2022 June 7

Companion animal cooperative self-investment:

An unacknowledged value in animal wrongful death law

When companion animals cooperate with their human guardians, might the animals be investing in themselves? U.S. courts do not recognize such a value. Courts recognize an animal's fair market value, or an animal's value, as it were, **to a stranger,** *and some courts recognize an animal's value* **to the guardian.** *However, no U.S. court recognizes the value of an animal's life* **to the animal**. *Here I argue that some companion animals have the capacity implicitly to invest in themselves. Animals exhibit this capacity when they develop their skills cooperatively with their guardians. If such an animal is killed unjustly, guardians lose the opportunity to recoup the guardians' investment, but the animal also loses the opportunity to recoup their investment. Recognizing the value of an animal's future to the animal has legal and philosophical implications.*

1. Introduction

Can horses, dogs, cats, pigs, and other mammals kept by humans intentionally engage in activities to improve themselves? When we invest in ourselves financially, we try to acquire an asset in order to enjoy its future, appreciated, value. When we invest in ourselves psychologically, we try to improve one of our skills in order to enjoy its future, appreciated, value. Companion animals are not known to invest in themselves financially. But can they, like our children, implicitly invest in themselves psychologically?

If they do, if companion animals make cooperative self-investments, this fact matters legally and philosophically. I here focus primarily on the legal repercussions as I am interested in the way juridical bodies determine awards when companion animals are wrongfully killed. We are perhaps more familiar with the issue in the case of humans. When innocent people were killed in the September 11th Twin Tower attacks, their families received compensatory judgments reflecting two values. The first value was the so-called "non-economic value," the apparent intrinsic value of the victim. We cannot put a dollar figure on the non-economic value of a person; the value of a person is often held to be incommensurable with any economic assessment of it. Nonetheless, adjudicators, wanting to try to acknowledge the value nonetheless, adopted the assumption that every victim was the moral equal of every other victim. Therefore, every surviving family was given the same fixed sum, or $250,000.[1] Presumably, this non-economic

[1] In establishing the Victim Compensation Fund for survivors of relatives lost in the Twin Towers, the U.S. Congress charged Kenneth Feinberg with allocating the monies. He

award was meant to recognize that the future life lost was of value both to the loved ones and *to the victims*. Consequently, regardless of the victim's age, wealth, gender, or social standing, the court gave each surviving family the same amount.

The second value recognized by the court was the so-called "economic" value of each victim. The court acknowledged that different families had lost different opportunities for future income because the victims had varying ranges of lost future earnings. To compensate the families for this, more objective, value, the court added an award, variable in size, to the fixed $250,000 figure. The awards were based on estimates of the amount each victim would have brought in for the family had their lives not been cut short. After subtracting from the total earnings the amount each victim would have spent on themselves, awards to surviving families ranged from zero to $7.1 million.

Notice that the "economic" value of a human being varies as a function of the prior efforts the individual has made to improve themselves. Those who traded the opportunity to take a lower paying job upon graduating from high school in exchange for years of advanced education and, later, a higher paying job were more likely to have lost large amounts of future income than those who chose not to make such self-investments. If all persons have the same non-economic, intrinsic, value simply because they are moral equals, individuals have different economic values insofar as they have made different choices about investing in themselves.

When a court must decide on the value of a companion animal unjustly killed, should the court also consider the possibility that the animals have lost the opportunity to recoup similar self-investments? I argue for a positive response.

2. Definition: Cooperative Self-Investment

Broadly construed, self-investment value is the value created by foregoing the pursuit of an immediate interest to pursue a longer-term interest expecting that the decision will produce greater future rewards. We can distinguish between explicit and implicit self-investments. To invest in oneself explicitly is intentionally to sacrifice the satisfaction of a current desire in order to secure a future larger reward. Explicit self-investment is not an innate skill of any animal, human or nonhuman: it must be learned. Everyone who has it learned it from someone else by engaging, first, in what I will call implicit cooperative self-investment, the undeliberated following of a teacher's instruction. No one engages in explicit self-investment without having first been taught, usually by one's parents, the simple building blocks of the more complex skill. Unlike explicit self-investment, implicit cooperative self-investment does not require the ability to think about one's self, much less one's future self. It does not require the ability to think about the long-term future, or the ability to make conscious choices on the basis of moral reasons, or the ability to report that one is foregoing the satisfaction of a current interest in order to secure a larger future gain. Implicit cooperative self-investment requires only that one have the ability to anticipate the short-term future, follow the directions of a teacher, and have the disposition to

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recommended variable awards for each victim's lost future income and a fixed sum for each victim's "loss of enjoyment of life" (Ackerman, 2005).

exercise the autonomy necessary to defer the gratification of a short-term desire to realize later, larger gains. By implicitly investing in oneself under a tutor's guidance, humans acquire the skills of explicit self-investment: consciousness of one's future self, prospective planning for one's future well-being, risk management, and cost/benefit reasoning. However, these skills are neither present nor necessary during the first steps of implicit self-investment.

As noted, some legal systems in the United States acknowledge the implicit self-investments of humans. However, none acknowledge implicit self-investments of animals. Guardians of companion animals killed wrongfully in the U.S. currently may expect to receive compensatory judgments reflecting only one value, the animal's *economic* value. As in the 9/11 case, this value is thought to be objective; it is the price the lost animal would have earned if sold on the market. However, an animal's fair market value (FMV) is often null. Is the animal, then, worth nothing, objectively and "economically?" Two points call this conclusion into question.

First, it seems unjust to set an animal's value at FMV because many guardians value their pets at rates far exceeding FMV. Guardians spend considerable amounts on food, surgeries, training, end-of-life veterinary care, and other measures to protect and enrich the animal's life.

Second, FMV only assesses an animal's value to a stranger. It fails to capture the rich value of the guardian-pet relationship. Guardians sometimes sincerely claim to love their animals as much as their children; some claim to have suffered more from losing a dog than from losing a father. (Rohrer, 2010). In light of these two points, many juries, state courts, and legislatures now recognize a second value, a more subjective, "non-economic" value.

As defined by some courts, an animal's *capital* value is the value of the animal to the guardian. This value may be determined by the amount the guardian has invested in the animal. For example, when Gabby died at a grooming business from being negligently exposed to extremely hot conditions, the New Jersey Superior Court acknowledged the dog had a "subjective value…to its owner" arising from "…their relationship and the length and strength of the owner's attachment to the animal" (*Harabes v. Barkery*, 2001). In another example, a Texas trial court awarded a woman $10,000 for the "loss of companionship" of her dog, Licorice (*Petco v. Schuster*, 2004). And in ANDERSON V. HAYLES, a jury awarded the plaintiff, Jim Anderson, $100,000 after his neighbor shot Chucky, Anderson's 7 year-old dog. Anderson told the jury Chucky had a vocabulary of 100 words, could catch clay pigeons expertly during target practice, and was an excellent swimmer. Chucky, the jury concluded, "offered therapeutic, hedonic, and recreational value … made 'coming home' a more enriching experience … enhanced the value of Mr. Anderson's relationships, and built bonds to others" (*Anderson v. Hayles*, 2016).

Acknowledging an animal's non-economic value is a step forward. However, when a companion animal loses her life, her human companion may not be the only one losing a chance to recoup investment in the animal's life. In this paper, I survey behavioral evidence that the animal may also lose the chance to recoup her investments in her life.

The Self-Investment Hypothesis:

Some companion animals implicitly and cooperatively invest in themselves.

Humans invest in ourselves in at least two ways. First, we *explicitly* invest when we consciously set aside current resources for future gains. We put cash into savings accounts and retirement plans. We learn new languages, lift weights. Second, we *implicitly* invest in our ourselves when, without conscious attention to what we are doing, we set aside the pursuit of current desires for the sake of future gains. Children implicitly invest in themselves when they resist the impulse to run outside and play choosing, instead, to finish their spelling or piano lesson. Very young children implicitly and cooperatively invest in themselves when they learn household norms. The crawler responds to encouragements to stand while holding onto the coffee table; the young one tries to brush his teeth the way Daddy demonstrates; the toddler rhythmically sways to the beat trying to imitate big sister's dance. These efforts demonstrate implicit self-investments, energy and attention spent trying to enhance one's skill set.

Such investments demonstrate that one can raise the value of one's future life, albeit unintentionally, by responding to a teacher's present prompts. They also demonstrate that one can fail to raise one's future value in two ways. First, one can fail or refuse to respond to prompts. Training methods may contribute to such failures; trainers who rely primarily on punishments tend to produce animals with lower executive functioning (Foraita et al., 2021). Second, an animal may live in an environment lacking such prompts; trainers who keep animals in kennels seem to produce animals with lower executive functioning than animals kept in households (Foraita et al., 2021). The value of an animal's future is variable, like a toddler's. It may swell or diminish as a function of present activities. However great or small it may be, the value of the individual's future life is lost entirely if the individual is killed before they can realize it.

One may reasonably doubt that nonhuman animals explicitly invest in themselves. Explicit investment requires, as I say, self-consciousness, rationality, autonomy, episodic memory, prospective planning for one's future, and the ability to assess risks and benefits. I argue only that some companion animals make implicit self-investments. I set forth the hypothesis in this section and answer objections in Section II.

For introductory purposes, notice the *prima facie* appeal of two ideas: that an animal's life has value for the animal, and that an animal can develop its capacities in a way that improves their welfare. As to the first claim, consider a ten year-old Rottweiler with diabetes, major organ failure, and osteosarcoma, a painful bone tumor that is very difficult to treat. It may be better *for her* to be euthanized than to suffer for months. If that verdict seems right, as I think it should and as many pet guardians have affirmed when facing the circumstance, then that animal's life has value or, in this case, disvalue, for the animal. For that claim must be true if we are to assert that euthanasia is *better*, all things considered, *for the dog*. Should a housecat become incurably depressed, incontinent, in constant pain, and unable to drink or eat, their life may no longer be worth living. When the things that make an animal happy no longer interest them, when they are so sad and lethargic that every hour only seems to add to their burden, the question of euthanasia

becomes urgent. Any minimally decent guardian will at least consider it. And a caring guardian will consider it—here is my point—by asking whether additional days of life will promise more aggregate value than disvalue for the animal.

Judgments that allow awards for unjustly killed animals take into account one reason guardians keep animals, to enhance the guardian's wellbeing. However, many guardians also keep animals to enhance *the animal's* wellbeing. Many humans want their nonhuman companions to have a good life for the salutary consequences it brings the humans *and* the animals.

The second idea also seems acceptable, *prima facie*. Companion animals such as dogs exhibit many human-like behaviors (Udell and Wynne, 2008), including learning to enjoy new, positive experiences with their guardians. A young truffle hog revels in working with their trainer as they learn to distinguish edible from nonedible fungi (Sullivan, 1982). A novice Quarter Horse leans into the challenge of learning to isolate a calf identified by the rider. A Jack Russell terrier pays attention to clues pointed out by their handler as the animal develops the nuance of discriminating explosive from non-explosive devices. If these animals are developing skills in common with a teacher, they are creating self-investment value whether or not they are conscious of investing in themselves. Insofar as they are attending to their tasks, they are self-investing even if the tasks are posed for them by their human companions. As long as the animals eventually adopt their teachers' goals as their own, they are improving themselves by acquiring skills they would not have acquired absent the companionable relationship.

Equally important, some animals, having seen what the trainer is after, adopt a higher, harder-to-achieve goal. The inexperienced border collie tries, unsuccessfully, to segment off a larger group of sheep than the trainer has requested, then tries again. The Quarter Horse turns a barrel more closely than its rider demanded, knocks it over, then tries again. A Golden Retriever runs down a frisbee the thrower thinks uncatchable. This, at least, is the hypothesis. To provide evidence for it, one must show that the animals are not simply responding automatically or "instinctually." Animals must be shown to be capable of paying attention to a command, focusing their energies on it, and exercising sufficient self-control to achieve it.

Let us start with an example of implicit self-investment in toddlers. Three-year old Kylee invests in herself whenever she acts intentionally on a *desire* or *want*. To act intentionallyis not simply to act on a desire or want. It is try, to expend effort, to satisfy a desire when less effort would be required to satisfy a competing desire. An act is performed intentionally when it is chosen. Imagine that Kylee is asked whether she needs to use the potty. Her inclination and practice is to respond unthinkingly "No!" and to keep on playing with her dolly. But if she is to act intentionally, she must attend to the question, choose whether to answer it, and decide whether to answer affirmatively or negatively. She must attend to her physiological state and ask herself if she really has to go. She may have a strong desire to continue playing and, thus, a strong motive to say "No." However, if she attends to the signs Mommy is attending to, she may well decide to say "Yes." While she still is not interested in interrupting her play, she may come to share Mommy's perspective and follow a rule she is immediately strongly inclined to disobey.

By exercising choice, young children cooperatively invest in themselves. It is no strike against them if, afterwards, they are unable to report on the experience or articulate, even to themselves, what they were attempting. For they are trying to overcome an immediate reflexive impulse in the service of achieving a more temporally distant goal.

In cooperative self-investment, toddlers inhibit a short-term impulse to achieve a more medium-term end. In so doing, they act as agents, autonomously and rationally, even if they are not explicitly thinking about what they are doing. Researchers describe this behavior variously, as imitation, play, learning, modeling. In such behaviors, toddlers are unconsciously creating new possibilities for themselves. They are learning skills they would not otherwise possess. Such implicit self-investments provide the basis on which more complex self-investments will be built. On the heels of these investments may come abilities that distinguish the self-investor from non-self-investing conspecifics. The self-investing animal may acquire an ability not possessed by the non-self-investing animal, such as the capacity to recognize subtle nuances in a tutor's glance or hand motion. An investment now may enable a horse later to respond appropriately to a novel request from a trainer, or an emotional support animal more sensitively to anticipate a guardian's unexpected mood change. These are paradigm cases of cooperative self-investment.

Or so I claim. What is the evidence?

3. Behavioral Evidence

Cooperative self-investments are executive functions (Diamond, 2013) with four necessary and sufficient traits:

3.1 Joint attention
3.2 Anticipation
3.3 Episodic memory
3.4 Self-control

Cooperative self-investment, therefore, involves more than automatized responses to stimuli or associative learning. Do some companion animals have joint attention, anticipation, episodic memory, and inhibition?

3.1 Joint attention

Joint attention is not present if two humans in the same room are concentrating on different things. Joint attention requires that they are each aware of the object the other is thinking about (Goffman, 1961). If we want to assist the toddler to find their squishy behind the couch, we look at the toddler, secure their gaze, and turn our eyes to the squishy's location. If the toddler is capable of joint attention, they follow our gaze and become aware that they are thinking about the same thing we are thinking about. They learn the squishy's location by working with us.

Horses show joint attention, respond to human gazes, and are capable of understanding us when we point (Lovrovich et al., 2015; Maros et al., 2008). They are more apt to obey an order not to move if it is given by an unknown handler when the handler is looking at them than when the handler is looking away (Sankey et al., 2011). They are more likely to choose a bucket with food in it when a person they know is standing behind it and looking at the bucket than when an unknown person is looking at the bucket (Krueger et al., 2011).

Dogs, too, are sensitive to our eye movements (B. Hare, Call, & Tomasello, 1998; McPhee, Manzone, Ray, & Welsh, 2015; Miklösi, Polgárdi, Topál, & Csányi, 1998; Miklósi & Soproni, 2006; Piotti & Kaminski, 2016; Hare and Tomasello, 2005; Kaminski et al., 2012; Miklósi and Topál, 2013). Dogs are more likely to follow instructions when their guardian is looking at them than when the guardian is looking away (Call et al., 2003; Schwab and Huber, 2006). They know when a human can see them and will choose more often to beg food from a person whose eyes they can see than to beg from a person wearing a blindfold (Gácsi et al., 2004; Virányi et al., 2004).

Dogs apparently can take our perspective, too. In one study, dogs were forbidden to take food under one of two conditions. In the first condition, the dog could see that the human could see the dog's actions through a window in a barrier, in which case the dogs tended to obey commands. In the second condition, when the dog could see that there was no window in the barrier and the human's vision was occluded, the dog had cover to disobey. When the dog thinks the companion cannot see them, the dog is much more likely to disobey (Bräuer, Call, & Tomasello, 2004; see also Maginnity & Grace, 2014). Dogs are able to figure out what their guardian is about to do and how they can match their actions to the guardian's actions (Benz-Schwarzburg et al., 2020; Duranton et al., 2017; Kubinyi et al., 2003).

Horses communicate with each other and with us using variously pitched whinnies, squeals, groans, snorts, and nickers (Briefer, 2012). Dogs use yelps, whines, barks, sighs, groans, and howls (Pongrácz et al., 2010; Simpson, 1997), possessing "a vast and flexible repertoire of visual, acoustic, and olfactory signals that allow an expressive and fine tuned conspecific and dog–human communication" (Elgier, Jakovcevic, Barrera, Mustaca, & Bentosela, 2009; see also Faragó, Takács, Miklósi, & Pongrácz, 2017; Kaminski & Nitzschner, 2013; Kaminski & Piotti, 2016; Kaminski, Schulz, & Tomasello, 2012; Piotti & Kaminski, 2016; Simpson, 1997; Siniscalchi, d'Ingeo, Minunno, & Quaranta, 2018). In these vocalizations animals are sometimes trying to turn their human companions' attention to an object. Piotti and Kaminski asked whether dogs playing with a favorite toy would break off their interest in the object when they became aware that a human companion needed their help to reach another object. They found that when a dog establishes joint attention with a human she can understand when the human has taken an interest in an object and may initiate a helping action to assist the human in obtaining the object (Kaminski and Piotti, 2016). As they observe,

> The dogs mainly directed their behaviour towards the object they had an interest in, but dogs were more persistent when *showing* the object relevant to the human, suggesting that to some extent they took the humans' interest into account. … [The results may

> support] the hypothesis that the dogs understood the objects' relevance to the human (Piotti and Kaminski, 2016).

Not all companion animals will have the same capacities. Just as toddlers have varying cognitive skills—and some toddlers, perhaps because of genetic disorders or cognitive impairments, may have no such capacities at all—we may expect different animals to have different capacities for self-investment. These differences probably exist at the individual, breed, and species levels. Cats, for example, are not as sensitive as horses and dogs to human eyes, tending to glance quickly at us rather than to gaze (Grandgeorge et al., 2020). If extended looking times are necessary to establish joint attention, cats may not be as capable of cooperative self-investment as other species.

3.2 Anticipation

To anticipate the future is to do more than wait for future developments, as a daydreaming person might do. It is also to do less than envision better-off and worse-off states of one's future self as one might do when planning a retirement strategy. Simply tracking motion as one daydreams is not anticipating what will happen next. And being conscious of the fact that one will exist in the future is not necessary to anticipate. Anticipation, or implicit prospection, falls somewhere between daydreaming and self-conscious planning.

Do any companion animals implicitly prospect? One way to disentangle an animal's ability to track a coherent motion and its ability to anticipate where the motion will end is to record their eye movements. Volter et al. showed dogs a video of two people tossing a frisbee back and forth. At first, the dogs looked at the catcher of the frisbee only after the catcher had the object in their hand. As the dogs learned the pattern of the frisbee's motion, however, they came to look at the catcher before the frisbee had arrived. "In other words," they conclude, "the dogs anticipated the location of the frisbee…" (Völter et al., 2020).

But were the dogs actually anticipating the frisbee's eventual resting place or simply responding to the motion of the catcher's hand? To control for this possibility, the researchers froze the video with the frisbee midway between the human pair and watched the dog's eyes. In this case, the catcher was not moving their hands because the video was showing a still frame. Yet even in this condition, some of the dogs eyes moved to the catcher, suggesting that the animals "were not just tracking motion, but anticipating it" (Völter et al., 2020).

To be intuitively aware of one's future is to be engaged in an implicit state, the fast and automatic process of predicting the values of various future possibilities. To "look forward" in this way is to be aware of one's future as consisting of multiple possible states. When we "look backward" in this way, we employ what Tulving called implicit memories (Tulving, 1985). When looking forward, we employ implicit prospections, rough and ready models to guide our

future behavior.[2] As Railton points out, this system has evolved to help us make decisions when we do not have enough time to deliberate about them. The affect and reward system, he writes,

> seems designed to learn complex statistical relationships, subserving the building of abstract casual/evaluative models that guide attention, perception, and action along expected-value maximizing lines (Railton, 2017).

In an experiment with 48 dogs, some of them "family" dogs without special professional training and some of them highly accomplished rescue and police dogs, dogs were tested to see whether they understood that a specific odor tracks a specific object (Bräuer and Belger, 2018). A dog, call him Bow, is shown two Kongs, a four-inch long snowman-shaped rubber toy. One, Target A, is stuffed with a substance, for example, peanut butter that has a different odor from the other, Target B, which might be stuffed with kibble. After Bow proves that he is equally interested in playing with both toys, he is removed from the room. An experimenter proceeds to drag one of the toys 18 meters across the floor from the starting point into a second room, where the toy is hidden. Suppose it is the peanut butter Kong. Bow is brought back into the room, released, and encouraged to find his toy. He smells the peanut butter and sets off expecting to find the Kong stuffed with peanut butter. However, when he arrives at the end of the trail in the second room, the experimenters have replaced Target A with Target B. So, Bow finds at the end of the peanut butter trail a Kong filled, instead, with kibble.

According to Brauer and Belger, violation-of-expectation experiments such as this one test for an animal's capacity to represent things they perceive. If animals are not forming unitracking cognitive representations of objects, we should not expect them to hesitate when they find the unexpected object. However, if they are representing, if they are tracking objects with concepts, we should expect them to act surprised when they realize they have misrepresented it (Bräuer and Belger, 2018). So, upon finding Target B rather than Target A, should Bow show no signs of surprise, then he probably cannot recognize when he has a false belief. But if he hesitates, acts confused, sniffs the ground, looks about, and continues his searching behavior, then his surprised response indicates that he is capable of representing, and misrepresenting, the future.

The experiment suggests that the animals, at the beginning of the sequence, are looking forward to finding a specific object (what) at a specific locale (where). As the authors conclude, "dogs *represent* what they smell and search flexibly" (Bräuer & Belger, 2018, emphasis added). The result also suggests that dogs anticipate. The dog infers from a cause—a peanut butter kong having passed along a certain trail in the room—that the future will present the object that left the odor trail.

We might be skeptical about this last claim. How do we know that a dog can anticipate finding a specific object? Experimenters have investigated this question, too. In tests for object permanence, dogs watch an experimenter place a plastic toy inside a box to the dogs' left side

[2] Panksepp considers such intuitive prospection to be a part of what he calls the unknowing, or *anoetic* consciousness, and the work of the *core-Self* (Panksepp, 1998; Tulving, 1985; Vandekerckhove and Panksepp, 2009); Damasio calls it a state of the *protoself* (Damasio, 1999).

(Miller et al., 2009). The box is attached to a beam that has a matching, empty, box attached to its right side. The beam is rotated ninety degrees, and observers record whether the dog looks first on its left or right for the toy. Many, although not all, dogs can solve the puzzle and accurately identify the correct location of the toy. This experiment and others provide evidence that dogs have object permanence, understanding of cause and effect, predictions about how they will find the world arranged in the future, and the ability to recognize when a prediction proves false.

While companion animals probably do not deliberate about their future episodically, they can anticipate what is coming. And that is sufficient, as it is the toddler case, to ground the claim that an individual values their future. As this section has shown, many companion animals are oriented to what-is-to-come.

3.3 Episodic memory

Unlike implicit or working memory, episodic memory requires mental representation of the past. As Tulving described it, this is the skill of being able to remember and report the who, what, where, and when of a past event.[3] It requires mental time travel, self-consciousness, and an ability to think about and report on the welfare of one's future self. It enables flexibility in generalizing a previously learned rule (Tulving, 1983). Companion animals clearly have working memory, passing object-choice tasks designed to test for it. Even puppies are able to use working memory to locate food. In one experiment, puppies are restrained and then allowed to see a human raising their arm briefly in the direction of food. Upon being released, the puppies can find the food, being guided by their memories of what they are looking for and where they have been shown it is located (Foraita et al., 2021). Since the humans lower their arms before the puppies are released, this experiment shows a temporal gap between the stimulus and the response, a sufficient gap to strain the capacity of working memory to account for the behavior.

Here, the animals may be demonstrating an early form of episodic memory. Working memory is short-term and its contents evanescent, whereas episodic memory is longer-term, its contents more sustained. To see "whether dogs can rely on episodic memory when recalling others' actions from the past," Fugazza et al., trained dogs to imitate a human action (Fugazza et al., 2016a). For example, the trainer would place their hands on a chair and then demonstrate that they want the dog to place their paws on the chair. Or the human would climb onto the chair and then encourage the dog to do so.

After a baseline was established for each dog's ability to imitate, the dog's companion would instruct the dog to "Do it!" In a subsequent stage, the dogs observed the companion exhibiting various behaviors, but the dogs were no longer expected to imitate the behaviors. Instead, after the human action was demonstrated, the dog was trained to "Lie down!" As the authors explain, "The aim of this training was to substitute the dogs' expectation of the imitation command with the expectation of a "Lie down" command" (Fugazza et al., 2016a). After a half-dozen trials in

[3] For Damasio, explicit prospection, like explicit memory, is a part of *core* consciousness; for Panksepp, *noetic* consciousness (Damasio, 1999; Panksepp, 1998).

which the dogs observed the owner exhibiting a behavior and then being instructed to lie down, the dogs expected the next trial to be the same. Soon, dogs would lie down before they were told to do so. They were anticipating the command "Lie down" and obeying it before it was announced. This shows that they can use implicit prospection to guide their behavior.

Further confirmation of the dogs' ability to prospect came along with a new wrinkle in the experiment. Instead of being told to "Lie down," they received the unexpected command "Do it!" To obey the command successfully required the dogs to recall a past event they had personally witnessed, namely, the human's behavior that they were being asked to imitate. Dogs could remember which behavior they were supposed to imitate for as long as one hour after seeing it (Fugazza et al., 2016b, 2016a) providing reason to believe the animals have "episodic-like" memory.

In another study, Kaminski demonstrated that a dog, Rico, could remember the details of *what* kind of objects had been hidden in addition to remembering *where* the object was located (Kaminski et al., 2008). Rico could then use these memories to guide his future movements as he searched for a toy requested by his companion.

Some animals behave in ways that suggest they may know when they know some fact and when they do not know it. In one experiment, a dog faces a human who sits facing the dog. Two V-shaped barriers flank the human. Each barrier has a gap between the two walls so that the dog can look through it to see what is inside. In the first phase, the dog is allowed to see a toy being placed behind one of the two barriers, and then encouraged to retrieve it (Belger and Bräuer, 2018). Dogs mostly walk straight around the barrier to the reward without first looking through the gap to check to see whether the reward is in fact where they have seen it placed, demonstrating working memory.

However, in the next phase, the dog is not allowed to see where the toy is placed. When encouraged to retrieve the toy, many dogs hesitate, bow in front of the human, lower their heads, make quick barks or in other ways seek additional information. Many animals will, instead of running immediately behind the barrier, peer through the gap in each barrier to see whether the toy is there. The title of Belger et al. asks whether dogs engage in higher order thought: "Metacognition in dogs: Do dogs know they could be wrong?" (Belger and Bräuer, 2018). For, the authors speculate, if the dog knows when she knows where the reward is—and knows when she does not know where the reward is—then she is surveying the contents of episodic memory to ascertain whether she has the information she needs to make a decision.

Whether any animal is capable of metacognition is a contested issue (Comstock, 2019). Fortunately, it is not one we must settle here. For, regardless of how that debate turns out, the studies cited in this section show that at least some animals appear to have episodic memory, one of the traits necessary for implicit self-investment.

3.4 Inhibition

In the minds of many guardians, companion animals display agency all the time. The animal fiercely resists an attack, overcomes a physical hurdle as it seeks something to eat, constructs a niche in order to sleep safely. In the so-called "folk mind," companion animals regularly inhibit their impulses, make decisions based on past experiences, and achieve longer-term goals. But is there empirical support for this conclusion? We can begin the discussion by considering the objection that animals cannot control themselves because they act "only" "on instinct."

According to the classical behaviorist paradigm, all horse behaviors are in fact the result of inflexible homeostatic monitoring systems. According to the so-called neo-Cartesian view, all animal behaviors may be explained by a combination of environmental changes, neural processes, involuntary motor responses, and natural laws (e.g., Carruthers, 1989). On this view, horses have only first-order beliefs and desires. Defenders of this view hold, like Descartes, that animals do not think (although, unlike Descartes, they may hold that animals feel). Various reasons for this view are given, including the claim that nonhuman animals lack language and having thoughts requires having language (Davidson, 2001, 1982; Frey, 2011, 1988, 1980). If a horse's purported decision is in fact the result of unfelt automatic algorithms, the horse's apparent control over himself is an illusion, a Clever Hans effect.

What is self-control? Here again we can distinguish two kinds.

The first, moral autonomy, is the feeling of being able to act on a principle when our inclination is to act on impulse. Do any domesticated animals have the feeling of moral autonomy? Do they think they can act in a principled way, doing what justice requires? I know of no evidence that animals have moral autonomy in this strong Kantian sense.

The second kind of control is executive control, the feeling of being the one who decides what to do with one's body. Do animals have the feeling that they can make choices? Do they feel as if they have executive control to make their own decisions? Executive control requires being free of "chains," either environmental constraints, psychological compulsions, or the coercive power of others. One can be deprived of the feeling of executive control physically or psychologically. Physically, one can be restrained and confined by others. Psychologically, one can be constrained and undercut by disruptive thoughts. In both cases, executive control is taken from us.

Call individuals who are not constrained agents. Agents have executive control over their bodies; their agency is the reason that their bodies move as they do. Their decisions are the causes of their movements. As Steward puts it,

> An agent is a *settler* of matters concerning certain of the movements of its own body, i.e., the actions by means of which those movements are effected are considered to be non-necessitated events, attributed always first and foremost to the agent, and only secondarily to environmental impacts or triggers of any sort (Steward, 2009).

To be an agent requires that one be able to inhibit immediate impulses to act so as to achieve some non-immediate reward (cf. Shepherd, 2014). Agents can enjoy goods and be harmed by

deprivations because they have a welfare that be promoted or harmed. As Steward argues, some sentient animals have a "…a certain freedom and control…"

> *It* decides, we think, precisely where it will go in search of food or shelter or to evade predators. Our natural inclination is to think of an animal as a creature that can, within limits, direct its own activities and which has certain choices about the details of those activities. … it goes deeply against the grain to suppose that each exact detail of each movement orchestrated by an animal was settled at any point prior to a period broadly coeval with what we think of as the period of the animal's action (Steward, 2009).

But is there experimental evidence to support this view?

When animals share attentional states with us, they may anticipate our movements and decide to cooperate with us. Like us, companion animals will vary in their ability to do this. They will also be affected by environmental stressors that limit their self-control the same way these stressors limit our self-control (Piotti et al., 2018) . Dogs, for example, have greater success inhibiting impulses when they are not sucrose-depleted, or not worn out from prior exercise (Belke, Pierce, & Powell, 1989; Comstock, 2016; Miller, Pattison, DeWall, Rayburn-Reeves, & Zentall, 2010; Robinson, 2010; Segerstrom & Nes, 2007; Angle et al., 2014). Placed in difficult situations and asked to perform an action, dogs may respond by displaying stereotypies, including lip licking, uncontrollable yawning, and circling (Palestrini et al., 2017). Dogs that are able successfully to control themselves in such situations are the ones most likely to succeed at training for roles as therapy, disaster, police, and cadaver dogs (Karatsoreos and McEwen, 2011; Riezzo et al., 2014). While some dogs never learn to sit, stay, roll over, come, or shake, other dogs easily learn to restrain their instincts in accordance with such commands.

While some conditions will deplete an animal's self-control, other conditions will enhance it. Extensive exposure to humans may help; well-trained explosives-search dogs tend to do better when working with their own handler than when working with a stranger (Jamieson et al., 2018). However, and as one might expect, the same is not true for all dogs. Some explosives search dogs do better when their handlers are stressed, and Zubedat's hypothesis about the cause of this behavior is worth citing:

> We postulate that since the handlers' exposure to stress elevated anxiety level and impaired their attention, it may have led to less control over the dog. Consequently, it allowed the dogs to 'take control' and manifest their training outcomes. This alleged locus of control transfer may explain the improved performance of the dogs . . . (Zubedat et al., 2014).

If Zubedat et al. are correct, the control exercised by a handler over a dog is dissociable from the dog's control over herself. Like us, dogs apparently develop self-control more efficiently when given a measure of control over their situation. Dogs working with stressed trainers may have more leeway to make their own decisions if the trainer is inattentive. Dogs left to their own

devices in such a situation may make more decisions on their own, thus increasing their level of self-investment.

These choices reflect a convergence of shared interests. But, again, not all dogs react the same way. Some dogs left in unfamiliar rooms with strangers quickly move to their guardian's side upon the guardian's return, but others do not (Rehn et al., 2014). Dogs whose guardians think the dog is attached only to them and predict the dog will not move to a stranger's side are often surprised to see the dog cozy up to a stranger in the absence of the owner. Dogs' values are dissociable from their guardian's values. Similarly, the value of an animal's future life is dissociable from the value the guardian places on the animal.
One way to test for agential control in a nonhuman is to ask whether the animal can inhibit a strong desire for an immediate reward in order to satisfy a strong desire for a better, longer term, reward. Scientists have devised at least four paradigms to study the phenomenon:

> … inhibition of consumption of current food contingent on future receipt of either a larger quantity or more preferred food, choice between quantities of food contingent on future pilfering or replenishment of food, carrying foods to different locations contingent on future access to those locations, and selection of tools for use to obtain food in the future (Roberts, 2012).

Three experiments strongly suggest dogs exercise autonomy by inhibiting their impulses.

In Go-no-Go, dogs are first trained to nose a button when they hear a whistle (the "Go" sign). If they respond appropriately they receive a food reward. In the next phase of the trial they are presented with the following challenge. The experimenter raises their palm in a "stop" sign, a sign the dog has been trained to understand as a signal not to move ("no Go"). After the signed "stop," the "go" whistle sounds. If the dog can refrain from "acting on instinct" and can successfully refuse to act on her desire to touch the button, she receives a food reward.

Can dogs do this? As one might expect, some can and some can't. Predictably, the age of the animal plays a role, and so does the individual's genetic background. Furthermore, structural and functional differences in neuroanatomy are correlated with success or failure in response inhibition. In a test using awake dogs trained to lay quietly in fMRI machines, researchers showed that parts of a dog's frontal cortex are more active when the dog is successfully inhibiting her behavior (Cook et al., 2016). Two of the regions are the canine proreal cortex, which the authors speculate "may be comparable to frontal regions supporting inhibition in humans," and the canine ventrolateral pre-sylvian cortex, "a likely candidate for analog to human pre-supplementary motor area, also involved in [human] inhibition" (Cook et al., 2016).

In a second experimental paradigm, A-not-B, an animal is allowed to see a food reward being hidden under one of three buckets, say, Bucket A. They are permitted to nose the bucket and retrieve the treat. The food is left in the same bucket for three trials. In the next, so-called reversal, phase, the animal sees the food hidden under A and subsequently removed and placed under B. The animal's challenge is to learn to inhibit his conditioned association of A with food

and to choose instead the correct location, B. When 12 month-old human infants are presented with the reversal trial, they perseverate and look under the wrong bucket, Bucket A (Topál et al., 2008). However, by two years of age, typically developing infants have learned to inhibit that response and they look under bucket B. In the intervening year, infants display individual variances in their performances. Like 18 month-old babies, dogs, too, display varying capacities to inhibit their responses in both Go-no-Go and A-not-B tests (Cook et al., 2016). Adult dogs generally succeed at Go-no-Go but often fail at A-not-B (Sümegi et al., 2014).

In a third experiment, dogs were tested to see whether they could retain a habitual response when faced with a novel task. First, they were shown food being placed in an opaque container. To retrieve it, the animals had to avoid knocking the cylinder over so as to retrieve the food from behind the cylinder. When the food was placed in a transparent cylinder, dogs could inhibit their impulse to reach straight for the food, remembering to perform the habitual response, that is, to approach the visible food from behind (MacLean et al., 2014). Dogs can track the location of objects, learn how to respond in patterned ways to get what they want, and can respond flexibly to reversals in those patterns. Trying to explain these behaviors as "mere associations" or "learned instincts" need no more undermine the argument that dogs implicitly self-invest than a similar reductionist explanation of a toddler's behavior under the same test conditions need undermine the argument that toddlers implicitly self-invest (Comstock, 2016). For the following claims are all consistent with the reductionist claims: dogs can inhibit their initial responses, change their behaviors to align with their longer-term desires, and reason about means and ends. These experiments provide additional evidence for canine agency.

Like young humans, dogs can control themselves, develop their own skills and make deposits in their future by aiming at intermediate-term payoffs. Kindergarteners earn returns for their teachers when they learn their lessons. But they also earn returns for themselves because they acquire the capacity to identify conditions in which their beliefs are false. For example, they may think that the rule "take turns" does not apply to the bathroom line, but when they are reprimanded for cutting into the queue they learn that this belief is false. Learning the scope of a rule and then working to bring one's conduct in line with the rule, is an implicit investment in oneself. The investment pays off in the future when one succeeds in determining whether the rule applies in novel situations.

Dogs who learn their guardians' household norms earn returns for their guardians. But they also earn returns for themselves because they acquire the capacity to identify conditions in which their beliefs are false. For example, they may think that the rule "stay in the yard" does not apply when they see a bunny across the street. But when they are reprimanded for chasing the rabbit they learn that this belief is false. Learning the scope of a rule and then working to bring one's conduct in line with the rule is an implicit investment in oneself. The investment pays off in the future when the dog succeeds in determining whether the rule applies in novel situations.

Can we assist animals in developing their self-investment capacities? The studies reviewed here suggest a positive answer. Animals differ, and we should expect variations between individuals. In the study previously noted, Rico remembered what toy was hidden and where (Kaminski et

al., 2008), but a second dog, Betsy, did not. When 12 horses were shown how to open a feed bin, 8 successfully learned to open it; 4 did not. Of another 12 horses not given the bin-opening demonstration, 10 did not learn to open the container, but 2 figured out on their own (Schuetz et al., 2017). Clearly, different animals have different cognitive capacities and the environments in which they are raised can influence the animals' psychology. Puppies asked to respond to a momentary distal pointing cue are more likely to remember where food is located if they are raised in human households than in shelters (Udell et al., 2010). The variability of these results confirms the intuitive point, that the working memory of different animals will have various levels of sophistication, between individuals, breeds, and species.

4. Conclusion

Some companion animals exhibit the four capacities necessary for cooperative self-investment: joint attention, anticipation, episodic memory, and inhibition. These animals can improve or depreciate their skills; they can exercise or fail to exercise self-control. U.S. courts should acknowledge these self-investments when an animal has been wrongfully deprived of the opportunity to recoup them. A method for doing so must be transparent, sensitive to differences in self-investment, and capable of resolving legal disputes.[4] Proposing such a method, however, is a task for another day.[5]

[4] I describe a method in "Nonhuman Self-Investment Value," an unpublished paper presented to the 2018 International Society of Utilitarian Studies in Karlsruhe, Germany, available at https://www.researchgate.net/publication/324680290_Nonhuman_Self-Investment_Value_2019_July_7

[5] In revising this paper, I profited from critical insights of eight anonymous reviewers of this journal and am especially grateful to Stevan Harnad for his patient guidance.

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