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The kingdom of dogs: Understanding Pavlov's experiments as human-animal relationships

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Abstract

The growth of Human-Animal Studies, multi-species and posthuman scholarship reflects an 'animal turn' offering important theoretical, ethical and methodological challenges to humanities, science and social science disciplines, though psychology, in particular, has been slow to engage with these developments. This paper applies the conceptual lens of the 'animal turn' to Pavlov's experiments with dogs, drawing particularly on the work of feminist cultural theorist Donna Haraway, to highlight the various dimensions of the human-animal relationship at their core. This portrait is contrasted with contemporary retellings of those experiments which ignore or are indifferent to the complexities of that relationship. Paying attention to nonhuman others that constitute animal experimentation in psychology, historically, today, and in retellings, is argued to be an important step for psychology. It prompts a radical shift in the way it might approach the lives of nonhuman animals, more in keeping with promising developments in other disciplines.

Key words: dogs, experimental psychology, human-animal studies, more-than-human, Pavlov, posthumanities

Introduction

The emerging field of Human-Animal Studies (HAS), as well as many parallel developments including posthumanities, multi-species ethnography and anthrozoology, pose a radical challenge to human-focused humanities and science disciplines, including psychology, by incorporating human relationships to nonhuman others and more-than-human worlds into theoretical frameworks and methodological approaches. Feminist and environmental philosopher Donna Haraway's list of 'human-animal worlds' where 'ordinary beings-in-encounter' takes place is instructive as to the range of this research: 'in the house, lab, field, zoo, park, truck, office, prison, ranch, arena, village, human hospital, slaughter house, vet clinic, stadium, barn, wildlife preserve, farm, city streets, factory, and more' (Potts and Haraway, 2010, p. 322).¹ Though psychology might readily take an interest in any of these domains, the lab is perhaps the most obvious. However, only a handful of articles, mostly outside of the discipline, have extended Human-Animal Studies to the psychology laboratory (Birke, 2010; Despret, 2004; Haraway, 1989; Pettit, 2012). Yet the laboratory has served as a crucible for psychology's complex relationship with nonhuman

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animals since its inception.² As DeMello points out, “ironically, while built for and on animals, the laboratory is not considered a home for human-animal relationships and it remains the task of HAS to undertake that study” (2010, p. 259). This article is an attempt to take up this task. Elsewhere I have argued for the kind of critical psychology that is needed to meaningfully contribute to an interdisciplinary and fast developing human-animal studies – staking claims for the necessary theoretical and methodological tools (Adams, 2018).³ The aim of this paper is different – to advance the ‘animal turn’ in psychology by going backwards. It engages in a revisionist analysis of a key figure – Ivan Pavlov (1849–1936) – to make the case for a theory and ethics of human-nonhuman animal entanglement at the heart of the discipline.

Today, Pavlov is remembered for his experimental work on conditional reflexes in dogs; but also for his anointment as one of the behaviourist movement’s founding fathers, an association that continues to this day, in both Western and post-Soviet science and culture. Pavlov’s concept of classical conditioning is now considered to be “the foundation of the modern science of learning and, in particular, of the influential theories of Watson and Skinner and the entire school of behaviourism” (Jarius and Wildemann, 2017, p. 322).⁴ Pavlov is also the focal point because he remains one of the most visible figures in psychology’s history, appearing in every undergraduate textbook and popular psychology treatise, and remains to this day one of the most cited psychologists of all time (Diener et al. 2014; Griggs and Proctor, 2002). Yet as will be argued in what follows, the received image of his life and work is largely unchanging. As an uncontested historical example, relatively fixed and unquestioned in the narrative trajectory of psychology, it will be claimed that an act of defamiliarisation is both necessary and significant. In doing so this article might be seen as contributing to a wave of revisionist approaches to canonical experimental studies in psychology (e.g. Gibson, 2013; Briggs, 2014; Griggs, 2015; Reicher et al., 2018). Whilst it may have some similarities, it is distinctive, however, in following a Human-Animal Studies tradition of moving “beyond anthropocentric histories and social narratives by putting animal life in the spotlight” (Johnson, 2015, p. 299).

To make Pavlov’s dogs a central focus we must look more closely at, but also beyond, their moment on the experimenter stand, in which they are perpetually suspended in countless print and pixel representations like flies in amber. It entails paying attention to the realities of life in the labs, and the broader contexts in which they lived and were entwined with others. For this purpose, Daniel Todes’ scholarship is especially germane (1997a; 1997b; 2000; 2002), not least his remarkably thorough biography of Pavlov (2014), which delves deep into archival materials and the neglected research of his many co-workers, providing access to Pavlov’s milieu in a way his own ‘official’ output does not. Whilst human-canine relations are by no means the central concern of this work, in attending to the minutiae of Pavlov’s methods, his life, those around him, and the wider social, cultural and political context, dogs repeatedly step into the picture. Many details remain absent, and the account is inevitably partial and patchy, augmented by passing references to dogs’ involvement in other scholarship (e.g. London, 1949; Rütting, 2007; Smith, 1995; 2000; Windholz, 1990; 1997). Nonetheless in what follows I attempt to locate canine experience, as it is entangled in the lives of others, centre stage.

The first section offers a critical overview of contemporary representations of Pavlov’s work. This is followed by a brief summary of the ‘animal turn’ and related

developments including posthuman and multi-species scholarship, as a foundation for exploring their relevance for an analysis of Pavlov and his dogs. Subsequent sections utilise the conceptual lens of the animal turn to examine the significance of Pavlov's adoption and development of 'chronic' experimental methods; and the vitally important shift from physiological research to the study of 'psychic secretions' and conditioned reflexes. These sections are followed by a focus on the significance of the interrelationship of dogs and co-workers, before considering how these relationships are manifest in Pavlov's later attempt to incorporate his results within a typology of canine character. Finally, the significance of a reading of key aspects of Pavlov's work through the animal turn for psychological theory is considered.

Contemporary retellings: 'hard-set laws' and a 'comfortable recovery'

Pavlov's work is continually re-presented and re-circulated in reassuring canonical narratives of psychology's historical timeline. In contemporary retellings, Pavlov's achievements carry all before them, and the dogs appear as matters of fact - conduits for Nobel-prize winning knowledge development, dispensable objects in the progressive teleology of psychology-as-science. The emphasis instead is on descriptions of 'classical conditioning'; on Pavlov's terminology, on one of the most celebrated 'accidents' in the birth pangs of the behaviourist movement in particular and experimental psychology in general. To document just a few examples: in a relatively early comparative analysis of Pavlov's theory and methods, Kubie repeatedly emphasises how Pavlov's object of focus was the "conditioned reflex under the constant conditions of the laboratory" (Kubie, 1959; p. 31), and only mentioning 'dogs' once in passing; Çevik reiterates a mechanistic portrayal of Pavlovian conditioning, i.e. a "conditioned stimulus (CS) acquires the ability to trigger a new response by virtue of being paired with an unconditioned stimulus (US)" (2014, p. 1), whilst never mentioning dogs at all – common practice in many extensions, overviews and appraisals of Pavlov's work which make no reference to dogs. The 700+ page *Handbook of Operant and Classical Conditioning* (McSweeney and Murphy, 2014) mentions only once that dogs were used as subjects in Pavlov's experiments.

The role of dogs as *living* animals rarely feature in accounts of Pavlov's contribution to psychology. They are subsumed in the clamour for scientific credibility:

hard-set laws derive from Ivan Pavlov's studies of animals' higher nervous activity, which allows animal behavior to be broken down into predictable and modifiable reflexes... Pavlov's famous experiment of the drooling dog shows that there are two types of reflexes: innate reflexes that are evoked by the irritant itself and acquired reflexes that are evoked by subsequent associations (Cherkaev and Tipikina, 2018, p. 29).

Hard-set laws, predictability, modifiable reflexes – these experiments are offered as a formative example of the scientific method being used to remarkable effect in the early days of psychology; with Pavlov championed as an "outstanding practitioner" in general, and for devising "a simple, elegant experimental paradigm with which to study learning" in particular (Tully, 2003, p. 117). On the rare occasions canine welfare is touched upon, the emphasis is on Pavlov's solicitousness and skill – "Pavlov trained [unaesthetized] dogs to

lie still and then operated so quickly that they were not disturbed or distressed” (Smith, 2000, p. 747); his commitment to the “best possible” postoperative care (Wood, 2004, p. 327); and an overriding concern for “comfortable recovery” from surgical procedures (ibid.). This forgetting extends to the overwhelming majority of scholarship on Pavlov (e.g. Bitterman, 2006; Kubie, 1959; London, 1949; Rütting, 2007; Smith, 1995; 2000; Windholz, 1997), where dogs appear only in passing as interchangeable experimental objects.

In textbook coverage, where undergraduate students might first encounter Pavlov and his dogs, we find a similar state of affairs. Here are two standard psychology textbook accounts of Pavlov’s experiments with dogs:

In Russia, Ivan Pavlov was investigating how involuntary responses – reflexes – could become conditioned to appear in response to new forms of stimulus... In a series of experiments with dogs reported in 1927, Pavlov showed that they could learn to produce the salivation response to the sound of a bell, if that sound was repeatedly paired with the presentation of food. This was significant, since salivation in response to food is an involuntary response, and not the sort of thing which an animal can produce deliberately (Hayes, 2000 p. 577-8).

Pavlov received a Nobel Prize for work which exploited the (delightful) fact that dogs salivate at the merest expectation of food. Pavlov demonstrated, by repeatedly pairing a particular stimulus (the food) with a sound (most famously a bell, but more probably a metronome), that his dogs would eventually salivate in response to the sound (or conditioned stimulus) (Banyard et al. 2015, p. 32).

Factual errors aside (Pavlov did not use a bell; he was awarded the Nobel prize for his work on digestion, which was *prior* to his study of salivation and reflexes), unremarkable textbook outlines such as this are often accompanied by a diagram, followed by some discussion of concepts relating to ‘classical conditioning’ such as discrimination and extinction (e.g. Banyard et al. 2015; Eysenck, 2004; Glassman and Hadad, 2014; Gross, 2015; Hayes, 2000, p. 577-8; Myers and DeWall, 2018). Little account is given of the canine involvement in experiments themselves. There is no description in any of these texts – academic, undergraduate, popular - of the conditions in which the dogs were kept, their lives, or the detail of the procedures beyond evasively rudimentary descriptions such as “his experiments used a machine that measured the amount of saliva a dog produced when given meat powder” (Train, 2007, p. 228). Wholly absent is any critical discussion of Pavlov’s methods in terms of ethics or epistemology, even when ‘critical thinking’ questions are offered; nor are there in more specialist textbooks dedicated to conceptual and historical issues and debates in psychology (e.g. Brysbaert and Rastle, 2009; Tyson et al. 2011).

These are normal, taken-for-granted depictions. It might even seem overly fussy or pedantic to expect anything more, especially in brief overviews. However, what is excluded from (even potted) history, intentionally or unintentionally, is often at least as significant as what is included, and tending to those absences can reveal a great deal. In what follows, closer critical attention *is* paid to Pavlov’s methods in order to unsettle received understandings in scholarship and textbook coverage, adopting the conceptual lens of the ‘animal turn’. The intention is not to damn him retrospectively, but to reveal a more complex portrait of human-canine interrelationship at the heart of his work. It will be

claimed that such attention holds important theoretical and ethical insights for historical understandings of psychology *and* for a contemporary psychology of human-animal relations. First, the ‘animal turn’ is considered as a vitally important academic context for this discussion.

The ‘animal turn’, multi-species scholarship and psychology

Some time ago Gail Melson claimed that in psychology “the study of human–animal relationships historically has been ignored and continues to resist attention” (2002, p. 347), an accusation that has since been repeated on various occasions (e.g. Birke, 2010; Serpell, 2009; Shapiro; 2017). Indeed to my knowledge, at time of writing this journal - *Theory and Psychology* - has yet to publish any manuscripts explicitly addressing human-animal or multi-species interactions and relations, in or outside of psychology. There have, of course, been exceptions elsewhere across various psychological topics, most specifically in the study of the human health benefits of animal contact (e.g. Holcombe and Meacham, 1989); and the study of the apparent correlation between human abuse of nonhuman animals and other humans (e.g. Miller, 2001). However since the beginning of the twenty-first century, the humanities and social sciences have witnessed a more thoroughgoing ‘animal turn’ – “a shift from a major focus on the social construction of other animals to attempts to get at ‘animals as such’, as they actually experience the world” (Shapiro, 2017, p. 3); and which recognises “the fact that human and animal lives have always been entangled and that animals are omnipresent in human society on both metaphorical and practical, material levels”(Cederholm et al. 2014, p. 5).

Numerous disciplines including the humanities, biological and social sciences, increasingly address the relations between human and other forms of life more broadly, diversely conceptualised in and amongst Human-Animal Studies, ecopsychology, ecofeminism, Indigenous Knowledge, posthumanism and feminist posthumanism, multi-species ethnography, transspecies psychology and much more besides (e.g. Åsberg, 2018; Gilbert et al. 2012; Haraway, 2016; Hustak and Myers, 2012; Latour, 2005). At the heart of this turn is a radical move, questioning the ingrained human exceptionalism of many intellectual traditions, and laying down a challenge to develop new ontologies, epistemologies and methodologies that can better incorporate human experience as entangled with animal and more-than-human worlds; to better reveal the contingencies of what it means to be human as something always in relation to and emerging from our relations to other species.

Returning to the specifics of human-animal relationships, describing shared tenets of the animal turn’ beyond a commitment to “new ways of thinking about animals and about human-animal relationships” (Potts, 2010, p. 291) is a tricky venture, considering the variety of disciplines and traditions involved. On my reading, one might cautiously assert the following: Epistemologically, it entails a readiness to “engage with the alterworlds of other beings” (Kirksey and Helmreich, 2010); which in turn, methodologically, demands the cultivation of novel methods of observation and interpretation - an invitation to “attend deeply” and develop “arts of attentiveness” (Head, 2016; Tsing, 2015) - that attempt to “become less hard of hearing in the context of a communicative and vibrant more-than-human world” (Country et al. 2015, p. 278). Ethico-politically it requires approaching

animals as more than merely “passive objects for humans to act upon or use as tools or resources” (Mullin, 2010, p. 148), and therefore incorporates an explicit recognition of speciesism as a form of psychologically embedded, socially structured inequality and injustice, and seeks to “practice methodology that challenges human superiority” (Head, 2016, p. 69). Theoretically (especially in terms of ontology) it seeks to evidence a growing understanding of multi-species interrelatedness, including animals, but often extending to other nonhuman forms, beings, things, places, and elements of the more-than-human world. It is effectively an attempt to develop a relational ontology within a theoretical framework that can incorporate human and nonhuman as distinct but mutually constitutive and interdependent (Adams, 2018).

Following these leads, in the remaining sections of this paper I attempt to selectively adopt the conceptual lens of the animal turn, multi-species and posthuman scholarship to attend more deeply to the canine experience and to human-dog encounters, as mutually constructing the reality of Pavlov’s experimental regime. This is achieved by focusing in on a number of key motifs and moments in Pavlov’s career: the treatment of dogs in his earlier ‘chronic experiments’; the shift to the study of ‘psychic secretions’, the later focus on a typology of ‘higher nervous activity’. In doing so I hope to unsettle contemporary retellings of those studies, but also to draw out some important lessons for a contemporary critical psychology of human animal-relations.

Chronic experiments in the kingdom of dogs

The physiologist is no ordinary man. He is a learned man, a man possessed and absorbed by a scientific idea. He does not hear the animals' cries of pain. He is blind to the blood that flows. He sees nothing but his idea, and organisms which conceal from him the secrets he is resolved to discover - Claude Bernard⁵

Pavlov was first and foremost a physiologist, and spent his early career studying digestion in dogs (for which he won the Nobel Prize). A visitor to Pavlov’s laboratory named it the “kingdom of dogs” (cited in Todes, 2014, p. 494) for good reason. The majority of dogs who found themselves on the experimenter stand were brought in from elsewhere – they had a prior existence (Cuny, 1965).⁶ As strays they may have lived in the company of dogs, scavenging and surviving day-to-day perhaps – we can only guess how well they lived, their attachments to humans and other dogs, and the extent to which they were affected by their sudden removal and relocation. The later use of dogs bred and raised on site is a different consideration – their existence was fundamentally imprinted by their experience of the laboratory space. For all the dogs in Pavlov’s care, however, life on the experimenter stand and in the kennels of St Petersburg (then Leningrad) University, the Military-Medical Academy and later, Koltushi, his ‘science village’, became a constant, and permanently defined the rest of their lives.

For over twenty-five years, up until the late 1890s, Pavlov’s studies concentrated on the relationship between eating and variation in the secretion of gastric, pancreatic and salivary fluids in dogs as proxies for human physiological processes. Pavlov was interested in physically intact dogs – at all stages of his career, he wanted to keep the dogs alive and functioning ‘normally’ as much as possible (Smith, 1995). He consistently emphasised the superiority of ‘chronic’ over ‘acute’ experiments, the latter relying on live vivisection,

during or immediately after which dogs died or were killed, often in extreme pain. For Pavlov such methods, though he used them where he considered necessary, offered no parallel to ‘chronic’ methods in terms of external validity - where surgery was undertaken (e.g. to insert a pancreatic fistula, create an additional stomach sac, remove a dog’s oesophagus), and the dog survived, and had a chance to recover, *before* an experiment – or more commonly a series of experiments - began.

Whilst acute experiments resulted in immediate death, chronic experiments lengthened an experimental dogs’ life, for the sole purpose of extended observation of physiological processes following various surgical interventions. There are no precise numbers available, but hundreds, perhaps thousands, of dogs commandeered as experimental animals died throughout Pavlov’s career, as they did in countless parallel physiology studies undertaken globally. Countless dogs perished as Pavlov and his co-workers developed and refined surgical procedures (Cuny, 1964, pp. 22-3). Operating techniques routinely failed, whilst new developments and the promise of success often increased Pavlov’s fervour “I’m trying – and will now shred dogs without mercy. You know, I have not worked so hard for a long time” (cited in Todes, 2014, p. 106). Even when surgery was ‘successful’ and dogs were kept alive, their remaining life was curtailed and/or their subsequent health complicated: “survivors usually developed fatal conditions long before their natural lifespan had expired” (Todes, 1997, p. 226).

In sum, the detail of Pavlov’s earlier chronic experiments, for which he won the Nobel prize, depict something darker and more complex than a Founding Father finding his way to greatness. They describe a messy human-canine interrelationship defined by suffering and violence, but legitimated, if also partially obscured, by the authority of science and Pavlov’s own standing. Though only a brief account, placing Pavlov’s dogs in the spotlight during this stage in his career reveals elements routinely overlooked in standard accounts of his life and work. Being more transparent about this history is worthwhile in recognising the reality of the lives of creatures integral to the development of psychology, otherwise reduced to expendable experimental objects. As discussed later, the fact that contemporary retellings still do not grant Pavlov’s dogs space as living beings is a reflection of a more widespread, and still ongoing, form of human exceptionalism in psychology. Before that, however, I consider how a shift in Pavlov’s methods heralded a different staging of human-canine relations, which demands a more nuanced theoretical and ethical framing.

Psychic secretions and conditional reflexes

Whilst the ‘chronic’ approach to experimentation in these earlier experiments remained a vital foundation, today Pavlov is much better known for his later studies of ‘conditional reflexes’ in dogs.⁷ It is because of this work, and its subsequent impact on the psychology of learning and the development of the Behaviourist school of thought that he looms large as an iconic figure in historical and popular accounts of psychological science today. In the course of studying the physiological mechanisms of salivation described above, dogs were regularly fed whilst on the experimenter stand and their saliva measured. At some point Pavlov and his staff noticed the dogs salivating ‘prematurely’ in anticipation of food, often in response to environmental cues that normally momentarily pre-empted

feeding. This was not especially surprising, but Pavlov was attempting to systematically control the variables contributing to salivation; and a dog's 'thoughts about food' were considered an intrusion. Unable to explain away what he termed 'psychic secretions', he and his staff became increasingly interested in them, eventually turning more or less the whole of his laboratory resources to their study (Windholz and Lamal, 1986). By this point Pavlov and hundreds of co-workers, human and nonhuman, now embarked on the systematic and almost exclusive study of saliva drops and what were now termed 'conditional reflexes' via thousands of chronic experimental trials.

The measurement of salivation depended upon a surgical procedure that was relatively unobtrusive (compared to pancreatic and stomach fistulas) - the insertion of one or more fistulas into a dog's cheek or neck to divert saliva from the three salivary glands into a measuring device. There is no suggestion in the literature that this surgical intervention, in itself, affected a dog's duration or quality of life. They were thus in keeping with Pavlov's commitment to chronic experiments; in fact they likely extended the number of experiments any one dog could be involved in considerably. Considered as human-canine interrelationship, this state of affairs is intriguing from a Human-Animal Studies perspective, as it suggests the possibility of more numerous, closer and qualitatively different encounters between experimenters (and separately employed handlers) and dogs; on ground less readily defined by experiences of violence and suffering. Even though they are now canonical components of the history of psychology, it is surprising how little we stop to consider the circumstances of a dog's life in Pavlov's laboratories during this prolific period of his career - what it was like to *be* a dog or the detail of the work carried out *with* them. Informed by the work of Donna Haraway in particular, these circumstances are now considered further.

Pavlov's dogs as companion species?

What happens if experimental animals are not mechanical substitutes but... significant others with whom we are in consequential relationship in an irreducible world of embodied and lived partial differences, rather than the Other across the gulf from the One? (Haraway, 2008, p. 72)

Even a brief survey of what we know, or can try to guess, about what it is like to be a dog, and even acknowledging the ontological impossibility of doing so, suggests the experimenter stand was at best a profoundly strange situation for dogs; at least partially defined by regular encounters with human handlers and experimenters (with implications, as we shall see, for Pavlov's human co-workers too). Biomedical, humanities and social science canine research points to the vividness of a dog's experience (Safina, 2015); of emotions keenly felt (Albuquerque et al. 2016); and to dogs as receptive, expressive and empathic communicators, capable of complex forms of (inter)subjectivity (Irvine, 2004; Kirk, 2014). Work in an ethnographic tradition also highlights how human-canine interaction is always a "spatially situated activity" in which meaning is mutually embodied and negotiated (Laurier et al. 2006, p. 2). Haraway similarly approaches "domestic" human-animal encounters, including laboratory work, as relational configurations, through which both human and animal mutually constitute, and transform, each other (Haraway, 1989; 2008; see also Birke, 2010; Despret, 2004). In describing the complexity and dynamism of

human-canine interrelationships in the context of dog agility work, Haraway uses the evocative phrase “subject-transforming dance” (Haraway, 2008, p.176), to capture how, over time, shared practices transform both dog and human, a point she extends and elaborates on compellingly in describing her own experiences. Whilst we might hesitate to consider Pavlov’s highly structured and carefully controlled experiments in a similar light, following Haraway, we can acknowledge that human-animal dynamics *always* operate from “inside the complexities of instrumental relations and structures of power” (2008, p. 208). At the same time, human entanglements with animals, including experimental animals, should always be approached as “face-to-face, in the company of significant others, companion species to one another” (2008, p. 93). Though our resources are limited by time elapsed, in what follows I approach Pavlov’s dogs accordingly.

During a ‘standard’ conditioning study, dogs were routinely restrained on the experiment for the duration of a single experiment, which often lasted for hours at a time, whilst being repeatedly subjected (by the human experimenter) to a range of stimuli, repeated or refined over many days (by the same human). Stimuli studied included those that fit the familiar portrait - exposure to a buzzer, metronome, bubbling water, cooling of the skin, a flashing light, rotating figure or particular shape; but also “strong electrical stimuli” i.e. electric shocks, the forced ingestion of acid, and “home-made mechanisms” - designed to intermittently inflict pain (Todes, 2014, p. 313). All of these and many more were used to stimulate a dog’s senses before/during being presented with food; in attempting to create, maintain or inhibit a conditioned response, i.e. salivation in response to the stimuli alone.⁸

Although it is routinely assumed that “in Pavlovian conditioning the animal remains essentially passive” (Glickstein and Berlucchi, 2008, p. 117), in practice, this was not the case – unsurprising in the context of even the brief survey above, of the complexity of canine affect, psychology and sociality. At times, a dogs’ resistance was literal and active – stubbornness in refusing food or other inducements; bridling at specific stimuli, expressing hostility towards unfamiliar co-worker; refusing to enter particular spaces (Todes, 2014, p. 494). There were subtler, unintentional forms of resistance too, borne nonetheless of the dog’s ongoing ability to confound any expectations of passivity. Despite the subsequent discovery of (apparent) regularity in the production of saliva that the ‘conditioned reflex’ attests to, even the simplest and most ‘basic’ patterns in the way conditioned responses worked were subject to a great deal of variation and complexity – a fact well known by Pavlov and his co-workers, but actively erased from academic publications and public pronouncements, and maintained as an “industrial secret” (Todes, 2014). Initially at least, Pavlov was profoundly troubled by the simple fact that different dogs responded to the same conditioned stimuli in different ways, in terms of the amount and timing of salivation; some conditioned responses were reinforced much more quickly in some dogs compared to others, and so on; just as the same dogs responded differently on different days – however much Pavlov refined his experimental apparatus to control extraneous variables. As a result, Pavlov had to constantly revise and update the foundations of his theory of learning – a clear indication of just how much the unpredictable vitality of animals resisted experimental objectification and exhortations of machine-like docility; a point returned to below.

If the experimental animal is considered passive in Pavlovian conditioning, so, in a way, is the human experimenter – they are carrying out carefully prescribed observations and measurements, under the direction of Pavlov, and also appear from the outside as interchangeable figures. The reality of the human-animal encounter at the heart of these studies further complicates this image. In Pavlov’s laboratories, studies were undertaken by co-workers, a mixture of graduate students working towards the completion of their doctoral theses and more established experimenters. Once prepared via surgery it was common practice for a dog to be assigned to a new co-worker for the duration of their studies (Windholz, 1990, p. 67). In Pavlov’s earlier conditioning experiments, human and dog were in the same cramped room, in close proximity, often for eight to ten hours at a time (Todes, 2014, p. 152); some extending to as much as twenty-eight hours (Windholz, 1990, p. 69). Experimenters were expected to keep disruptions to a minimum – any unexpected sound or movement might interfere with the conditioning process and become unwanted ‘noise’ (Todes, 2014, p. 308). The labour in this space of encounter, for both dog and human, was constraining, monotonous and wearisome, and demanded patience and forbearance on both parts. A key challenge was staying awake – either animal falling asleep at the ‘wrong’ time was potentially ruinous for the experimental procedure. Boris Babkin, co-worker and subsequently friend and biographer of Pavlov, here recalls the particular form of tedium that characterised conditioning experiments:

The only action consisted in pressing a bulb, which set up some stimulus, visual, auditory or tactile, every ten or fifteen minutes and writing down the number of drops of saliva secreted in half a minute, then reinforcing them by giving the dog a little meat-and-bread powder when it responded to the stimulation, and again becoming enveloped in silence. It was impossible to read or do anything else, since an interruption of this act then became a conditioned stimulus in itself and might completely obscure the effects of the special stimulation (cited in Todes, 2014, p. 309).

In fact not every worker could muster the “great endurance” required indefinitely. As with dogs, there are numerous accounts of human co-workers suffering over-exhaustion, breakdown and even early death (Todes, 2014, p. 152). Are Pavlov’s experiments a perfect example of labs as “highly structured spaces constrain[ing] both the behaviour of the animals *and* the people working there” (Birke, 2010, p. 342; emphasis added)? Clearly dogs and humans experience asymmetrical degrees of constraint in these encounters, which might appear at odds with Haraway’s human-canine “subject-transforming dance”. However, paying closer attention further unsettles received representations in which experimenter, animal and apparatus all have their carefully designated place in revealing highly mechanistic and universal psychological processes, and reveals the messy and entangled nature of human-animal relations at the core of Pavlov’s research.

The temperament of a dog

Lab experiments tend to rest on creating animals as objects, whose experiences are considered unimportant... lab animals are seldom seen as animals. Rather, they tend to exist as numbers, as tools of the trade (Birke, 2010, p. 341).

As noted above, Pavlov's dogs were also involved in a more subtle and yet pervasive resistance – not least to their keeper's carefully constructed theoretical edifice. In practice, Pavlov's dogs were not docile and passive conditioned reflex machines. Pavlov was in fact willing to alter his theoretical framework to keep up with the liveliness and unpredictability of his dogs, and eventually accepted it, at least in part, as a consequence of studying “intact organisms” (2014, p. 169). Todes makes a strong case that Pavlov's later introduction of a personality typology, framed physiologically as a reflection of distinct types of “higher nervous” processing, was introduced, at least in part, to interpretively contain experimental results that were in practice highly varied and inconsistent (2014, pp. 529-40). Positing the existence of inherent characteristics – “nervous types” – is today a much less well known aspect of Pavlov's oeuvre, but at the time was considered vital to justify otherwise unexplainable variety in conditioned reflexive responses (i.e. timing and quantity of drool produced in response to conditioned stimuli).⁹

Despite the contemporary image of Pavlov's dogs as interchangeable moving parts in some giant demonstrative machine of stimulus-response learning, co-workers were increasingly encouraged to observe idiosyncrasies in a dogs' behaviour on and off the stand. Such attention became part of experimental protocol by the 1910s, fully endorsed by Pavlov, and exemplified in his own “anthropomorphic” interpretations of his dogs' behaviour (Todes, 2014, p. 298). In fact, the interpretive containment of the ‘industrial secret’ of conditioning experiment variability was made possible by, and further encouraged, the attentiveness of co-workers, attendants and Pavlov to a dog's behaviour, preferences and character (Dror, 2003; Todes, 1997). Alongside measuring stimuli and response type and timings, a final column was now reserved for ‘other observations’, in which experimenters remarked on a dog's reactions to the demands of an experiment in terms of “character”. Dogs were routinely described as “weak or strong, compliant or independent, passive or impressionable, aloof or sociable, modest or greedy, cowardly or heroic” (2014, p. 495). ‘Other observations’ were taken extremely seriously, as evidence of experimenters' knowing their dogs and their dispositions, and, from the 1920s, in helping establish a dogs' ‘nervous type’.¹⁰

Reading second-hand translated excerpts from more detailed accounts (including correspondence, theses and internal reports), available thanks to the meticulous work of Todes, it is remarkable how seriously dogs' individuality was taken; how attributions of intelligence, character and personality were integral to the everyday work of experiments; and how routinely “assessment of the dog's personality [were] invoked in interpreting experimental data” (Todes, 1997, p. 240) – in contrast to the tendency noted by Birke in opening this section. We certainly get a sense that dogs were more than objects and numbers: that they behaved and expressed themselves in myriad ways, that they were lively contributors to the work undertaken, and that these contributions were noticed, articulated and discussed, in the labs. Pavlov revised his understanding of the human condition, including his own, in light of how the dogs' responded to life as an experimental animal, and vice versa – for Pavlov the boundaries between knowledge of people and of dogs were extremely porous, reflected in his “long-standing practice of interpreting people as dogs and dogs as people” (Todes, 2014, p. 631).

Nor was the dogs' liveliness ever co-opted or made calculable in any final sense. Despite Pavlov's evolving personality typology, and ever-more stringent attempt to control

extraneous variables, he was always playing catch-up with the way in which the relational configurations of dogs and co-workers exceeded calculability - much more so than the cautious acknowledgement of “borderline cases” by his later champions (Cuny, 1964, p. 94). Ultimately, his quest to systematically understand the psyche via physiological processes “set him on a three-decade journey to the horizon”, whereby “the ultimate destination continually receded behind and endless landscape of new and perplexing complexities” (Todes, 2014, p. 300). Industrial secrets, interpretive moments and ever expanding personality typologies point to the liveliness and unpredictability of the dogs on and off the experimenter stand, as observed by Pavlov and his co-workers; to the active engagement of the dogs in expressing their own needs, desires and discomfort. Whilst dogs were ‘significantly unfree partners’ in the relational configurations of the lab, we are right to follow Haraway in avoiding absolute categories of freedom versus unfreedom, and to instead be drawn to the metaphor of “degrees of freedom”, which always allow for “unfilled space; something outside of calculation that can still happen” (Haraway, 2008, pp. 72-3). To paraphrase Despret, the system *cannot* fully articulate the animal (Despret, 2004).

In sum, closer attention paid to Pavlov’s experiments and the human-animal relations at their core reveals a picture at odds with the one commonly circulating in academic and popular discourses. Borrowing the conceptual lens of the animal turn, they can be profitably framed to reveal a more complex ethics and epistemology. In what follows, the significance of this framing for a psychology of human-animal relations is considered in more detail.

More than setting the historical record straight: towards a critical psychology of human-animal relations

To ‘de-passion’ knowledge does not give us a more objective world, it just gives us a world ‘without us’; and therefore, without ‘them’ (Despret, 2004, p. 131).

The portrait of Pavlov’s dogs that emerges from this discussion stands in stark contrast to the standard one found in psychological literature, where they are made visible only as disembodied S-R conduits, saliva-producing apparatuses. In their iconic image it is in fact the dogs’ ‘conditioned reflexes’ which *stand in* for the dogs. As the countless diagrammatic representations of conditioning attest, they are docile, one-dimensional, animals-as-machines; a necessary but arbitrary component in the Pavlovian equation of conditioning the reflex. We might be tempted to think this is all very well, but interesting only as a historical curiosity. Psychology has moved on in terms of the use of animals in experimentation, evident in, for example, the more stringent codas of the American Psychological Association and British Psychological Society guidelines for working with animals (APA, 2012; BPS, 2012). If this is indeed the case, acknowledgement of earlier fundamental ethical issues to unsettle the teleology of psychology is much needed as a parallel process, as the above discussion of psychology textbooks and other coverage attests.

However, more remains at stake here than ‘setting the record straight’ for historical accuracy. The ongoing erasure of human-animal ethical and epistemological issues from psychology’s past, however habitual and unintentional, impacts on how we understand and articulate psychology’s present – in terms of what is prioritised, emphasised, discussed and

debated. Here the recounting of Pavlov’s work reifies problematic framings of human-animal relations that are *still* deeply embedded in psychology in general and experimental psychology in particular (Adams, 2018), as I have documented above. The result of this perpetual blindspot is a neglect of the ‘individuality and ‘species specificity’ of the lab animal; the sanctioning of a reductive framing of what a human-animal relationship *is* in the lab; and the exclusion of “any other interspecies relationship [as] a legitimate object of study” (Shapiro, 2010, p. 259). These processes are necessary for constructing Pavlov’s dogs retrospectively as docile objects, but they are also alive and well in constructing other historical and contemporary experimental animals in the present. Take a recent psychology textbook account of memory processes:

When we move on to discuss the relevant evidence, you will notice that the great majority of studies have used monkeys. This has been done because the invasive techniques involved *can only be used* on non-human species. It is generally (but perhaps incorrectly) assumed that basic visual processes are similar in humans and monkeys (Eysenck and Keane, 2015, p. 97; emphasis added).

The “can only be used” here implies but does not articulate a logic of human exceptionalism (or speciesism) – it cannot be used on humans because of the ‘invasive’ nature of psychophysiological research (e.g. Afraz et al, 2006), but it can on rhesus monkeys.¹¹ Similar processes of erasure accompany uncritical accounts of the ‘central’ and ‘misunderstood’ role of animals in psychology experiments in the past and today. Here Bennett uses Harlow’s maternal deprivation experiments as an example of the ongoing utility of animal experimentation in psychology:

For example, consider how Harry Harlow’s famous monkey studies contributed broadly to social, clinical, developmental, comparative, and biological perspectives on attachment. The longevity and impact of these studies is evident across disciplines. The animal model developed by Harlow continues to provide the foundation for new discoveries about how early life experiences influence biobehavioral development and health across the lifespan. These studies provide us with controlled, experimental avenues to answer clinically relevant questions that simply could not be addressed with human studies.

This despite the fact that Harlow’s studies actually have attracted plenty of retrospective disapprobation for their astounding levels of inventive, pathological cruelty (e.g. Blum, 1994; Gluck, 1997; Haraway, 1989). As Birke says of laboratory research with animals more generally, “this kind of use rests on a moral discontinuity – for we can only justify their use if we believe that non-human lives are ethically less valued than human ones” (2010, p. 342). Notwithstanding moves to make psychological experimentation with animals more ethical, this moral discontinuity is ongoing, a reflection of a still limited ethical and epistemological framework compared to the developments underway in sister disciplines.

Psychology is far from a monolithic beast, incorporating many different tendencies, often at critical odds with each other. In particular, a psychology concerned with human-animal relations continues to emerge and shift, incorporating different ways of working with animals, and of conceptually framing human-animal interaction. The flagship APA

journal *Psychological Bulletin* published an overview of a “psychology of human-animal relations” (Amiot and Bastian, 2015), in which the authors thematise this emerging field. At its heart though the understanding of human–animal relations therein is largely untouched by the more radical developments summarised above. In the many studies they cite, emphasis is overwhelmingly placed on human perception of non-human animals – the latter are rarely encountered as living beings in methodological procedures, rare still as meaningfully contributing to and experiencing interaction and therefore ontologically significant in mutually constitutive ways (Adams, 2018). It is a parallel issue that in and amongst psychology’s canonical timeline, ‘classic’ studies and ongoing experimental practices, the absencing of human-animal relations is significant – not least for how psychology depicts and understands itself.

There is great scope to extend the tenets of theoretically curious and critically-oriented psychology to the animal turn, and in doing so to radically develop the a psychology of human-animal relations in psychology, opening up the discipline to more interesting stories, past and present. Responding to tenets of the animal turn outlined at the beginning of this article, this entails an epistemological readiness to engage with other beings as co-constituting distinct but shared realities; a willingness to develop methods that strive to observe, interpret and engage nonhuman others and their entanglement with human experience; and an ethics and politics alert to culturally and professionally embedded speciesism and human exceptionalism. Theoretically, it invites the development of a radically relational ontology. An “assumption of relationality” (Stanley, 2012, p. 636) is already a central tenet of many versions of critical, constructionist and feminist-oriented psychology; a critical response to the reductive methodological individualism of mainstream psychology. Gergen’s version of critical psychology, for example (e.g. 2009, 2011), conceptualizes (human) experience as an “outcome or expression of fundamental relatedness”; displacing the ‘[human] individual as “the primary source or ontological foundation of being” (Gergen and Hosking, cited in Stanley, 2012, p. 636). Within a critical psychology framework, knowledge, power, and reality itself all depends on relational dynamics (Gough, 2017); and is accompanied by an ethical commitment to recognizing the importance of relational processes in maintaining self and others. Simply put, multi-species and posthuman theory extends the scope of a relational ontology to incorporate other species (Adams, 2018; Smart and Smart, 2017). This is especially salient for social psychology, where to date ‘the social’ is almost exclusively approached as a human construct, even in critical versions (Adams, 2017).

Conclusion

In this paper I have attempted to re-examine Pavlov’s oeuvre partly through accounting for the everyday experiences of the dogs involved – a form of “history from below” which takes animals as legitimate historical subjects (Montgomery and Kalof, 2010). Montgomery and Kalof claim that analysing animals as historical subjects “adds new dimensions and new levels of understanding to a wide range of disciplines” (2010, p. 36) – the subsequent list of disciplines and potential examples does not include psychology, but it clearly could. It is hoped that this paper has challenged familiar representations of a seminal milestone in psychology’s history, and its place in the canonical narrative of

psychology's (scientific) progress. Closer attention reveals how Pavlov's experiments are spaces of encounter saturated with human-nonhuman interactions – they *are* those interactions. They involve reciprocal relational bonds between the various permutations of humans, dogs, dog-appendages, blood, excretions (saliva, gastric and pancreatic juice), experimental apparatus and physical spaces. Following Haraway's lead, I have attended to entangled subjectivities, shared interests and dangers, as well as divergent and dissonant experiences and fates.

The primary flaw in contemporary retellings of Pavlov's experiments with dogs is the lack of recognition *of* a relation, and attendant responsibilities to the other, lost in “unidirectional relations of use, ruled by practices of calculation and self-sure of hierarchy”(Haraway, 2008, p. 71). In such a partial depiction, important ethical and epistemological issues are routinely erased and therefore remain unaddressed, to this day. In terms of ethics, a staging of relationality and responsibility towards (nonhuman) others is notable only by its absence, perpetuating a “moral abandonment of their being” (Adams, 2010, p. 304). The most significant abandonment ethically here is not, to be clear, Pavlov's, but that found in the contemporary retelling. In terms of epistemology, there is no sense that embodied canine and relational human-canine realities routinely exceeded Pavlov's attempts at interpretation, or that such messiness was an ‘industrial secret’. Both are related – not acknowledging canine willfulness and liveliness permits a two-dimensional perspective, which in turn dissuades scrutiny of the privation and violence meted out – why apply morality to machines?

As an alternative, the experiments can be reframed as a complex form of “companion species” kinship; if we are willing to stay with the (often violent) trouble of the contradictions and dissonances inherent in that kinship (Haraway, 2016); to take responsibility: “to be in response is to recognize co-presence in relations of use and therefore to remember that no balance sheet of benefit and cost will suffice” (Haraway 2008, p. 76). The alternative, in other words, is to make Pavlov's dogs *matter* for a psychology that is more actively attuned to the intersection of human and more-than-human worlds. In closing their critical review of Zimbardo's infamous prison studies informed by newly-available archival materials, Reicher et al conclude that “there is no longer any excuse for repeating a story which is so deeply flawed. We need to get busy rewriting our texts and revising our lectures” (2018, p. 1). The same, surely, can be said of Pavlov and his dogs. In this case, however, a rewrite has wider implications for the discipline of psychology. It invites a radical widening of the scope of who and what matters in psychology beyond the species barrier, and with it the entangled ethical, methodological, theoretical and political debates such an invitation warrants.

Postscript: The names of some of Pavlov's dogs

Arap	Kal'm	Rijiy I
Arleekin	Kellomäki	Rijiy II
Avgust	Khizhin	Rogdi
Baikal	Krasavietz	Ruslan
Barbus	Lada	Satyr
Bek	Laska	Serko
Bes	Lis	Shalun
Bierka	Lyadi	Sokol
Box	Mampus	Sultan
Boy	Martik	Tom
Chernukha,	Max	Toy
Chingis Kahn	Mikah	Trezor
Chyorny	Milord	Tungus
Diana	Mirta	Tygan
Druzhok	Moladietz	Rosa
Felix	Murashka	Umnitza
Garsik	Nalyot	Valiet
Golovan	Nord	Visgun
Ikar	Norka	Zheltyi
Iks	Novichok	Zhuchka
Jack	Pastrel	Zloday
John	Pestryi	Zmei
Joy	Pingiel	Zolotisty
Jurka	Rex	

Sources: Todes, 2014; Tully, 2003, Halmeck, 2017

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¹ Despret focuses on Oscar Pfungst and Clever Hans (a horse), Rosenthal's 'dull and bright rats' experiments; both Haraway and Despret discuss Harlow's attachment experiments with rhesus monkeys (Haraway, 1989, pp. 231-243).

² Prefixing animal with nonhuman might better reiterate the fact that humans are of course also animals, and therefore trouble the human-animal distinction as dichotomous. It still depends linguistically on a binary however, so for the rest of the paper 'human' and 'animal' are retained as descriptors.

³ The term more-than-human world was coined by US philosopher David Abram to refer to all forms of earthly life – animals, plants, landforms; and to make salient the fact that the world exceeds the human in ways we are nonetheless a part of, the human and more-than-human world.

⁴ Though Pavlov did not identify himself as a behaviourist – in fact he was often at pains to disassociate himself from that movement (Todes, 2014).

⁵ Cited in Preece (2006). Bernard was a French physiologist and proponent of vivisection.

⁶ There is a quote often attributed to Pavlov: 'At that time dogs were collected with the help of street thieves, who used to steal those with collars as well as those without. No doubt we shared the onus of the sin with the thieves' (e.g. Cuny, 1964, p. 30). Accounts of the use of dogs in late 19th and 20th century medical laboratory research suggest that a preference for dogs is at least partly motivated by 'the availability of large numbers of stray and unwanted dogs at low cost' (Scott, 1970 cited in Giraud and Hollin, 2017, p. 167); and that experimenting on 'street dogs just brought in' does not seem to warrant any further explanation in contemporaneous physiological research (Neilson and Terry, 1906, p. 407).

⁷ Pavlov referred to conditional reflexes (*uslovnyi refleks*) – referred to in English, with a not-insignificant 'Anglo-American distortion' as conditioned reflexes (Todes, 2014, p. 1).

⁸ Less well known still (they are not mentioned by Todes) are parallel experiments conducted by Pavlov's students exploring, for example, the effects of a severed *corpus callosum* on conditioned reflexes (Bykoff and Speranskii, 1924 cited in Glickstein and Berlucchi, 2008); which *did* still depend on prior invasive surgery that routinely resulted in extreme suffering and death.

⁹ It also provided a theoretical framework and legitimation for some of his more horrifying, in terms of canine welfare, later experiments conducted in the 'Tower of Silence' laboratories, not reported on here due to the confines of space. See Todes, 2014, pp. 499-503.

¹⁰ He initially argued that there were *two* basic nervous processes emanating in waves from the cerebral cortex, excitation and inhibition (Pavlov, 1927), gradually expanding the number of variations of 'nervous types' to twenty-three (Todes, 2014).

¹¹ Richards points this kind of research as 'the most controversial from an animal welfare perspective' (Richards, 2010, p. 240).