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How dogs become accurate instruments: care, attunement, and reflexivity

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Those who live with Type 1 Diabetes have lost the possibility of producing insulin; they are dependent on non-living and living prostheses—machines, human beings and animals—that constantly read, measure, translate and interpret the fluctuations of their blood sugar to avoid hypoglycemia, which can be lethal, or hyperglycemia, which can lead to long-term complications. This philosophical essay, based on interviews and observations in a training facility, follows how dogs become “biocompatible patient friendly alarm systems” for hypoglycemia. It also explores how different modes of translation operate in the creation of a symbiosis between a human and an animal and how, along with them, a new conception of responsibility, accuracy, and of the subject emerge.

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Introduction

Donna Haraway in her book *Simians, Cyborgs, and Women: The Reinvention of Nature* famously shares some of the lessons she learned “walking with [her] dogs and wondering how the world looks without a fovea and very few retinal cells for color vision, but with a huge neural processing and sensory area for smells” (Haraway, 1991, p. 190). Taking at face value her thought experiment, I wandered into a non-profit organization in North America that trains service dogs to smell hypoglycemia for patients with Type 1 Diabetes. This facility is a kind of a “laboratory” designed to create a lifelong relationship between two particular individuals: a human being and a dog.¹

The reason for my choice is twofold. First, it is related to an ongoing interest in the role of non-humans in the construction of our social fabric, and in the possible invention of a new political ecology where those who (or which) have long been misrepresented or not represented at all could be given a voice (Serres, 2014; Latour, 1993, 2005; Hache and Latour, 2010; Houdard and Thiery, 2011; Hache, 2012). Non-humans, in the context of my study, are not only machines, technics, or objects; but they are also animals (Haraway, 2003, 2007; Despret, 2004, 2006, 2008, Despret and Buchanan, 2016; Doré and Michalon, 2017). Second, it is related to the question I’m pursuing, as a philosopher and as an anthropologist of science, regarding the notion of “individuality” and/or how to reconceptualize the notion of the individual in a landscape where human competences have been redistributed and collectivized thanks to, and via, other beings, whether humans or non-humans. It is a question I have explored in my previous book entitled *Hawking Incorporated* (Mialet, 2012a), where I did an ethnographic study of “an individual.” Here I showed that contrary to how this individual (Stephen Hawking) is usually represented—a pure brain—his cognitive competences, his identity and even his own body were distributed and redistributed in complex collectives composed of humans and non-humans (which I called his extended bodies) without which he would not have been able to think, be, and live. I also described how, and by which processes, a singularity emerged within these constant movements of materialization, collectivization, and translation. By doing so, I not only fleshed out what “an actor network” is, I also recovered a singularity that has been overlooked in the sociology of translation (for an introduction to Actor Network Theory, see Latour, 2005; Mialet, 2012b). I called this subject the distributed-centered subject (Mialet, 2008, 2012a, 2017, 2019a, 2019b).

It is with this problematic in mind that I became interested in Type 1 Diabetes because patients who live with this disease are permanently attached to a collective without which they would not be able to survive. Having lost the possibility of producing insulin, they are dependent on collectives of machines, human beings, and animals that constantly read, measure, translate, and interpret the fluctuations of their blood sugar to avoid hypoglycemia, which could be lethal, or hyperglycemia, which could lead to long-term complications. Indeed, a plethora of prostheses are created to “sense” the body. These take on different forms: sensors (continuous glucose monitors) that prick and stick to the body, glucometers that measure blood sugar, dog’s noses that smell hypoglycemia, parents that learn how to read their kids’ reactions, etc. The body sends multiple verbal and physiological signals that have to be interpreted by those who are more or less connected to it, while conversely, those who are more or less connected to it have to develop an incredible acuity to “sense” and “interpret” these signals. It is like a pack of sheep that have to be close together—skin against skin—as a way to feel and to react in case of danger (Despret, 2006). In this regard, my new book is an ethnographic study of senses, sensors, and sensation, or more precisely, an ethnographic study of sensibility.² It is also a story

about a body that does not stop at the boundary of the flesh and incorporates humans and non-humans in its functioning, but also that makes its internal functioning visible to her and those around her (if she is unable to sense her own body) thanks to the mediation of other beings and/or machines. The surveillance then is delegated to the patient herself, the machines, the parents, or the animals. Finally, it is also a story about a complex system composed of multiple feedback loops, a kind of cybernetic (or psychoanalytic) machine, an array of mirrors that communicate with each other: gaze, words, nose, paws, numbers, alerts, that have to be calibrated against one another, or coordinated in such way that they can give feedback to an individual of what they measure, sense, and understand about her or him and upon which s/he can act: infinite translations. The boundary between what belongs to the patient and her surroundings is constantly negotiated, and we assist in a very interesting “exchange of properties” (Mialet, 2012a, 2019a, 2019b) or slippages between all the actors (and their practices) that are implicated in the “supposed” management of diabetes which is, ultimately, a very complicated, if not, according to some, “an impossible task” (Mialet, 2019a). Moreover, phenomena of standardization are crucial, things often break down and have to be recalibrated and maintained. Mainly, all of these prostheses have to be adjusted to a particular individual: it is, so to speak, the Quantified Self *avant la lettre*.³ In this essay, I will focus on one of these prostheses: diabetic alert dogs. I will follow how dogs become living prostheses, that is, how they become “biocompatible patient friendly alarm systems” for hypoglycemia.⁴ I will explore how different modes of translation operate in the creation of a symbiosis between a human and a dog and how, along with them, a new conception of responsibility, accuracy, and of the subject emerge.

Discussion

Having a close relative with Type 1 Diabetes, I became part of a study about the burdens associated with the disease. I will start with a short ethnographic description of a very strange encounter.

Nathalie was sitting on the edge of her chair quickly writing down our responses to a survey she was conducting when her dog, which had been sleepy and very quiet so far, moved closer to her, sat, and put his paw on her leg. She glanced at him, and continued writing. But the dog was obviously not satisfied with her response and put his paw on her leg again. “Okay,” she said, she put her pen down, opened a small black bag, pulled out her tester, pricked her finger, and put a drop of blood on it. “I’m fine!” she said, looking at the number displayed on her tester, while continuing to talk to her dog, “my blood sugar is in range,” “what do you want?” she asked him, as if she was expecting him to voice his demand, “I don’t feel anything,” she added, trying to adjust her body’s sensations, the number flashing on the screen, and the feeling of the warm paw of her dog passing through the thick fabric of her jeans. Ten minutes later, the dog was still there, immobile like a statue, staring at her. He put his paw on her leg again. She tested one more time. Her blood sugar had dropped dramatically. She was about to have a hypoglycemic episode. The dog knew and had access to something that, neither, she, the machine she was using, nor we, could perceive. In retrospect, the dog’s paw on her leg, which at first, we had mistakenly read as an invitation to play, had something a little off about it. There was something very mechanical, a little robotic even. This dog was not playing. And he was not joking either. He was at work.

Catching the unseen. It is the dream of any ethnographer to catch in a second by observing your expressions, gestures, tone of

voice, and posture, how you think, what you desire, how you were raised, how you make sense of the world, what constitutes the form of life to which you belong, and what makes you the way you are—your uniqueness as a human being, as a social actor, or as a cultural being. It is a dream that, years of complex fieldwork, and multiple layers of interpretations, and re-interpretations will never be able to fulfill. Dogs, however, have this capacity. They are able to access certain information about human individuality, that humans themselves ignore. They are, indeed, the ultimate ethnographers, or to quote Horowitz, “the ultimate anthropologists” (Horowitz, 2010).⁵ As we will see later, not only are they extremely attentive to visual details and always eager to know or interpret what you want or think or desire, but they are also able to seize through their primary sense, smell, all the layers that constitute what we, “humans,” would easily subsume under a category, or a name, or an object. Indeed, their olfactory skills are unique because by taking a smell in their mouth, then through their nose, they are capable of breaking it down to a molecular level.⁶ As the director of the facility I studied, which trains diabetic alert dogs, told me:

“You and I when we look at an orange and we smell an orange, we think ‘orange’. When the dog smells this, it smells the last three people that have handled it, the dirt that it was grown in, the water that it was watered [within], any chemicals that were spread on it, they smell the all combinations...to them it’s not ‘orange,’ it’s nineteen other things put together. It’s just how their mind works” (Interview, director, 2015).⁷

In the case of diabetes, diabetic alert dogs and machines do not work with the same principles. The dogs pick up on the scent the human body is creating when the blood sugar is changing rapidly, while the machines go through the skin to register the blood sugar. Dogs are said to be more “exact” in so far as they can recognize low blood sugar when it drops before machines do.⁸ And this is why, the trainer told me, “You often tell people ‘trust your dog.’ And you are welcome to tell people I don’t care what your CGM [Continuous Glucose Monitor] says, if your dog is alerting, you need to test and figure it out, because the time is the real time and the CGM has a lag of about 20 min...” (Interview, trainer and foster, 2015).⁹

But dogs and machines are also calibrated against each other. As a patient explained to me:

“She [the dog] is trained to alert for low blood sugar or falling blood sugar, so usually she will alert if my blood sugar is falling, but she will alert me when I’m at 130, 120 [mg/dc], I will check my blood sugar or look at my Dexcom [CGM] and dix minutes later I’ll check again and usually, I’m twenty/thirty points lower and after that the Dexcom has usually picked up on the fall as well, so I’m conscious of how my blood sugar is dropping, and I’m conscious of what I’m feeling because I know that I’m going low and I can (1) avoid it by eating something and (2) I [can] start to regain the ability to feel it. Because I know when it’s happening (Interview with patient, 2015).”

We will go back to the calibration between dogs and machines at the end of this essay. Let’s now follow, in this particular context, how dogs become living prostheses for people living with type 1 Diabetes.

Putting a value on the smell. The out of range blood sugar smell that goes with diabetes is part of all the smells that float in the universe, “to [the dogs], it’s just another smell in the world,” as the director put to me. The goal then is to create the conditions of

possibility for dogs to recognize this particular smell (the smell of “hypoglycemia”), to put a boundary around it. And the way of doing this is to put a value on smelling it. As the director said: “what we do, we came along and said [to the dogs] ‘when you smell this, something good happens, so you let me know’ [she speaks for the dog], and something good happens, which is usually a food reward” (Interview, director, 2015).¹⁰

The training however is far more complex than a mechanical behavioristic response: “if you do the right thing,” “I will give you a treat.” The trainers have to customize their interactions with each particular dog, “because,” as the director said to me, “each dog is like a person, an individual,” and they have their own way of functioning.¹¹ The trainers’ job is to catch and mark precisely what they call the “eureka” moment when a dog “gets” it, because the dog has to understand what the trainers are looking for: “it’s very interesting,” she says, “because when we were first teaching dogs, the first thing we will usually get is they will do a lip flip, they’ll come along and they will smell your breath and they’ll do a lip flip where they don’t touch you, but they pull the scent back in their mouth, you see them thinking ‘is that it?, is that it?’ [She points her nose in the air like a dog smelling something] and you’ll wait for the light bulb to go on and they go ‘oh that’s it!” (Interview, director, 2015).

But before they are able to smell that “in the wild,”¹² they have to recognize the scent on a piece of fabric in the facility. Samples will be collected from diabetics who had low blood sugars. A cotton ball will be put under their clothing, under their waistband, their bras and they will keep it there so that it collects the scent that will then be stored in the fridge at the facility. They know, as the director mentioned, that the scent sample is the most potent for the first 2 weeks, after that, it has a significant drop off and then it stays at that level for the next 6 months, “that was proven,” she says “by the search and rescue people who are out searching for cadavers,” then she adds “the scent sample will stay in the refrigerator at 50 degrees, so it’s cool, but it’s not frozen or cold, ... we can then, use them and [afterwards] put them right back in” (Interview, director, 2015). Temperature is an important factor to keep the scent active.

For a short period of time and a few times a day, the trainer will bring the dogs, one after the other, into her room, then, she will ask the dog to give his paw each time he smells the smell on the patch.¹³ She will use a clicker that will equate the smell with the sound and then reward him immediately. The choice of the clicker over the voice is intentional. As she says, dogs have “Ph.D. s in body language,” which implies that very different meanings can be conveyed through the modulation of one’s tone of voice. Clickers sound the same. It is therefore easier for the dogs to recognize what humans want. Keeping them interested is crucial (this is also true in the case of guide dogs’ training, see Mouret, 2015); the exercise must be pleasant and excite their curiosity and their ability to resolve problems. Boredom must be avoided at any price, as disinterest can put lives in danger. Then the samples are moved on to different persons in the facility to extend the horizon of the dogs and see if they can smell the patch in another context. Finally, they will start recognizing the smell [of hypoglycemia] on people in the facility, some of whom may have diabetes; if this is the case, everybody has to stop and test.

As one of the persons, who works in the facility as a program coordinator and a foster for dogs in training, said to me: “The dogs do their job, they live with us and they are alerting, they learn that the scent doesn’t just come from a scent sample, that it’s on people, and that they might be on different people, it helps them; [then] we move them though several homes [called transitional homes] [where they live] with diabetics before they are placed. Some homes have multiple diabetics, some homes [have only] a single person, some homes [have families] with

children with diabetes, so it helps them generalize or we play this game wherever we are, it's pretty simple, we are just building [on] what happened at the training facility and they are doing the same thing they will be doing when they are placed" (Interview, foster, 2015).

When the dogs are fully trained, that is, when they are able to recognize the scent on multiple patches, then on one patch placed successively on different human beings, then "live" on a human being on site, then on human beings living in their homes, they are brought back to the facility where they are matched with a future owner. They could alert on any one; thus, in the same way the owner of the facility had to be tailored to the individuality of each dog, every dog is going to be tailored to a specific individual, and this process will be made possible through the special bond that is going to be created between the two. This bond (and its maintenance) is a guarantee of durable assistance and has a moral dimension attached to it (Mouret, 2017).

Matching dogs and clients. Thus, now that the dogs are trained, it is the people that will need to be trained. The trainers know their dogs and their personality so they have to ask the clients to fill out a survey in order to learn about them, their style of life, what they like, etc. Obviously, there are "objective criteria" so to speak, they will not match an active dog with a person who is a "couch potato," but there is much more to it than this.

"It's instinctual," says the director, "part of it you can do the ABC, you can say 'they are retired, their lifestyle is a little bit slower, they are not going to be doing PTA, swim teams, blabla, fifteen things all at once with five kids,' so maybe a dog that is a little less active would be better, there is something that is actually beyond what I can actually describe" (Interview, director, 2015).

And she adds, showing that the dog has become the probe through which she can understand the other—*she* also has become an ethnographer: "and dogs are wonderful at reading our body language [...] *And for me it's tuning into them*, it's always kind of know[ing], like even if he [she points to her dog sleeping in the corner of the room] is lying over there and if he was about to get up and look, my first thing would be 'what is on his radar, where does he go,' and I read the language to see if it is somebody he knows, or is it somebody he doesn't know, he is going to react and start barking because he does sometimes (laugh) or is it something like when James [referring to one of the volunteers I met previously] comes by, for example, his body language is so completely different than when you would come in the door, and it's looking at that, and without thinking through it knowing 'oh it is something he knows or something he doesn't know'" (Interview, director, 2015, my emphasis).

Indeed, before dogs and clients meet in person, the trainers have long discussions about who they think is going to fit with whom: "it's a standing joke," she says, "okay we think that we all have it figured out and then we bring everybody in the room together [all the dogs and all the clients] and we do some basic exercises, we put them on leash, we walk them around, we switch dogs and then there are usually three or four of us that will stand off with clip boards and I'll go 'there is a match, there is a match, oh, it's not going to work, look at that body language between the two of them' and then we keep switching until we finally find the right connection [...] then we sit down after we all look at our original list, to the list we now know is true, and say 'what [did] we miss in our discussion, how can we get back at this,' but for me it's all about watching the two together, I can tell there is going to be a connection, I can tell if it's going to work" (Interview, director, 2015).

However, most of the time, she doesn't really look at the body language of the person, which can be misleading (people have more defenses than dogs), she mainly follows the dogs' reaction. They let her know which one is the match for them.

"So in this case, I had a young woman," she says, "who absolutely didn't want anything to do with this golden retriever, so you know her body language was closed down she is like 'oh I really don't want to touch this dog, I don't want to take care of this dog' and yet, I know instinctively, that's a good match, she doesn't know it yet.... Maybe it's something in the dog's body language that I'm picking up on. And again, I can't explain why I know what I know about the dog's body language. *I can show you all the pictures, and show you the diagrams that everybody reads, but a dog's body language happens in a second, in ten seconds I can show you ten different things. It's fast and it's quick and if you are really trying to think you spend too much time thinking, you have to just experience*" (my emphasis, Interview, director, 2015).

In the same way she previously said, the dog "catches in a second the nineteen components that make an object," this time, it is, her, the human, who catches in dix seconds what the dog is experiencing and what's happening around him, she reads the context in which he is embedded (and she reacts to the ways in which he reacts to her reaction to the other). This is what I call an exchange of properties (Mialet, 2008, 2009, 2019b, 2014). She embodies the dog's *umwelt* (she become the dog) and through this process is able to transform the dog's behavior. As she says:

"I'm thinking with my dog, it's not something that I go 'ok I'm going to do this.' I just instinctively know that this will get me that, and the dogs get it" (Interview director, 2015).¹⁴

Creating and maintaining a bond. As soon as the trainers have found the right match, they will start initiating what they call "the umbilical cording," which means that the dog is permanently [physically] attached to the person at the beginning of their relationship.¹⁵ One has to create a special bond between these two beings, a co-dependence. Because, as the director stresses, "bonding is a big part of the alerting. The dog has to feel a bond with you, and the stronger the bond the more accurate the alerts. So as time goes by, the dog gets much better at it (Interview, director, 2017)."

The perfect attunement between these two bodies is, thus, crucial, not only with regard to their personalities, but also because the dog has to learn the pattern of his or her owner, indeed there is nothing normal or average about diabetes. It is different in every single person. It is the dog, this time, that has to embody her human's pattern in order to allow her human to be able to manage her diabetes, another exchange of properties (Mialet, 2012a, 2019b). "When I first started," the director says, "I really thought in my naïve mind that it was $A + B = C$, carb and insulin gives you perfect blood sugar and I couldn't understand why people couldn't get it right... and then as I began to work with more and more diabetics, it is anything but $A + B = C$, and what happens in this person's body doesn't happen in [that] person's body with the exact same thing. And that's why ... our follow-up support once a dog is placed is very individual and very intense, because there are no generalities that you can use in diabetes. You know what I mean, one person's exercise shoots him up [hyperglycemia], another person exercise shoots him down [hypoglycemia], another person exercise doesn't hit for 4 h, and each dog has to figure that out when we get them out on a

final placement, but they do, they get it” (Interview, director, 2015).

Yes, they get it. Eventually. But to do so, the patient has to be involved in this process as well. And, in the same way the dog has to learn the pattern of her owner, the handler has to learn the behavior of her dog in order to catch up if her blood sugar is dropping, another exchange of properties. As a patient told me:

“For the first few weeks, I was checking [my blood sugar] about twenty times a day, it was a lot, I didn’t stay like that every time she did something out of ordinary for a dog, I had to check my blood sugar and see if it was an alert or something *toward* an alert (my emphasis, interview patient, 2015).”

Through this fine-tuning between “the dog’s alert,” “the numbers produced by the glucometer and their interpretations,” and “her feelings or lack of them for that matter,” the dog’s alert becomes recognizable to her human, while conversely it allows her human to regain the feelings she might have eventually lost. It is the patient, here, who sees her own behavior transformed by this encounter:

“When I started to go to college, I lost the sense to feel that my blood sugar went low, that’s why I got [Fleur] the dog, but she kept me from going low so often, that I’m trying to feel it again, I felt when I was 60 the other day, which sucks, but it was really cool, because I’m slowly regaining that back” (Interview, patient, 2015).¹⁶

The capacity to read the dog reacting to her human is the product of a fine-tuning between dogs, machines, and feelings, but also of time, of living together, of learning how to know each other, of “rubbing shoulders” against one another:

“There were three or four months of transition, she was alerting and I wasn’t picking up on the alert because I didn’t know her as well as I do now, there was this transition, but she has been working for me for one year and half [now]” (Interview, patient, 2015).

Like a couple who starts knowing each other so well that they complete each other words, the patient refines her reading to the point of being able to anticipate the dog’s anticipations:

“Anything involving a paw is usually a clear alert, so those, I was understanding in the first few months, but those, and before I go low, or I start dropping quickly she will pick up on it, I think, I think I’ve learned, and she will stare at me intently for a while and she will come over and will alert me, so I wanted to pick up her little extra things that she does, I call them that ‘pre-alerts’ before the actual alerts happens” (Interview, patient, 2015).

And in return, if the human does not engage in this mutual relationship, the dog could lose his or her ability to alert, on top of being a dog that might also need to sleep:

“She is with me constantly, night time alerts [are] something that we are working on right now, she was really good at them with her finishing homes, with the home of the other diabetics, I’m a super heavy sleeper, so I have the feeling that in the beginning she tried to alert me at night and I didn’t wake up so I think she might have given up (laugh). She tends to sleep through the night and not alert me unless it’s like 4:00 a.m. on so I had a few wake-up alerts and she will jump on my bed and wake me up if I’m low, the night times are not usually the problem, it’s during the day that I will have the wild low blood sugar and swings, so I’m working, we are working with training,

right there, right now for night time alerts” (Interview, patient, 2015).

Indeed, the trainers do a lot of support with the newly placed dogs and their humans. They are also mobilized each time there is a problem. They know their dogs and they know which dog works best under which conditions. Each situation is different, however. As the director told me:

“We are on the phone with them two or three times a week and [the patients] have to chart every single alert the dog gives them and anything the dog missed and we go through that line by line, say what worked, what didn’t work, okay we are going to tweak a little this, we are going to move a little that way, we are going to use a high reward for this, you know” (Interview, director, 2015).

This relationship is, indeed, extremely fragile and has to be rethought, refined, and recalibrated each time a problem occurs. Each factor that might have triggered a missed alert has to be investigated: time, location, ongoing activities, etc. Every detail has to be discussed between the director and the patient; of course, the dog is the main actor in this process. The translations that take place between these different actors—as much as the modifications they engender in the ways in which clients and dogs engage and work with each other—are the necessary steps to make an alert possible.

It took about 3 months for this patient to start feeling comfortable with her dog. It was toward the end of the summer right before she had to go back to school that the dog convinced her that she was able to work properly:

“She had a very few good alert toward the end of the summer where she caught me before I would go low, and that’s what proves to me that she is amazing at doing her job” (Interview, patient, 2015).

Like the trainers who reappear and become visible in the case of a problem, it is the dog this time, which like an invisible technician (Shapin, 1994; Mialet, 1999, 2003), becomes visible in case of danger:

“She is so quiet, especially in public, and so calm; if something is up, I’ll know because she won’t be doing her normal thing. I was sitting in one of my big lecture halls the other day, and she crawls up under my chair, no one knows she is there, and I forget that she is there, but she like started thumping her tail against my chair and I had no idea what was going on, I looked down and her eyes were just like focused directly on my face, so I checked my blood sugar and I was at 250, she just does things out of the ordinary to get my attention, usually it’s with her tail or her paws, she has a very strong tail that can make a lot of noise if needed, and she knows when it happens she is going to get treats, so that gets [her] excited and get her more motivated to get my attention” (Interview, patient, 2015).

Though she is trained for low blood sugar, like most diabetic alert dogs, she will also be able to pick up high blood sugar as well (like for example 250 mg/dc), which, as I mentioned at the beginning of this essay, can have terrible consequences in the long run for a person who has diabetes:

“If I’m not wearing the Dexcom (the CGM), I will have no ideas that my blood sugar is high, so it can stay there for a long time until I want to check my blood sugar as well” (Interview, patient, 2015).¹⁷

But again this is only 6 months after Emma got her dog—she remembers the exact night when it happened—that she started to

feel that she could completely trust her dog, that she could rely on her. She was at Starbucks with a study group, and she took insulin to cover her coffee and snack. She was walking home and suddenly she thought she might have forgotten to take insulin, so she took insulin again without really realizing what she was doing, she was on “autopilot,” and then she got home:

“She [talking about her dog] had been doing sort of weird things on coming back home, but it was late at night, and I thought that it was because she was tired, but we got home and she would not leave my side, and she wouldn’t get water and she would not lay down at her normal place and she was sort of all over me and pawed me and everything, and I checked my blood sugar, and I was on target, I was 130, but I had seven units of insulin on board [which meant that she could go low later in the night] and so that was definitively an aha moment because I wouldn’t have noticed that until I was low already, and I would have been playing catch up all night [meaning eating all night to raise her blood sugar], but instead because she alerted me so early I was able to start eating slow acting carbs that did not make me feel sick, like the skittles and juice and everything, like if I was low already [not knowing if she was going to be low or not, she might have ingested fast acting carbs when her blood sugar was not low yet, making her blood sugar rise very quickly, thus making her feel sick].”

The dog knows that her owner, and only her owner is her job. And the dog accompanies her, wherever she goes, night and day. She even goes with her to band practices. In this case, the patient makes sure that she cares for the dog to be cared for in return (for a similar argument in the case of therapeutic dogs see, Michalon, 2014):

“She has headphones that I put on her...she would just sit on the side and if anything is wrong, she will just come to me, or I can see her looking at me from across the field” (Interview, patient, 2015).

This dog was in part selected because she could handle very loud noises, and thus could share her human’s passion; she is also rigorous and playful:

“She is very high energy which is a good thing and a bad thing, but she is able to handle, sort of the rigorous... [of] being on your feet all day, crazy schedule, basically, [But] if she has a lot of excitement around her, specifically towards her, she is going to be very excited and [will] not being able to keep her cool” (Interview, patient, 2015).

Something that service dogs have to learn to do: control their emotions (Mouret, 2015).

However, dogs’ sensitivity to their humans, which is their strength, can also play against them. Some dogs are so sensitive that in cases of extreme levels of stress, they won’t be able to function, they will shut down, as in the case of a household where a couple was in the middle of a divorce.

“Because dogs are not machines,” says the program director and foster, “they are living beings and they are affected by stress and changes that go on as well” (Interview, foster, 2015).

And, she adds, “I think that dogs very much have their own personalities, just like people do, and I think they react *strongly* to the emotions of their handler[s], I know that, and we tell people just during training whatever your feeling is going down into your leash and then into your dog. I know somebody who had a service dog, she was a college student and every time that she had finals the dog would have stress diarrhea, because she herself was so

upset that it upset the dog” (Interview, foster, 2015, my emphasis).

The human, the leash and the dog have become a one and unique self.

A one and unique self. As Gregory Bateson argues:

“Consider a blind man with a stick. Where does the blind man’s self begin? At the tip of the stick? At the handle of the stick? Or at some point halfway up the stick? These questions are nonsense, because the stick is a pathway along which differences are transmitted under transformation, so that to draw a delimiting line across this pathway is to cut off a part of the systemic circuit which determines the blind man’s locomotion” (Bateson, 2000, p. 318).¹⁸

The human-diabetic alert dog has become a “systemic circuit,”¹⁹ which also has to integrate the gaze of others to become part of their environment in the same way the dog has become part of the humans’ self:

“She gets a lot of attention [Emma talks about her dog] and I get a lot of attention, she is definitively a walking billboard that says there is something different about me...When I first got her, I was so conscious about all the stares that I was getting, but now it’s pretty normal” (Interview, patient, 2015).

A way to be included in the environment is to use the dog, not just as an alerter, but as a mediator, or as sentinel (Keck, 2020), to alert other humans about this invisible and threatening disease and its complex management:

“If someone comes up to me, and ask me why I have her, if I’m in a good mood and not super tired, I’ll try to educate them a little about diabetes, about how she helps me, about what service dogs do in general” (Interview, patient, 2015).

This is how dogs make diabetes visible—thus manageable—through their action and presence, while also making visible, through the words of their humans, the invisible technicians and the other workers that they represent. This is what they do for diabetics and society at large: they allow humans to live with a disease, not only by catching their low blood sugar, but also by allowing them to teach their fellow human beings what it means to live differently, that is, to care.

This companionship must be reinvented every day. And, every year, like one checks and maintains a car, dogs (and people) have to be recalibrated.²⁰ The beauty of this living instrument is its flexibility *and* its objectivity, a strange combination of being at the same time loving, factual, and none judgmental.²¹ Often high numbers make a person with diabetes feel bad about herself or the tone of the voice of those who are around her [for example, when telling her to test] can hurt her feelings.²² In this regard, the diabetic alert dog, has the property of a “self-regulating tool,” but also offers a very different relationship between the patient and his or her disease:

As the director tells me, “I mean diabetics for so long [and imitating the voice of a mother asking her kid to test her blood sugar] or ‘you are a little irritable, go test your blood sugar, really we are going to go through this again,’ you know this kind of thing, you know if a dog alerts it’s not because you are being irritable, it’s just a fact, there is a smell there, [and imitating the dog talking] ‘I’m just letting you know, it’s non-judgmental’ and then, she adds ‘the unconditional love, living with a dog and having *that body there*’ (she started crying).” [We laughed (to relax the atmosphere)]. And [she continues] “you put those two things together especially with a diabetic

who has a chronic disease and who never gets a break, who doesn't have to take a vacation...(Interview, director, 2015).” [She teared-up again].

The owner of the facility was all these characters at once (dogs, parents, patients), before she became the conduit of intense emotions, just as the dog through the leash “gets” the emotion of her owner.

Conclusion

Bronislaw Malinowski, in *Argonauts of the Western Pacific*, reminds us of ethnography's goal “of which an ethnographer should never lose sight. This goal is, briefly, to grasp the native's point of view, his relation to life, to realize *his* vision of *his* world. We have to study man, and we must study what concerns him most intimately, that is, the hold life has on him. In each culture, the values are slightly different; people aspire after different aims, follow different impulses, yearn after a different form of happiness. In each culture, we find different institutions in which man pursues his life-interest, different customs by which he satisfies his aspirations, different codes of law and morality which reward his virtues or punish his defections. To study the institutions, customs, and codes or to study the behavior and mentality without the subjective desire of feeling by what these people live, of realizing the substance of their happiness—is, in my opinion, to miss the greatest reward which we can hope to obtain from the study of man” (Malinowski, 2005, p. 19).

Or, one might add, from the study of human–animal relationships.

The story I have told is about a complex attunement between different living beings, humans and animals, but also machines, that constantly have to tailor themselves to each other, discipline each other, think with each other, grasp the others' point of view, become the other, and realize the vision of the other's world. The trainer attunes to the dog, the dog attunes to the trainer; the dog attunes to the individual, the individual to the dog: all are ethnographers of each other, all inhabit each other worlds, all exchange properties (Mialet, 2008, 2012a, 2019a, 2019b see also Latour, 2017; Despret, 2020). While the trainers will eventually disappear to reappear in moments of friction or disconnection (Shapin, 1994; Mialet, 2003), this strange symbiosis between a human being and a dog, now intimately connected through invisible, and sometimes perceptible bonds, will continue being reinvented and replayed through a glance, a paw, a word and a number bouncing back off each other in quest for a hidden actor that only becomes visible through them: Diabetes type 1.

Tracker of trackers of blood sugar, I thus saw emerging another kind of subject, a human being, but a human being who is fabricated with, through and by, not only other human beings, objects, machines, or narratives (Mialet, 2012a, 2019b), but also by an animal (and not against it as the tradition since Descartes would like us to think), a symbiotic being. A human being who is not closed off from her environment, but made by it.²³

What I have discovered is the enactment of another definition of accuracy, so crucial in the management of diabetes, which is here intimately connected to its etymology, that is the notion of care and “cure”: “Funnily enough, the term *accurate* derives from care: ‘prepared with care, exact’; it is the past participle of *accurare* ‘to take care of.’ Here, the notion of doing something with care led to that of ‘being exact’” (Puig de la Bellacasa, 2012, p. 211). One could say, in this case, that the dog is more “exact” because he “smells” by being attuned to you and he is attuned to you to smell. But contrary to what Puig de la Bellacasa argues that “The tempting proximity between these terms [care and ‘being exact’] reveals a risky ground: the ambition to control and judge what/who/how we care for” (Puig de la Bellacasa, 2012, p. 211),

we see here the opposite, “no judgment is involved.” Yet, “better control” is achieved.²⁴

Thus, if diabetic alert dogs are instruments or prostheses, in a similar way other service dogs might be (Mouret, 2015, 2017; Pemberton, 2019; Van der Weid, 2019), or if they share certain characteristics specific to therapeutic dogs such as being (perceived as) individuals or persons (Michalon, 2014), they also are instruments of a very specific kind; they are able to give humans feedback about themselves because they understand something better about themselves than they do through smell, care, attunement and reflexivity. By their very nature and ways of functioning, they also reconfigure what an instrumental relationship is.

Finally, I also see emerging another definition of responsibility, what Donna Haraway, to quote her again, calls “respons-ability” (response—ability) the capacity to respond to an action or an idea in front of those for whom they will have consequences. And (some) dogs, as we have seen, seem particularly good at this.²⁵ It is, then, by sharing with them, another species (in addition to other beings, machines and humans), the “burden” of and responsibility for managing diabetes, that living with this disease becomes possible, that is, living *tout court*.

It is also by sharing with the reader how the concept of the distributed-centered subject functions on the ground, that I tried to make tangible how different forms of translations between spheres that are often thought as being incompatible—such as the human, the technical, the animal and the medical—or whose compatibility is deemed problematic in medical translation, are (made) possible. Lastly, it is by offering a new way of thinking about “the subject,” not as contained “in” the individual, but as distributed and centered, that I engage those who are interested in, or work on, “patient-centered” medical Knowledge Translation practices, such as “health literacy” and “self-management,” to imagine what the “distributed-centered patient” medical Knowledge Translation practices might look like. Another exchange of properties.

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Notes

- 1 The person who is at the head of the facility upon which this paper is based created her non-profit organization in 2010. My study took place in the summer 2015 and was based on multiple interviews with the director, trainers, volunteers, patients, and a few brief observations in the training facility. All of them agreed to respond to my questions in the context of my current book project on Type 1 diabetes and its management. This paper should be read as a philosophical inquiry more than an in-depth ethnography. By contrast, I am currently writing up the results of an in-depth ethnographic study which started 2 years ago in another facility, which is at the origin of the creation of diabetic alert dogs and uses different methods.
- 2 This book/project tentatively titled, *The Thinking's Person Disease: An Ethnographic Study of Sensibility, Senses, Sensors and Sensations* examines the training of therapeutic dogs, hackers, the creation of algorithms, and patient experience.
- 3 While people who have type 1 diabetes are precursors of the Quantified Self movement and use similar techniques, they now also benefit from the practices developed by the users of the Quantified Self (Fritz and Guillot, 2017; Liang et al., 2011; Moretti and Morsello, 2017).
- 4 If self-management is said to play a crucial role with regard to treatment efficacy and the quality of diabetes care (Heisler et al., 2003), alert dogs have been shown to have a “potential value for increasing glycaemic control, client independence and consequent quality of life, and even reducing the costs of long-term health care” (Rooney et al., 2013).
- 5 I transpose here a dated and perhaps caricatural conception of what an anthropologist is (someone who has access to something his or her informants ignore), but it seems to work here as a provocative thought experiment. We will also see how dogs are becoming sophisticated anthropologists in learning how to construct a common problematic with the humans they observe and work with.

- 6 There is an interesting parallel here with the thought experiment imagined by John Locke. The experiment is based on the following riddle: What would happen if, instead of eyes, scientists had microscopes in their eye-sockets? The answer: equipped with such prosthetic eyes they would get to the essence of things for they “would come nearer the discovery of the texture and motion of the minute parts of corporeal things, and in many of them probably get ideas of their internal constitutions,” but they would simultaneously become angels, for then they would be “... in a quite different world from other people: nothing would appear the same to ... [them] and others: the visible ideas of everything would be different” (Locke, 1988, p. 160) as quoted in Mialet, 2012. The dog has access to a level of reality that is unknown to us except if we equipped our eyes with specific prostheses; a telescope. However, the dog’s capacity to smell hypoglycemia is the result of highly intense training, in this regard, the dog’s nose becomes an instrument.
- 7 I’m interested in pursuing the differences and/or similarities between human and animal cognition along three different threads of analysis (1) Temple Grandin (who is also my main informant’s reference), insists on her capacity to think visually rather than verbally, and links this visual capacity to her ability to think like animals do, they are completely sensitive to details; (2) The “madeleine of Proust,” humans think through and with smell and taste as well; (3) This quote is particularly interesting because it shows that every element that composes a “puff” of smell is contextually dependent or brings its own context with it; what, then, does it mean to “smell” context. This seems to echo what Ann-Sophie Barwich says: “Instead of taking a stimulus centered-approach and looking at smells as stable percepts, computationally linked to objects, we trade better if we adopt a more processual and context-bound perspective” (Barwich, 2016, p. 46).
- 8 There is a “lag” between the CGM (Continuous Glucose Monitor) and the glucometer’s reading. Both readings depend on puncturing the skin; however, contrary to the glucometer that directly measures the amount of glucose in the blood, the CGM measures the glucose concentration in the tissue, as a result, the CGM’s (or FCGM’s) reading is delayed in comparison with the glucometer’s because it takes more time for the glucose to permeate the interstitial fluid. Depending on the brand, the glucometer has a margin of error of 10–15%, and the CGM around 10%. The question of accuracy that used to be associated with having “the right number” when the glucometer was the only management tool available is no longer the (only) standard. With the introduction of the CGM, which reads the blood glucose continuously, people who use this device are more interested in looking at the trends than isolated numbers, that is, at how long their blood sugar is in range (the medical standard is between 70 and 120 mg/dc). However, if the CGM offers new resources to read the blood sugar, and has a lower margin of error today than when it was created, dogs are still faster than either the glucometer or the CGM in catching blood sugar dropping.
- 9 Indeed, how can one trust someone or something that can access the imperceptible? Trusting the dog (and the machines) is crucial. To trust a dog with one’s life, however, can be difficult to establish, especially for those who have been used to taking care of themselves for a long time. Conversely, the dog must be trained “to trust” the smell over the human partner’s sense of their own body’s well-being; that is, if the dog smells that the blood sugar of a person is dropping fast despite being told not to move because “she feels fine,” the dog has to disobey” (it is called “disobedience intelligence,”) and alerts until she tests her blood sugar. I explore elsewhere the difference between trusting a machine versus trusting a dog, and how people with diabetes use one and/or the other against, or with, what they feel (Mialet, 2019a).
- 10 The director used to be a trainer. She also uses her experience as a trainer to give advice during the training process when needed. She will be referred as “the director” in the text.
- 11 See here also Michalon (2014) who argues that animals enter into the regime of person when they are in a care relationship.
- 12 Here, I make an allusion to E. Hutchins and his study of cognition in the wild (Hutchins, 1995).
- 13 The person who trains the dog has diabetes, so she has to test herself before to make sure that she has the “right” number and that the dog she is training is not going to be distracted by her scent.
- 14 There is an interesting distinction here between “thinking with” and “thinking like.” We see the notion of “thinking with” emerge in Donna Haraway and Vincianne Desprest’s work as well. There is a link with the notion I call an exchange of properties, the capacity to become the other, that I also explore in this text.
- 15 The physical attachment, the leash (or cord), through with the bond is originally created echoes the definition of the natural contract as it is described by Michel Serres. The quote is taken from Steven D. Brown’s. Steven D. Brown refers to Michel Serres’ “natural contract,” which he describes as “a bond, a cord which binds partners to one another” (Brown, 2002, p. 21). He continues, quoting Serres: “The cord has three functions. First, the cord ... marks out a field and with its flexibility surrounds it: can anything be defined without it? To this object, second, it attaches the subject, as if to its knowledge or its property. And third, it informs others, contractually, of the situation produced by the enclosure: can there be collective forms of behavior without this? These practices concern, respectively, form, energy, and information; they are, if you will, conceptual, material and judicial; geometric, physical and legal. Bonds of knowledge, of power and of complexity. All in all, its triple tress links me to forms, to things and to others, and this initiates me into abstraction, the world and society. Through its channel pass information, forces and laws. In a cord can be found all the objective and collective attributes of Hermes (Serres, [2014]1995d, pp. 108–109). [...] Brown explains, “The real power of Serres’ claim lies in the way he points out that we have never really talked about or thought about anything else. Science, law, religion—these are all ways of making contracts, cords which bind us to one another and to the world. We are at once very modern and very ancient, approaching the brink and right where we have always been. Hermes returns. One more reason to take follow Serres in seeking instruction from the knotted spaces which lie between these practices, these times.”
- 16 Annemarie Mol makes a similar argument regarding the ways in which diagnostic tools participates in what she calls “intro-sensing” (Mol, 2000).
- 17 Humans can also smell high blood sugar (in this context the breath of the person who has diabetes smells like alcohol), while low blood sugar is invisible to humans except when the person who has diabetes expresses behavioral changes. The patient herself can also experience certain sensations which are not always reliable. Moreover, as previously mentioned, the competence of feeling high or low blood sugar can be lost. As I shown here, dogs and machines can help the patient to feel again their sensations (on the use of machines to regain sensations, see also Mol, 2000).
- 18 On the ways in which seeing-eye dogs are trained, see Neil Pemberton’s article, which illustrates beautifully what I call an “exchange of properties” by showing the many ways in which every actor (dog, trainer, blind person) has to become the other to become this co-organism (a seeing-eye dog with his or her partner). (Pemberton, 2019). Moreover, my story starts where his ends, in so far as the dogs trained to become diabetic alert dogs are often dogs that failed to become certified blind dogs. On dogs’ training see also Mouret (2015, 2017) and van der Weid (2019).
- 19 However, contrary to seeing eyes dogs who have to be attached to the person to guide them, diabetics alert dogs do not have to be attached physically to the person to be able to alert. The leash is not crucial (expect at the beginning as previously mentioned).
- 20 The very complex and subtle process that participate in the production of DAD, that I have described, does not always work. And it could fail at different stages. Sometimes dogs will not have the right mindset to be trained, or the personalities of dog and human will not “match,” or the dog or the person will not work hard enough to maintain this relationship. In any of these eventualities, dogs might change partners, or career, or become pets.
- 21 One could say that the dog exercises a judgment when he or she acts in a certain way, but it is different than being “judgmental.” Conversely, the dog is sensitive to the one who judges his or her actions (on this specific point, see also Mouret, 2015, in the case of guide dogs).
- 22 This is the paradox created by the practice of self-regulation, which on the one hand introduces freedom, while on the other, displaces the blame for poor control—for not maintaining the proper balance—onto the patient (Mol, 2000, 2008).
- 23 One could argue that this symbiosis between dog and human exists in other companionships’ relationships (see the notion of agility describes by Haraway, 2003). The point I’m making goes one step further, however, in so far as the life of one relies on the life and performance of the other.
- 24 On the notion of control, Mol has also explored the “logic of care” versus “the logic of choice” in its role in the management of Type 1 Diabetes (Mol, 2008). Though I agree with her emphasis on the notion of care, I propose here a different way to connect notions of “care,” “accuracy,” “control” and “objectivity.”
- 25 Or, [some] of them are made good at this.

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