted them to act in the same manner. Through an attentiveness to the dog's behaviour, the trainer makes an assessment about a sample's contents. Thus, the trainer and dog work together to produce decisions. However, whilst recognizing the collaborative quality of knowledge

produced through such encounters, attention should also be afforded to asymmetries in the agency of each party. Firstly, the signaling behaviours (e.g., sitting down in front of a positive sample and moving away from a negative one) that dogs are conditioned to display benefit the human party who depend on these clear visible behaviours to make sense of the dogs' response to the sample. For the dogs, however, such learnt behaviours are "alien to any signaling behaviour they have evolved as a species." (Mancini et al., 2015, p.2673). Furthermore, it is the human's interpretation of the dog's signaling behaviour that is recorded and used in analyses of dogs' abilities, centering the structure of these training sessions on the human.

Because the goal of the training is to produce dogs who will eventually take part in scientific studies, during which the trainers will have no prior knowledge of the composition of the samples, it is essential that the dogs make independent decisions during their searches. Therefore, the training process not only requires the trainers' attention to how the dogs are affected by the odours, but also demands management of the affective relationship between the dog and their trainer. Once dogs are thought to "know" their target odour (i.e., they have demonstrated consistent reliability in alerting to positive samples and ignoring those that are negative), the trainers begin to work "blind", meaning that they do not know the composition of the line-up and are not at risk of unconsciously prompting the dog during a search. During such training sessions, an assistant takes responsibility for the selection and formation of samples, sometimes using randomisation apps.

Working blind is not the only means through which cross-species affect is managed in the training room at MDD. In addition, a one-way screen enforces a physical and visual barrier between trainer and dog during a search. Fitted with a tinted window, the screen allows the trainer to watch a dog search, whilst simultaneously preventing the dog from seeing their

trainer, should they turn and attempt to look to their trainer. When the trainer stands behind the screen, the dog is prevented from being able to "look back" (Haraway, 2008, p.21) and thus is not at risk of being affected by any conscious or unconscious physiological cues from their trainer. These techniques and tools for managing interspecies affect illustrate an understanding of the dogs as responsive, minded beings who are capable of reading human communicative cues. Through the use of the one-way screen we also observe the performance of unequal power differentials in the relationship between human and dog here, whereby the human has the capacity to restrict what is visible to the dog.

**Listening to what the dog tells you**

In Sanders' (2006) study of K-9 officers' relationships with their patrol dogs, he observed that as a result of the officers' understanding of the dogs as individuals with unique personalities, strengths and weaknesses, the training process is underpinned by the handlers' learning to "read" the dog. This practice was also found to be central among the medical detection dog trainers. A vignette from my field notes taken at PVWDC helps to demonstrate this:

*Tash is working with Jet, a dog in the early stages of the training process. Midway through the session, an intern comes into the training room holding a plastic pot that had been used during another dog's training elsewhere in the centre. She sets the pot aside on some low shelving, a couple of metres away from where Jet and Tash, are working. A minute later, Jet walks away from Tash over to the item and sniffs it curiously. With her eyes focused on Jet, Tash asks the intern "Is that dirty?" The intern confirms that the equipment is contaminated with the training odour used to teach young dogs the game of scent detection. With Jet still sniffing, Tash clicks, marking Jet's interest at the pot, and rewards her with some kibble. "No wonder she's hitting on it," Tash says, "you're not wrong girly!"*

As illustrated in this brief vignette, the trainer's understanding of Jet is guided by an assumption of dogs as beings who can be "read". During an interview with Dani at MDD, in which she reflected on the attributes that that she considers fundamental to a successful medical detection dog trainer, she emphasized the importance of learning to understand dogs through modes that prioritise the nonverbal. Specifically, she explained that trainers have to "listen" to the dogs:

> "You have to understand *why* they're doing what they're doing and how to harness everything that they have. It's very much working with them to work out what their reason or drive is for doing it, to sort of harness that so you can get the best working relationship (…) They speak to you. The way they move, what they're doing, their posture. Even just the way they look at you as if to say 'I don't understand what you're saying' means you know you need to work out a different way of doing it (…) Even though they can't speak English, you still have to communicate with them. You still have to sit and listen and work out what it is they understand and don't understand."

Implicit in Dani's account is her desire to understand each individual dog on their own terms, as beings who, whilst not sharing a human language, are certainly not mute nor unable to respond in a manner that can be understood by humans. Although dogs do not communicate in verbal utterances akin to humans, they are nevertheless recognised as highly communicative in nonverbal ways, as both trainers in the above examples acknowledge.

When a trainer makes themselves available to "listen" to an individual dog over repeat interactions, they develop the ability to work with the dog to reliably indicate the presence of target odours as a human–dog team. Furthermore, they also build an understanding of the

nuances of that dogs' body language in order to deduce further information about the details of the particular odours–beyond the binary "positive" or "negative"–that are embodied in the dog's movements. Working blind, Ed at MDD demonstrated his ability to infer the particular characteristics of the control samples presented to Lola, through paying close attention to Lola's body as she interacted with the samples. The pair were training for a study to detect a specific bacterium and their positive samples were laboratory grown bacteria suspended in a broth, while control samples were either pure broth or broth with specific antibiotics. Observing how Lola moved her body away from the control samples over numerous training sessions, Ed had learnt that Lola would typically come away from the sample very quickly, turning her body to the right, after sniffing a control of pure broth. However, when a control sample contained an antibiotic in addition to broth, Lola would turn the other way. Despret's (2013, p.71) understanding of empathy as a mode of bodily questioning that "attunes bodies" is useful for thinking about the way knowledge emerges here. By asking what matters to the individual dog as they investigate odour samples, and allowing the dog's body to affect them, trainers learn to think *with* the dogs, rather than merely about them as objects (Ibid.).

**Interpretive flexibility**

An ideal medical detection dog would perform an unambiguous behaviour (e.g., sitting down) when presented with a sample odour. However, the trainers acknowledge that sometimes a dog's search behaviour on a given day may not be as consistent as desired. To illustrate this point, I recall a training session at MDD, during which Lola offered some ambiguous search behaviour that Ed was obliged to make sense of. Whilst most dogs are trained to search a system that comprises a number of search positions, Lola was unique, as she was (at the time of my fieldwork) the only dog at MDD trained to search for a disease odour on a one-stand system. In theory, the one-stand system should elicit one of two responses from Lola: she either

remains at the stand and sits to indicate a positive sample, or she returns to her trainer to indicate a control sample. However, having observed Lola work over several sessions and listened to the trainers who routinely work with her, I learnt that Lola sometimes behaved in a manner that was not always easy to interpret. In particular, she had a tendency to raise her paw when interrogating samples, commonly when the sample was a target, but sometimes also out of apparent frustration after she had been presented with a run of consecutive blanks. Although MDD use a "balanced reward system", whereby dogs are similarly rewarded for ignoring control odours as they are for correctly alerting at target odours, the trainers speculated that being presented with control odours may not be as satisfying for Lola as sniffing the salient target odour. As a result of this potential unpredictability, making sense of her behaviour required the skill and experience of her trainer. The following vignette, informed by my field notes, begins as Lola was searching a target sample–though as he was working blind, Ed, was unaware of the sample's contents.

*Sniffing the sample, Lola raises her paw to the arm and expresses a high-pitched whine. She then turns away from the stand and hurries back to Ed's side, behind the screen. Ed comments to Kelly, who is assisting, that he is not confident in making a call of indication or no indication, based on Lola's behaviour, and he elects to send Lola to search the sample again. "Seek seek," Ed calls out, sending Lola to search again. On this pass, Lola raises her paw again but then sits, offering her trained alert response. This time, Ed calls out "indication," and is informed by Kelly that this is correct. He clicks and rewards her with some pieces of dry dog food at the stand. Ed and Lola then leave the room whilst Dani switches the sample to a control. On the next search, as Lola investigates the sample, she raises her paw towards the stand and begins to bend her legs and move her bottom towards the floor. But before committing to a full sit, she comes away from the stand and returns to Ed's side behind the screen. Ed calls out "clear" to*

*Dani for confirmation. After telling him this is correct, Dani asks, "How did you know not to call [indication] on that?". Ed replies, "There wasn't all the huffing and puffing. It's not something I can really explain, it was just different."*

This example makes clear that, recognized as behaving beings with unique personalities, dogs trained in medical detection do not always perform in predictable machine-like ways, but their behaviour can engender complexities requiring a degree of interpretive flexibility from their trainers. Trainers speculated on possible reasons for changes in a dog's search behaviour, which included the arrival of a new baby at the fosterer's home, or a dog's recovery from a recent illness: events that, it was understood, could affect a dog's mood and, in turn, their work. The risk of ambiguous behaviour from a medical detection dog is also associated with the aforementioned arbitrariness of the conditioned behaviours the dogs are trained to perform in response to the sample odours, which do not provide opportunity for dogs to communicate nuances beyond the binary options of "positive" or "negative". It is therefore imperative that attunement is cultivated between the parties in order for the trainer to interpret the dog's behaviour accurately. Working alongside each other over a period of months or, often, years enables both parties to "learn to know each other" well (Despret, 2013, p.66). Consequently, the trainers are able to draw on their knowledge and experience of personal relations with the individual dog, developed both inside and outside the context of the training room, to interpret their behaviour accordingly. The above example highlights why becoming attuned with the dog is essential here, as the interspecies communication that takes place between trainer and dog is felt as much as it is interpreted (Hodgetts & Hester, 2017, p.84).

A comparative case in which interpretive flexibility has been examined is in the work of Ivan Pavlov (Todes, 1997). Examining the use of dogs in Pavlov's physiological laboratory work,

medical historian Daniel Todes (Ibid.) explains how interpretive flexibility was key to overcoming a tension between the laboratory scientists' conflicting perceptions of the dogs. In one sense, Pavlov's dogs were certain kinds of "machines" imagined and constructed via surgical operations in the laboratory. For instance, some were fitted with fistulas to enable the collection of gastric secretions. These dogs were thus particularly constructed technologies, fabricated to produce something else. However, Todes reveals how this characterization–what he terms, the "dog-as-technology"–existed in tension with an interpretation of the "dog-as-organism". This latter depiction of the dogs is tied to the dog's status in the experiments as a living and complex organism: Pavlov's experiments only took place once the animal had recovered from surgery and regained its "normal" physiological state. The assessment of such "normalcy" was a task assigned to Pavlov's co-workers who took into consideration a dog's weight, temperature and "happiness"—perceived through attention to factors such as a dog's appetite and energy. As a result of the degree of individuality that informed the perception of each dog, Todes argues that interpretive flexibility was crucial to the practice of interpreting experimental data. Certainly, the experimental procedures and uses to which Pavlov's dogs were put differs to those of medical detection dogs in significant ways, especially regarding material practice. Notably, in order to become research participants, the bodies of medical detection dogs are not altered through surgical bodily manipulation. Instead, as I have illustrated, their "becoming" is achieved through training practices that alter the dog's affective engagement with the world. However, similarly to Pavlov's dogs, medical detection dogs are regarded simultaneously as both object and subject. On the one hand, they are considered potential tools in disease detection: ideally trained to respond in a specific way to the presence or absence of a particular odour. In practice, though, they are routinely acknowledged as complex biological beings with unique personalities, emotions and desires. As Todes demonstrates was the case for the scientists working alongside Pavlov's dogs, the

acknowledged significance of a dog's mind, or their "psyche", is a frequent source of interpretive flexibility in the case of training medical detection dogs.

## Conclusion

In this paper I have presented an analysis of ethnographic findings on human–dog relationships in the context of medical detection dog training. Within this domain, trainers' understandings of these dogs are shaped by contradictory perceptions of them as both "screening tools" and as "minded individuals". These findings support previous work highlighting the inconsistency that shapes human–dog relationships (Arluke & Sanders, 1996; Sanders, 2006): reflective of the constant paradox (Herzog, 2010) that is a feature of human attitudes towards, and interactions with, other animals more broadly.

The trainers' definition of medical detection dogs as minded individuals is associated with an understanding of the potential for ambiguity in the dog's search behaviour. To overcome such ambiguity, attunement (Despret, 2013) with the individual dog is cultivated over frequent training sessions. Whilst these findings suggest that the boundaries between human and animal are more blurred than once thought, it must be acknowledged that even when animals are recognised as agentic individuals and considered as "collaborators", a fundamental asymmetry underpins interspecies relationships. As Haraway (2008, p.73) reminds us, animals work but "not under conditions of their own design". Indeed, the dogs involved in medical detection work have not actively chosen to do so in the same way as the trainers, nor do the outcomes of the research stand to benefit then. The analysis presented here has highlighted how the training system ultimately privileges the human. Looking to the future, research in the field of human-computer interactions that adopts a multispecies participatory design to re-center detection

practices on the dogs (Mancini et al., 2015) might provide the prospect for some of the asymmetry observed in the human-centered training system to be mitigated.

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**Notes**

[1] Trainers also have the option to call "hesitation" if they are unsure about the dog's behaviour.

[2] Throughout this paper, all names of people and dogs are pseudonyms in an effort to maintain anonymity. However, due to the niche field of work undertaken by these organisations, I was unable to guarantee my participants anonymity. This was made clear in the process of acquiring informed consent.

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