

Exploring Dog Agency: an Inquiry into Dog Agency and Augmentative Interspecies Communication Technology

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Abstract

Since the introduction of nonhuman animals into the sociological research field, theories of nonhuman animal agency have been developed. However, these new definitions miss empirical ground. This study explores dog agency in practice. An additional focus is on the impact of Augmentative Interspecies Communication technology on dog agency. The technology considered is a soundboard with recordable answer buttons. Through semi-structured interviews with guardians – both with and without AIC technology – dog agency is tested empirically. Findings suggest that dogs have agency. Dogs' actions are informed by their needs and wants and tailored to their interests and preferences. Incorporating AIC technology into the dog-human relationship offers dogs more opportunities to display their agency. In addition, the technology improves the communication and connection between dog and guardian and improves awareness of the dog's actions and thought processes. Subsequently, opportunities arise to advance the dog's quality of life.

Keywords

dog – agency – Augmentative Interspecies Communication – technology – George Herbert Mead

In contemporary society, nonhuman animals are omnipresent in our everyday lives. They are part of our language and culture, they are food, transmitters of disease, etc. (Bryant, 1979). A variety of nonhuman animals are kept as companion animals. Yet only dogs have a long history of interdependence and co-evolution with humans, more so than others (Amiot et al., 2016; Hare & Tomasello, 2005). As permanent companions of mankind, dogs are ubiquitously present in contemporary Western societies. In 2020, there were over 89 million dogs in Europe, with an estimated 25% of households having at least one dog (FEDIAF, n.d.). In the United States over 38% of the households had at least one dog in 2018 (AVMA, 2018). Despite their omnipresence, dogs remain marginal to the research field of sociology (Ferkl, 2018). With its anthropocentric history, sociology has come to study “the *human* society” (Nibert, 2003, p. 5; emphasis added), “the social and cultural life of *people*” (Carter & Charles, 2018, p. 85; emphasis added) and “the social as centered on the *human*” (Cudworth, 2015, p. 1; emphasis added). Consequently, sociological theory is anthroponormative: Conceptualizations of “society,” “sociality,” and “social action” were only theorized about in relation to humans. This is also the case for “agency,” which has been defined in strictly human terms (Carter & Charles, 2018; Twine, 2010).

Agency is often defined as making motivated, purposive choices, acting upon them with creativity, and being able to reflect upon these choices (Emirbayer & Mische, 1998). Recently, scholars have been considering the idea of nonhuman animal agency. Arguing that old understandings of agency are impoverished, they attempt to redefine agency (Taylor, 2011). However, these new conceptualizations remain theoretical, as there has been little empirical testing of these definitions and interpretations to the everyday reality.

An additional focus is on Augmentative Interspecies Communication (AIC) technology. By communicating via a soundboard with recordable answer buttons, dogs and their guardians explore new ways of communication (Hunger, 2021). This study addresses the “talking dogs” phenomenon from a sociological perspective by focusing on how AIC technology can provide a deeper understanding of dog agency. To that end, dog guardians both with and without a soundboard will be interviewed. The research questions central to this study are: How do dogs perform agency in their daily lives? How do dog guardians perceive this agency? How does AIC technology impact the agency of dogs? How does AIC technology facilitate meaning-making between dog and guardian? And how does this meaning-making capacity of AIC technology impact the guardians’ perceptiveness of their dog’s agency?

Literature Review

Toward Nonhuman Animal Agency

The domestication process of wolves commenced 30,000 years ago (Kaminski & Marshall-Pescini, 2014; Ovodov et al., 2011). During this process, dog-specific traits emerged, making them very suitable as human companions. Examples are dog-human emotional attachment (Topál & Gásci, 2012), dogs' social competence (Topál & Gásci, 2012), and the canine perceptiveness for human speech cues and communicative signals (Lakatos & Miklósi, 2012). In addition, research has shown that dogs are superior at interpreting their guardians' conduct and adjusting their own behavior accordingly (Hare & Tomasello, 2005; Hart, 1995) and interactions between dogs and their guardians are more frequent than with other companion animals (Hart, 1995).

Despite dogs' omnipresence, sociological research on dogs is scarce. As a consequence of the Cartesian legacy and the pitting of sociology against natural sciences, an anthropocentric sociology emerged (Ferkel, 2018; Irvine, 2008). For example, for symbolic interactionism, language is a deciding factor in interaction. We attribute superior linguistic skills and the capacity for culture and meaning-making processes to humans (Carter & Charles, 2018; Catton Jr & Dunlap, 1978; Haraway, 2013), while nonhuman animals are defined in the absence of these features (Tovey, 2003). However symbolic interactionism lends itself to explore interspecies interaction because it focuses on interactions between individual entities (Alger & Alger, 1997; Carter & Fuller, 2016). By identifying the dog and their guardian as social actors, agency can thus arise out of the interaction between them (Denzin, 2004).

Generally, agency is defined as "the capacity to act" (Esser et al., 2016, p. 8; Ganesh, 2015; Kuus, 2019; Schlosser, 2015). In the literature however, agency is connected to a range of conceptualizations. These center on (a) purposeful acting, where the agent performs goal-directed activities (Glock, 2019); (b) taking initiative, meaning that the agent commences the act (Schlosser, 2015); and (c) choice-making, when the agent chooses from a variety of alternatives (Hays, 1994). Creativity (d) is also associated with agency, as Shilling (1997) states that the creative capacities of the agents need to be acknowledged in contemporary notions of agency. Further, Mele (2003) views motivation (e) as a basic indicator of agency. Another criterion for agency is self-awareness (f) and self-hood (Carter & Charles, 2013). Besides this broader conceptualization of agency, is the conceptualization of the chordal triad of agency (Emirbayer & Mische, 1998). Three elements constitute agency: the (g) iterational, the

(h) projective, and the (i) practical-evaluative. The first refers to how acts of routine incorporated in everyday life create order and stability. The second indicates that agents act future-oriented. The third element addresses the capacity of the agent to act in the best way according to the situation. By making both practical and normative judgements, the best course of action is found (Emirbayer & Mische, 1998).

Agency as defined above has a strong human-oriented connotation (Taylor, 2011; Taylor & Signal, 2011). Consequently, the idea of nonhuman animal agency has been contested (Sorley, 2021). It is only since the emergence of the Human-Animal Studies (HAS) research field that the idea of nonhuman animal agency has been considered. HAS scholars have argued that old understandings of agency are impoverished (Taylor, 2011). New approaches to agency are more dynamic interpretations (Carter & Charles, 2018) and they shift the focus toward (actant) relationships (Archer, 1995, 1996, 2000, 2003; Carter & Charles, 2013, 2018; Taylor & Signal, 2011). Additionally, scholars have discussed both real and fictionalized animals as agents (McFarland & Hediger, 2009). Špinka (2019) identified four levels of nonhuman animal agency. Passive or reactive agency are reflexive responses or perceptual decision-making. Daily activities of nonhuman animals, such as foraging, are called action-driven agency. In competence-building agency, knowledge and skills are gathered for future use. Lastly, aspirational agency are “acts to achieve long-term goals through planning and intentions based on [reflections]” (Špinka, 2019, p. 12). When researching police dogs, Smith et al. (2021) found that dog agency is all about engagement and preferences. Motamedi-Fraser (2019) empirically discusses nonhuman animal agency regarding language and words. Although scholars investigating nonhuman animal agency engage with different conceptions of agency, they all advocate the understanding of nonhuman animals as active participants in human-animal relations (Carter & Charles, 2013) and as co-creators of the social world (Carter & Charles, 2018).

These new interpretations present opportunities to reflect on the agency of nonhuman animals. However, the conceptualizations on (actant) relationships stay rather philosophical and theoretical. They lack applied knowledge, as there have been few empirical studies of everyday reality. Other studies on nonhuman animal agency have an empirical base, but do not engage with the various (sociological) understandings of agency that live in the literature (McFarland & Hediger, 2009; Motamedi-Fraser, 2019; Smith et al., 2021; Špinka, 2019). Consequently, this study aims at (a) exploring dog agency empirically by (b) using a comprehensive framework based upon the nine indicators of agency. By questioning how dogs perform agency in their daily lives, this study aims at providing a conceptualization of agency in practice.

Technology and Symbols

Both nonhuman animals and technology have been co-evolving with humans (Schick & Toth, 1994; Shipman, 2010). Examples range from the ox and plow (Scanes, 2018; Willham, 2012), to the dairy cow and milking robot (Broucek & Tongel, 2017; John et al., 2016). Currently, companion animal technologies are emerging (Hall et al., 2018). An example is the development of Augmentative Interspecies Communication (AIC) technology. Through a soundboard with recordable answer buttons, companion animals are able to communicate with their guardians (FluentPet, 2023; Hunger, 2021). The AIC technology emerged in 2018, when Hunger (2021) introduced buttons to her dog Stella. Through a technique called “modeling,” Stella learned to associate each button with a specific word or meaning (Hunger, 2021). Research on the effectiveness of AIC devices in human-animal communication is still ongoing (Smith et al., 2023).

The AIC soundboard, remodeled after existing Augmentative and Alternative Communication (AAC) devices for humans, accords with the discipline of Animal-Computer Interaction (ACI; Mancini, 2011). While interactive technology targeted at nonhuman animals has been present for decades – e.g., bio-telemetry devices, operant interfaces, robotic machines – there has been little attention given to the study of animal-computer interaction, as well as the animal perspective in the design of interactive applications (Mancini et al., 2017). By acknowledging animals’ needs and preferences in the design process, ACI aims to design for and with nonhuman animals (Mancini et al., 2017).

Emerging technologies such as the AIC soundboard make for new ways of human-animal communication and relations. Specifically, both guardian and dog communicate through and with the soundboard based upon a shared understanding of meaning. In these new forms of human-animal relations, dog agency can thus be conceptualized by its relationality to the other actors: the guardian and the soundboard technology. Subsequently, the symbolic interactionist theories of Mead (1972) prove to be fruitful for inquiry into dog agency and the role of technology in communication between humans and other animals. As a forefather of symbolic interactionism, Mead’s ideas were fundamental for the development of the perspective (Aksan et al., 2009). The key element in Mead’s theories is the concept of “significant symbols” (Blumer, 1981). According to Mead, significant symbols are what distinguishes humans from other animals, as nonhuman animals only have natural signs. In contrast, significant symbols are learned. Through these significant symbols, the expressers convey meaning and value to the observers (Rose, 1962). The observers then respond according to the meaning and value the symbol has for them (Rose, 1962). Both expressers and observers supply and provide the interaction with content (Rose, 1962). For Mead, it is in the interaction that

the significant symbols become meaningful (Da Silva, 2007). Communicating and interacting is thus always a social process, in which symbols are expressed, shared and interpreted (Blumer, 1981; Da Silva, 2007; Rose, 1962).

While Mead's original theoretical frameworks apply only to humans, it seems relevant to investigate the possibility that nonhuman animals too can convey and understand significant symbols. As such, the concept of significant symbols provides the base upon which we can understand the phenomenon of "talking dogs": Both dog and guardian convey meaning through the technology. Each button represents a different significant symbol and thus conveys a different meaning. Through interacting with each other and the buttons, these meanings are learned by both dog and guardian. In the interactions between both dog and guardian, the significant symbols become meaningful. It is then, because the relation between dog and guardian is laced with these significant symbols, that dog agency can be understood through its relationality: In the interaction between dog, guardian, and technology, agency becomes visible.

Current Study

This study employs a qualitative approach to empirically study dogs' expression of agency, the perceptiveness of guardians toward their dogs' agency, and the impact of AIC technology on both. Research on guardians' comprehension of dogs' emotional states is conflicting. On one hand, studies have shown that dog guardians are often unable to identify their dogs' emotional state (Buckland et al., 2014; Demirbas et al., 2016; Kerswell et al., 2009). On the other hand, researchers argue that dog guardians have mastered their dogs' expressions and body language and are able to adequately interpret their actions (Birke & Hockenhull, 2012). They have learned to "read" their dogs meticulously (Birke & Hockenhull, 2012; Brandt, 2004).

This study uses interviews to infer dogs' experiences and actions. Based on these interviews this study aims to explore and describe dogs' expressions of agency and how AIC technology plays a role in guardians' understanding of agency. Interviewing guardians favors the humans' perspective over the dogs'. Still, by recognizing the dog as active co-creator of the social environment, this study attempts to understand the guardians' notions of their dogs' agency with the aim of understanding their needs and thus improving their wellbeing.

Research Design

Sampling

The Generic Inductive Qualitative Model (GIQM; Hood, 2007; Maxwell, 2012) informed the research design. As an inductive approach for qualitative

research, the GIQM proves fruitful because of its methodological flexibility (Liu, 2016). Following the GIQM approach, purposive sampling was carried out: Dog guardians with and without AIC technology were sampled. Dog guardians who did not use the soundboard were sampled in Flanders, Belgium. Because of the novelty of the AIC technology, no dog guardians using the technology were found in Belgium. Thus, guardians using AIC technology were sampled worldwide. Because of the importance of the cyclical research process to GIQM, further sampling and interviews were done in different rounds: a pilot interview, then a first round with nine interviews, and a second round with 11 interviews. A total of 21 respondents were interviewed, of which 11 did not have a soundboard at home. Of the 10 participants who had a soundboard, there were four who identified their dog as a beginner, three who identified their dog as an intermediate, and three who identified their dog as an established soundboard user. Participants were clearly informed about the research objectives and aims through informed consent, and codenames were used for both guardians and their dog(s) to guarantee their anonymity.

Data Collection and Analysis

Data was collected through semi-structured interviews. Following the GIQM, the literature was used as a guide to develop interview questions. The interview questions aimed at finding how dog agency transpired in everyday life and as such included different themes and subjects on dog agency. As there were participants with and without AIC technology, one question list was made, but with additional questions for the participants with the soundboard. These addressed the relation between dog agency and the soundboard. After each interview round, the question lists were scrutinized and adapted.

The GIQM model (Hood, 2007; Maxwell, 2012) guided coding and analysis of interviews. The interviews were video-recorded and transcribed afterwards. In addition, during the interview, the author noted important thoughts presented by the participant in order to ask follow-up questions. After the first round of interviews, the first round of coding and analysis commenced. The author coded the transcriptions of the interviews in NVivo, following the content of each (part of a) paragraph. The paragraphs were coded multiple times if applicable. After the first round of coding, many isolated codes were present. They were linked to one another, and four central overarching codes were developed: agency, activities, dog-being, and the human social context. To further organize the codes, two concept maps were made during the first round of coding. When the first round of interviews was coded and the codes were organized, interview questions were adapted, and the second round of interviews commenced. After this second round of interviewing, the interviews were coded to already-existing or newly made codes. In addition, one last concept

map was made. Lastly, all coded text was exported to Word, where recurring thoughts and themes were highlighted and organized within each code to prepare for writing.

A Post-Anthropocentric Conceptualization of Dog Agency: Exploring Nine Indicators

Purposeful Acting

Goal-oriented actions are linked to the dogs' major interests: eating, playing, wanting attention, and going outside. Beyond that, dogs communicate purposefully with their guardian by using their paws, their body (weight), and barking: "And if I have my hand on the keyboard, he'll put his paw up on my arm, or he'll sit beside me and wait until I acknowledge him" (Grace). Comparing their current dogs (with previous ones), respondents found that often one acts purposefully, while the other acts vaguely. The latter hinders clear communication. In addition, respondents acknowledge that they are often unable to recognize the goal when their dog acts vaguely: "I think there are certainly moments that [...] he wants to say something, but that you don't understand what it is" (Sorine). In this void between dog and guardian, the soundboard comes in. The soundboard opens up new avenues for communication because the dog can communicate more specifically and elaborately: "Now, if she sits and stares at me and I ask her what she wants and she uses the buttons, I now know that she has a purpose behind the staring besides wanting to play" (Poppy).

Taking Initiative

Most dogs take initiative to fulfill their needs (eating, peeing, etc.) and their wants (playing, walking, etc.). Many initiatives take place within the daily routine of the dog: "In the week [...] there is a fixed schedule, like clockwork. In the weekend, the hours get intertwined. And often he comes asking like, 'And now will we. ...' He comes pushing with his nose and asks for a walk" (Julia). Comparing one dog to another, respondents find that some dogs tend to take less initiative. With the soundboard then, dogs can take more initiative by pressing the buttons, even if the guardian is not in the same room. Through the soundboard, requests are more specific and comprehensible for the guardian. Lastly, the dogs took initiative during the interviews. By pressing buttons, bells, or handing their guardian a toy, they interfered with the interview and made their presence known: "Like right now. She just took initiative and handed me a toy to play" (Iva).

Making Intentional Choices

While some respondents could not answer whether their dog made intentional choices, others provided elaborate examples. Intentional choices relate to the dogs' needs and wants. For example, dogs can be very picky regarding their food, toys, and walks. The soundboard features as a tool for clarification in the choice-making process. It allows dogs to communicate their choice to the guardian, so that less miscommunication occurs: "I said, 'Come up here.' And she went to her buttons and said 'Later.' So that was a very clear like, 'Yeah, I'll snuggle with you later'" (Iva).

Being Creative

Here again, not all respondents identified their dog as creative. Others found that their dogs' creativity entailed finding solutions to get toys, food, or to look outside. Creativity via finding unique ways to play or occupy themselves were discussed: playing keep-away, destroying walls, hunting, etc. The soundboard provides dogs with new opportunities to express their creativity: Dogs form surprising word combinations, try to manipulate their guardian, and search for unique solutions to communicate: "When her food buttons stopped working, which I had next to the piano, she realized she could press the piano keys with her nose to get our attention" (Dani). Lastly, respondents argued that creativity is intrinsic to communicating via a soundboard: "And so I think that being able to articulate complex [...] ideas with a limited vocabulary inherently requires creativity" (Lowen).

Being Motivated

When dogs are motivated to do something, their acts correspond to that. They are motivated to go for a walk or do agility. Still, motivation is not always there, as motivation can depend on the mood, the day, the character of the dog, and the specific task at hand: "Ultra, she is less [motivated], I think. Sometimes she is, in our opinion, a little bit boring. But if she wants ... during hunting she is totally not boring" (Fiona). Some respondents reflected upon the intrinsic motivation of their dog. They stated that their dog takes action for themselves, and that they can be patient when it is required:

Sometimes she'll want to do something, and, I'll be busy, right? Like, now. And I'll say "Later." [...] And she will lie down and she'll restrain herself and go to sleep. [...] So these are things that she clearly deeply wants and can also be patient for, because she wants them, not just as an instant gratification, but this is like a desire of hers. (Lowen)

The soundboard itself can be a source of motivation, and it can also increase or lessen a dog's motivation for other things, such as food.

Acting in the Best Way

Some respondents stated that their dog does not act in the best way. For example, they pull on the leash to reach other dogs. Other respondents' answers acknowledge that their dog oftentimes acts in the best way. With the introduction of the soundboard, two respondents were able to turn the unacceptable behavior of their dog into more appropriate behavior: "There was a lot of barking and anxious behaviors prior to the buttons. [...] Since the buttons, he has used them a little bit more to communicate. So it's less barking, more specific requests with the words" (Nimme).

Lastly, respondents' answers acknowledged that what they see best and what the dog sees best differs oftentimes: "She might be acting the best way for her feelings, but not necessarily the best according to how I feel about a situation" (Dani).

Acting with Routine

Routines are central to the life of the dog, and different types of routines structure their day. The overall routine encompasses, among others, a fixed eating hour and daily walk. The dogs also have multiple individual routines. The soundboard reveals that most dogs are still very fixated on the routine. Either they use it within the established routine, or they use it as a tool to keep the routine going. Yet, the soundboard also introduced an element of unpredictability as an opportunity to break the routine:

Before the buttons, everything was on a routine. [...] Since the buttons, he's had the opportunity to tell us when he wants to do things. And [...] while there's a level of routine, there's also that unpredictability of "I can ask for a second walk," or "I can ask for a third walk," or "I can ask for treats even though I had dinner." (Nimme)

Acting Future-Oriented

Some respondents argued that their dog acts in the present. Other respondents presented examples of future-oriented acts regarding a specific routine, i.e., dogs can anticipate a routine and act accordingly. Respondents who identified their dogs as established users on the soundboard explained how their dogs are definitely thinking about the future. With the buttons "Later" and/or "Tomorrow," their dog can communicate his/her thinking about the future and

their future acts: “She buries her food, you know, like pretends to bury it. [...] So she’ll bury that food and then she has gone over and hit Later. So like she’s saying, ‘I’m saving this for later’” (Iva). Still, even with the soundboard there are difficulties in trying to understand how future-oriented their dog acts:

I don’t know if like I’ve ever talked to her about anything that’s happening more in the future than a few days away. In part because she has a Tomorrow button. [...] So if she’s thinking about things much further in the future other than like tomorrow, I don’t know. (Lowen)

Being Self-Aware

Some respondents without soundboards did not know how to answer when questioned about their dogs’ self-awareness. Others – both with and without soundboard – answered that their dogs are aware of their physical surroundings, their role in the family, and their belonging to different species. Thus, they have a social self. The soundboard provides more insight into the thinking processes of the dogs, and their self-awareness:

The way she handles the buttons to me tells me that she understands words and what their meanings are, which is one thing you would expect from self-awareness. [...] And then our names. She never pushes her name, ever. But she’ll push mine or my husband’s. And that tells me there is a difference there to her. She doesn’t need to say her name. She knows her name. She knows who she is. (Poppy)

The Augmentative Interspecies Communication Soundboard: Facilitator of Meaning Making between Guardian and Dog

Communication and Connection

As a tool to “speak,” the soundboard allows the dog to communicate their thoughts and acts to their guardian. Yet dogs also communicate via their body language, vocalizations, and eye contact. Respondents stressed the importance of being able to read “dog” language, even when using buttons. For some, the soundboard has even been a tool to better understand “dog.” The soundboard, then, is about finding shared symbols and inviting the dogs to speak to us:

Whenever you go through any dog training, I feel like the idea is [...] that we know that a certain symbol means sit. Or a certain word or hand gesture means wait. So we’re kind of communicating [in agreed upon fashion]. [...] And you know, the buttons are kind of the same way where now

we have words that I'm saying the same thing, and I'm kind of emphasizing and helping her understand. And then she has a way that she can communicate more clearly to me. (Dani)

Although all respondents with a soundboard advocate for its utility, they also recognize there are still some uncertainties in the communication between dog and guardian. These arise on both sides, as guardians have difficulties interpreting their dogs' messages, and the dogs themselves have difficulties communicating through a limited number of buttons: "We don't always understand what she's pressing or asking for. [...] Sometimes she may be asking for something and we just can't figure out what it means" (Quinni). Lastly, respondents clearly commented on how communicating via the soundboard resulted in a stronger connection between them and their dog.

Awareness and Understanding

The introduction of the soundboard brings about a higher level of guardian perception, awareness, and understanding of their dogs' actions. Additionally, using the soundboard comes with a community, other resources, and more knowledge. All these aid in developing more awareness and insight into their dogs' thoughts, acts, and agency:

I really think that as a dog guardian, I wasn't aware of how much, like, positive reinforcement training and advocacy existed for dogs. [...] The buttons gave me access to other resources and people that were also doing the same thing and taught me other things too. (Nimme)

In addition, the higher level of awareness and extra insight allowed the respondents to be better attuned to their dog and his/her wishes: "Now because she can communicate better what she wants, I realized that there's never a time where she's just sitting there not thinking. [...] I will know she wants to play. She's not just wanting a treat" (Poppy).

Discussion

On Agency and Augmentative Interspecies Communication Technology

Across all nine indicators, respondents gave various examples of their dogs' agency. Their dogs' acts relate to their major interests – eating, playing, walking – and preferences – specific food, specific toys, etc. Through body

language, vocalization, eye contact, and soundboard use, they communicate these to their guardians. The soundboard thus augments human-animal communication, in addition to the dogs' other communicative strategies (Bastos & Rossano, 2023). Dogs' motivation for acting depends upon the day, the mood, the character of the dog, and the specific task at hand. Also, dogs still have instincts, and their acts are mainly informed by their needs and wants. Consequently, the dogs will not always display their agency. To summarize, dogs have the capacity for agency and their actions are informed by their needs and wants and tailored to their interests and preferences. This understanding categorizes agency as the property of an individual entity, which is similar to the conception of Carter and Charles (2013). This conceptualization confirms the thoughts of Dretske (1999), who stated that in order for dogs to be agents, they have to perform purposeful acts.

The four levels of agency of Špinka (2019) were echoed in the results. When dogs act according to their instincts, their agency is passive/reactive. Conversely, when dogs' actions are informed by their needs and wants and tailored to their interests and preferences, their agency is action-driven (Špinka, 2019). This definition of action-driven agency also supports Smith et al.'s (2021) conception of agency as engagement and preferences. Thirdly, when dogs make use of the soundboard, they gain skills and information for future use. This ties into competence-building agency (Špinka, 2019). Lastly dogs' self-awareness ensures that they have also aspirational agency (Špinka, 2019). The findings from this study are in line with previous research on nonhuman animal agency. In addition, the conceptualization of dog agency through the nine indicators proves to be fruitful for a post-anthropocentric definition. Inquiring into the nine indicators opens up new understandings of how extensive (dog) agency can be conceptualized.

In the Animal-Computer Interaction Manifesto, Mancini (2011) aimed at developing technology so that it can "improve animals' life expectancy and quality, [...] and foster the relationship between humans and animals by enabling communication and promoting understanding between them [...]." With the introduction of AIC technology, these two goals are readily accomplished. Firstly, the soundboard brings about a higher level of awareness and insight into the dogs' agency and thought processes. Respondents who did not have a soundboard were unable to answer some of the questions on agency. In contrast, respondents with a soundboard provided elaborate answers. Further, the soundboard allows dogs to state more specific and elaborate requests. Subsequently the overall communication improved and the connection between dog and guardian strengthened. Regarding the second goal – improve animals' life expectancy and quality – various respondents explained how the

new awarenesses and insights allowed them to improve their dogs' quality of life. By acknowledging and acting upon the needs, wants, interests and preferences of their dog, the guardians were able to ameliorate the daily lives of their dogs.

On Operant Conditioning, Talking Dogs, and Mead

Dogs pressing buttons require one to ponder whether dogs truly have a capacity for agency or whether they are simply well-conditioned. Operant conditioning refers to behavior "controlled" by its consequences (Staddon & Cerutti, 2003). Organisms are taught to associate a particular behavior with either a reward or a punishment (Spielman et al., 2021). In contrast, teaching dogs to use AIC technology happens with a technique called "modeling." The guardian presses the button and then follows up with the meaning of that button (Hunger, 2021). Imperatively, dogs are neither rewarded nor punished when using the buttons; only the meaning is acted upon. The dog ultimately learns to associate the button with the intended meaning both through observation and trial-and-error. Thus, operant conditioning differs from the modeling method, as no reward or punishment is used.

One can argue that certain events – receiving a treat, going outside – are positive reinforcements for dogs. In this sense, the initial phase of learning how to use a soundboard with buttons can be equaled with operant conditioning. After all, when a dog presses the "Outside" button, they are rewarded because they are allowed to go outside. Similar events might occur with other buttons. However, the findings suggest that dogs eventually pass this initial stage. They start pressing buttons with more abstract meanings like "Angry," "Happy," "Now," "Later," "Tomorrow," and thus the dogs are neither rewarded nor punished. Only the associated meaning is conveyed in the interaction between dog and guardian. In addition, more established soundboard users press their buttons without their guardian present. Here again the dog is neither rewarded nor punished for their button use. Thus, although operant conditioning can be an initial phase in which dogs learn to navigate their soundboard, dogs demonstrate their agency by initiating communication through the buttons as well as communicating on more abstract topics. These demonstrations of agency are in line with the agency showcased by dogs without a soundboard.

In conclusion, these results suggest that dogs have agency. The soundboard improves communication and connection between dog and guardian. Dogs are learning the meaning of each button via modeling and association. As Dani said, communicating through the buttons is communicating "in agreed upon fashion." Like normal dog training, the soundboard works via shared symbols and shared understandings of meaning. This ties into Mead's theory

on significant symbols (Da Silva, 2007; Rose, 1962). In the interaction between dog and guardian, the symbols are learned and the meanings become shared. Mead's theory of significant symbols provides a useful framework to understand the communication via the soundboard. Consequently, sociological theories and perspectives should be considered anthropocentric. Future research could break with this anthropocentric paradigm and use these theories to investigate nonhuman animals and their interaction with humans.

Limitations and Avenues Forward

This study was an explorative, empirical study into dog agency. Subsequently, some limitations were present. Firstly, findings support a post-anthropocentric notion of agency. Yet the focus is still on the agent/actor, and less on the processes of a post-humanist perspective. Future research could investigate this further. Secondly, other animals – other companion animals, agricultural animals, or wild animals – and their agency could also be the topic of future research. Thirdly, data were gathered through interviews, and thereby we assume that guardians accurately interpret their dogs' expressions, body language, and actions. As existing research on guardians' comprehension of their dogs' actions is conflicting, future research could further elaborate on guardians' comprehension by doing pre- and post-test studies using AIC technology. Furthermore, interviews favor the human perspective. Future inquiries into nonhuman animal agency could gather data through observations or visual ethnographies which center nonhuman animal perspectives.

Conclusion

The findings suggest that dogs have agency. They act on purpose, take initiative, and make intentional choices. They are creative, motivated, and act with routine. Also, they act in the best way, they act future-oriented, and they are self-aware. Despite this capacity for agency, it still depends upon different factors whether dogs showcase their agency. Dogs' actions are informed by their needs and wants and tailored to their interests and preferences. Future research could further investigate these actions of agency. By doing quantitative research on these nine indicators, actions of dog agency and guardians' perception of that agency can be researched more thoroughly.

Bringing AIC technology into the dog-human relationship offers dogs more opportunities to display their agency. In addition, findings suggest that AIC technology improves communication and connection between dog and guardian. Communicating through shared symbols, the AIC technology enables

dogs to clearly explain their wants, needs, interests, and preferences to their guardian. Further, guardians whose dogs use AIC technology are much more aware and have more understanding of their dogs' actions and thought processes. Consequently, technologies can alter our understanding of nonhuman animals. It is then because of the improvement in communication, connection, and awareness that opportunities arise to advance the dogs' quality of life. Future research could use this as a starting point to look at how dogs and guardians interact and converse together in a society that is human-oriented.

Lastly, this article implies that anthropocentric sociological theories are suitable to study interactions between humans and other animals. Future research could adapt, improve, and expand anthropocentric sociological theories to include nonhuman animals in the research field. This way, nonhuman animals can become as present in sociology as they are in society.

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