

Clever beasts and faithful pets: A critical review of animal psi research¹

Diane Dutton and Carl Williams

Liverpool Hope University

Abstract

While sharing key theoretical and methodological assumptions with human psi research, animal psi (ANPSI) research poses its own unique conceptual and empirical challenges. We explore two main strands of ANPSI research: a) experimental research which has tended to explain ANPSI as an evolutionarily adaptive process of information transmission, and b) fieldwork, which has emphasized the importance of the human-animal relationship for the expression of psi. Although there is some support for both explanatory frameworks in ANPSI research, we argue that the evidence suggests that animal psi may function as an expression of relationship or 'resonance' between individuals. We suggest that it may be more profitable to search for animal psi in the context of close human-animal relationships, and that parapsychology needs to seek methodologies that engender the expression of psi in relational contexts.

Keywords: animal psi, ANPSI, human-animal relationship

Introduction: Emerging explanatory frameworks in animal psi research

It is fair to say that animal psi research is a relatively neglected area of investigation in present day parapsychology. Theoretical debates about the nature of psi rarely make reference to findings from animal work, and conceptual and practical issues ensure that, with one or two notable exceptions, most researchers do not involve animals in their research programs. Yet an examination of the origins, underlying assumptions and findings of animal psi (ANPSI) research illuminates a number of conceptual and empirical debates that are pertinent to parapsychological research in general.

With its heyday in the experimental parapsychology of the 1960s and 1970s, animal psi research arose out of attempts to situate psi within a broader biological and evolutionary framework. In outlining the main theoretical aims and methodological issues involved in this emerging sub-discipline, Rhine (1950, 1951) suggested that the study of psi in animals may usefully facilitate an understanding of the evolutionary foundations of psi, a position that has been echoed by later researchers (e.g. Taylor, 2003). Early interest in ANPSI arose out of attempts to explain unusual sensory abilities such as homing or 'psi-trailing.'² While later research programs began to identify non-psi sensory processes that might explain homing, the large numbers of anecdotal reports of psi-trailing behavior were less easily explained, and served to help shape early ideas about the specific form and function of animal psi abilities. Rhine had suggested that psi appeared relatively early in evolutionary history and in animals could best be considered as a "presensory mode of orientation" (1951, p.244). Hence psi could be considered to be a largely unconscious cross-species ability. However, anecdotal reports of extraordinary animal sensory abilities suggested that animal and human psi may differ in some basic respects. Rhine and Feather (1962), for instance, suggested that abilities such as psi-trailing require such profound sensitivity that animal psi may be stronger, more consistent and perhaps even *qualitatively* different from human psi.

Debate about the precise nature of animal psi has also shaped expectations about which species may be more likely to display various psi abilities and which contexts may best elicit ANPSI. Some early writers were sufficiently impressed by the complex coordination of particular social species to posit the existence of animal 'supersensory' processes, such as a 'group mind' (Hardy, 1965), 'group soul' (Selous, 1931) or a 'spirit of the hive' (Maeterlinck, 1901). But it is in the context of the human-animal relationship that much of the early interest in potential psi abilities arose. Many lay accounts of

unusual animal abilities focused on the potential for psi communication between animals and their owners or caretakers, as an expression of the strong bonds that often form between humans and animals. These relationships tend to involve social species with highly developed communicative abilities and a high level of responsiveness to humans (such as dogs, cats, birds, and horses). Growing out of anecdotal accounts of the unusual abilities of companion animals, the field experiments of Sheldrake (e.g. Sheldrake & Smart, 1998, 2000a, 2000b) are pertinent examples of this type of research.

A contrasting strand of animal psi research has restricted work to those species that have traditionally informed much experimental psychological research, such as mice or rats. These animals are arguably less complex and more easily able to be manipulated in an experimental laboratory setting. In such settings, any bonds that form between animal and experimenter tend to be considered as detrimental to the investigation, and the focus is upon isolating the precise form of psi that may be operating (e.g. telepathy or clairvoyance). A widespread assumption within early animal psi research was that, while animal psi abilities were more evident in spontaneous settings, more rigorous investigation demanded the controlled environment of the laboratory (Morris, 1970; Davis, 1979). In this respect, the context within which animal psi research developed somewhat inevitably reflected the broad conceptual and methodological assumptions of the human psi research program. In an early review of animal psi research, Morris (1977) argued for the integration of parapsychology and biology, and a common language for both, that could express the developing models of communication and information transfer that characterized both fields. In doing so, he was expressing the predominant explanatory framework that has shaped much parapsychological research to date: namely, that psi may best be understood as the anomalous transfer of *information*, the process of which can best be studied in a carefully controlled experimental setting.

Animal psi research has therefore been shaped by many of the same assumptions as human psi research, and has struggled to overcome similar methodological challenges, such as individual differences in the ability of participants, decline effects, and the difficulty of disentangling experimenter and participant psi. In other respects animal psi research has posed its own unique problems and opportunities. The distinction between ordinary and non-ordinary sensory abilities is arguably more difficult when we are working with non-human species, with different physical, cognitive and social abilities. Issues to do with the motivation, mood or levels of stress of participants are similarly more thorny when those participants are not able to communicate their thoughts and

feelings to an investigator. And the assumption that animal psi may best be elicited in simple species in non-social settings proves to be problematic when the dynamics of ANPSI studies are considered more closely.

We have chosen a broad distinction in the following appraisal of animal psi research. We examine firstly those studies which constitute the main body of formal ANPSI research, and which focus largely on experimental evidence. We then turn to consider research which has focused more closely on the expression of psi within the context of close human-animal relationships, and which tends to be characterized mostly by anecdotal reports and field studies. We subsequently argue that the contrasting demands and opportunities of these different research contexts shape an assessment of the conceptual and evidential value of ANPSI research.

The experimental animal: Animal psi in the laboratory

Much experimental animal psi research has been conducted within an operant or classical conditioning paradigm. Within this context, animals can be trained to respond to a particular stimulus (e.g. light, food, electric shock) and a baseline response obtained. Such conditions tend to be easily manipulated to measure any deviations from baseline behaviors which might be due to psi. The use of this type of paradigm for testing psi in animals is based on the assumption that psi in such contexts would act to *increase* favorable conditions for the animal.

The two earliest formal experimental ANPSI studies focused on cats, and will be explored in a little detail as they served to shape the design of later ANPSI research by highlighting some key methodological challenges (Davis, 1979). In a study which explored the ability of a human agent to influence a cat, Osis (1952) used six domestic kittens in a forced choice paradigm. Kittens were tested on their ability to detect which of two metal cups containing food was the target cup chosen by a human agent. Efforts were made to minimize olfactory and other sensory cues. Variations in the general procedure included comparing trials where the agent identified the target cup (by choosing a card from a randomly ordered pack) and also carried out all other experimental tasks (i.e. arranging the food cups, handling the kittens and recording the results), with trials in which the agent was isolated in a cubicle and a separate experimenter carried out the other tasks. Kittens were also tested in the presence of negative stimuli, such as electric shock. Initial exploratory trials indicated above chance

scoring, but this seemed to be restricted to only some kittens. A second series of trials using an independent experimenter to record the results indicated little positive deviation from chance scoring but significant psi-missing in a condition with negative stimuli. Osis (1952) highlights the presence of decline effects for most kittens across trials, as well as the tendency for some animals to form 'side-habits' in developing a tendency to consistently choose a particular cup (e.g. the one on the right hand side). There were clear individual differences between animals in deviation from chance scoring, and these differences seemed to be mediated by the relationship between experimenter and animal. For instance, in the exploratory trials, the best scoring kitten had formed a very strong attachment to the author (who acted as one of the experimenters) and his family, suggesting a possible interaction between human and animal psi.

In a follow-up study, Osis and Foster (1953) attempted to control for possible effects of experimenter psi, and also to further explore whether differences in handling of animals affected scoring. In this second study, a clairvoyance condition was obtained by placing food in only one cup; the kitten's task was to use psi to detect the correct cup, without the influence of an experimenter. Kittens who were handled affectionately scored significantly above chance, whereas kittens who were subject to unpleasant handling (e.g. rubbing their fur the wrong way or withholding food) scored significantly below chance. These early findings suggest that while there seems some evidence for the operation of psi in the animals' performance, the expression of this may be influenced by aspects of social interaction between human and animal. The social facilitation of success that a positive research atmosphere can produce is by now a well-known feature of research on human psi, utilizing settings such as the Ganzfeld (Dalton, 1997; Sherwood, Roe, Holt & Wilson, 2005).

It was not until the 1960s and 1970s that further substantial experimental work with animal psi was attempted. One strand of research in this period tested for precognition in situations where the animal was likely to anticipate future emotionally charged events. Morris (1967) showed that goldfish who were randomly chosen to be netted and briefly lifted out of their tank exhibited significantly more activity than fish that were not to be removed. However a later study, in which a person other than the experimenter was responsible for the random selection of the fish, found no effect, suggesting the possible presence of experimenter PK (Morris, 1977). A small number of studies explored precognition in rodents in situations where the animals faced possible death. Morris (1967) found that rats which were to be terminated showed more tendency to freeze in an open-field test (though this was only the case if they were familiar with the open field). However, Schmidt (1970a, cited in Morris,

1977) using a similar procedure failed to replicate this effect, and Craig (1974, 1975) and Craig and Treurniet (1974) found that rats who were to be terminated the next day were more, not less, active. Morris (1977) suggested that this discrepancy may have been due to differing time intervals between testing and death in Craig's study, but Davis (1979) concludes that the difference is probably due to experimenter psi. For obvious ethical reasons, later research moved away from this type of testing situation, but these studies serve to demonstrate that situations with strong emotional involvement may be more likely to elicit *both* experimenter and animal psi.

Animal psi research after the mid 1960's was characterized by a greater attention to developing more rigorous experimental procedures using automated testing systems. In an automated shock-avoidance paradigm, Duval & Montredon (1968a, 1968b) tested whether mice could anticipate which side of a light- and sound-shielded cage was to be shocked, by moving to the 'safe' side of the cage before the shock was administered. A random number generator determined which side of the cage was shocked. The analysis was complicated by the formation of stereotyped behaviors in the mice, such as routinely jumping to the opposite side of the cage after being shocked, or freezing due to fear. But when the stereotypical responses were removed from the analysis, significant results were obtained. These studies embodied a more rigorous experimental design and so could be considered to represent reasonable evidence for ANPSI (Morris, 1970; Davis, 1979), although later studies using a similar design were not generally indicative of a psi effect (e.g. Levin, 1975, cited in Morris, 1970; Terry, 1976). However, these later studies were not direct replications of the Duval and Montredon work; Levin's study used gerbils rather than mice, and as Davis (1979) notes, the experimental apparatus used in Levin (1975) and Terry (1976) differed in some important respects from the Duval and Montredon apparatus. The large number of precognition experiments performed by Levy and his colleagues in the 1970's should also be briefly mentioned here, as some of these attempted to replicate the Duval and Montredon findings. It is unfortunate that this body of work cannot contribute to an evaluation of this testing paradigm, due to reported fraud (see Rhine, 1974).

One clear problem with the Duval and Montredon experimental design was that the negative effects of the electric shock introduced non-random behavior, as the mice attempted to avoid the shock. Schouten (1972) attempted to improve this design by substituting a positive reinforcer for electric shock to test whether mice could determine by psi which of two randomly selected levers would produce water. Both a clairvoyance and telepathy condition were run; in both conditions the experimenter was blind to which lever was the target. In the telepathy condition, pairs of cage-mates

were separated, such that while one mouse was choosing a lever, its mate was aware of which lever led to water. The results were marginally significant in favor of psi, though only when non-habitual responses were evaluated. There appeared to be no significant difference between the telepathy and clairvoyance conditions, although some pairs showed behavior suggestive of telepathy. Schouten (1972) interprets his results as representing confirmation of Duval and Montredon's (1968a, 1968b) findings, though a later study failed to replicate these results (Schouten, 1973, cited in Morris, 1977). It seems that the tendency for psi to occur mainly in non-random (and so more labile) responses is an important characteristic of animal psi.

Using a similar design to Schouten's, Terry and Harris (1975) obtained significant findings in a precognition study with rats, but only when stereotypical behaviors were excluded from the analysis. However, in a clairvoyance test using gerbils, Parker (1974) found that both random and non-random behavior trials achieved significance, although the scoring rate was slightly higher for the random trials. There were clear individual differences between gerbils, with some performing better on random behavior trials and others performing better on non-random behavior trials. The question of individual differences in psi ability was explored directly in a precognition study using rats (Eysenck, 1975). Using a similar apparatus to Duval and Montredon (1968a, 1968b), rats were tested for their ability to predict which side of a box would be electrified. While electric shock seemed to inhibit psi in some rats, others responded by psi-missing. Eysenck (1975) suggested that the difference was due to the strain of rats used, with some strains being low in arousal and thus likely to seek out stimulation, even if it was aversive. Other strains were high in arousal and likely to be inhibited by higher levels of electric shock. However, in a study explicitly designed to tease out possible effects of strain of rat and level of shock (Hewitt, Fulker & Eysenck, 1978) no differences were found, and no evidence of psi.

The difficulty of determining whether experimenter psi is operating alongside, or instead of, animal psi is illustrated most clearly in those ANPSI studies which have tested for psychokinesis. Such studies have typically tested possible influence on the behavior of a random event generator which controls either a positive or negative stimulus. A watershed study of this type was Schmidt's (1970b) investigation of the ability of animals to influence an electronic RNG. In one set of trials, a cat was placed in a cold room together with an RNG connected to a heat lamp. An above-chance scoring rate was obtained on the first five testing sessions, but declined thereafter, possibly due to the cat developing an apparent aversion to the lamp. In a second set of trials, cockroaches were tested to see if they could influence an RNG which controlled the amount of electric shock administered. The results

showed that cockroaches received in fact significantly more shocks than would be expected by chance. In explaining this psi-missing effect, Schmidt (1970b) suggests a possible influence of experimenter psi, perhaps due to his admitted dislike of cockroaches.

As with ESP animal psi studies, PK studies are also complicated by decline effects and the problem of apparent individual differences in psi ability. A sophisticated study by Watkins (1971) attempted to tease out the relative influence of environmental factors on the expression of possible PK in lizards. An RNG was linked to a light which warmed the air in the chamber in which the lizards were kept; it was assumed that psi would function to maintain an optimum level of heat. The results showed that the amount of time the light stayed on was related to the amount of relative atmospheric pressure, which seemed to be the most important variable in maintaining an optimum environment. Watkins also found evidence for individual differences in success, with the strongest effect for females, and for those animals who were dominant in the social hierarchy. Animals who were subordinate showed evidence of psi-missing.

In his study of PK in fish, Braud (1976) found a clear decline effect over four experimental series. In the first three series, fish appeared able to influence an RNG to produce mirror images (a positive reinforcer for some species of fish) but this effect appeared only in the first trial runs, and declined consistently across trials. It is difficult to determine whether such decline effects in animals are due to habituation to stimuli, or other unknown motivational aspects of the animal, or are in fact evidence of the involvement of experimenter psi. Such effects can sometimes interact with individual differences; for instance an exploratory study by Kennedy (1979) found clear differences in the ability of three rats to influence an RNG connected to a light stimulus, with one rat actually showing an *increase* in psi-hitting as trials progressed.

Since the 1970's there has been little experimental work exploring animal psi, with the exception of a handful of studies which have investigated PK using a mobile RNG device, called the tychoscope. The researcher Chauvin, who published early ANPSI work under the name of Duval, tested the ability of mice to influence the movement of a tychoscope (Chauvin, 1986). Earlier tests had indicated that if the device was presented close to the mice, and to the rear of the cage, they became afraid of it. Results suggested that mice could significantly influence the device to move away from the cage; however, this effect appeared to be specific to certain animals, and was not replicated in subsequent trials. Later work using the tychoscope focused on whether instinctual imprinting behaviors in young animals may

function as a vehicle for possible psi. Imprinting is a much studied phenomenon whereby young animals develop an attachment to the earliest stimulus they are exposed to, which is usually the parent. Peoc'h (1988) imprinted young chicks to a tyroscope and tested whether, if prevented from following the tyroscope, they could use PK to influence the machine to spend more time near their cage. To control for effects of experimenter PK, trials were analyzed only after the completion of the whole experiment, and the experimenter was not present during any trials. The results showed that the tyroscope spent significantly more time close to the cage when imprinted chicks were present, compared to when non-imprinted chicks were present. In an attempt to replicate Peoc'h's findings, Johnson (1989) tested chicks imprinted on a different object, a rotating red box. An RNG controlled whether the box was activated or not. Despite evidence that chicks were strongly imprinted onto the box, the object was not activated at significantly more than chance levels. As Johnson (1989) notes, the lack of effect may have been partly due to methodological differences between these two studies, such as a smaller sample size and less overall exposure to the stimulus in the Johnson (1989) study.

In a much later study, Green and Thorpe (1993) attempted to improve upon Johnson's (1989) method by using larger numbers of chicks and controls for experimenter effects. In the first of four trials, a rotating light controlled by an RNG remained on for significantly longer when chicks who had been imprinted onto the light were present. However, a subsequent trial showed no effect when the experimenter was absent, suggesting the operation of experimenter PK. Additional trials to further test the effect of the presence of the experimenter and the possible influence of the chicks' locomotor activity on the RNG output found no evidence of either animal or experimenter PK, and no further evidence of level of activity influencing the RNG. Green and Thorpe (1993) suggest a possible explanation for the discrepancy between the findings of themselves and Johnson (1989), compared to Peoc'h's (1988) positive results. In the earlier Peoc'h study, the source for imprinting (and the PK target) was a moving rather than a static object. As Green and Thorpe (1993) note, a situation in which a moving object is the target is more likely to elicit psi in imprinted animals, since this most closely mimics the imprinting process, which primes animals to maintain proximity to a (moving) parent.

In an interesting follow-up to his earlier work, Peoc'h (1995), tested whether chicks kept in the dark were able to influence an RNG which controlled the movement of a tyroscope. A candle was attached to the tyroscope, so that the closer the robot was to the chicks the more light they received. In this test, chicks were not imprinted onto the tyroscope. The machine spent significantly more time near the chicks' cage, compared to a control condition where no chicks were present. A possible

problem, however, with this experiment is that no test was made without a human observer present, thus making it difficult to assess the impact of experimenter psi.

As Davis (1979) has noted, the expectation that psi could be more easily examined in less complex species studied in the laboratory has not been borne out by the evidence. The experimental findings reviewed here suggest a psi effect that is small, inconsistent and not easily repeatable, even in the same species. Researchers have struggled with defining and eliciting non-stereotypical behavior, in experimental conditions that are likely to be impoverished or even sometimes stressful for the animal. While more rigorous attention to experimenter effects may have resulted in better designed studies in this area, there has been little success in adequately controlling for, or explaining, the role of individual differences in psi ability in animals. In addition, the potential interaction of animal and human psi in these contexts has been an intriguing but poorly understood feature of many experimental studies. In aiming to remove the experimenter-animal relationship from the testing situation by more automated procedures, experimental ANPSI research may have inadvertently removed a element crucial to the expression of animal psi. We turn now to research which focuses more directly upon the human-animal relationship as a potentially rich context in which animal psi may occur.

The companion animal: Animal psi in the human-animal relationship

In setting out recommendations for the investigation of animal psi, Rhine (1951) and Morris (1970) suggested that the examination of spontaneous accounts of animal psi were useful mainly as a precursor to more rigorous experimental research. We will argue, however, that the focus on motivation, behavior, and interaction that field studies may facilitate a more fine-grained analysis of some of the characteristics of animal psi within the human-animal relationship. We will discuss first those cases of 'clever' animals; reported as showing unusual conceptual or numerical abilities assumed to be mediated by psi. As with the studies discussed in the previous section, the interpretive framework underlying much of this work is a model of psi as the anomalous transfer of information not obtainable by normal sensory means.

An early example was the investigation by J.B. and L.E. Rhine of a horse called Lady, claimed by her owner to display 'mind-reading' abilities (Rhine & Rhine, 1929a, 1929b). The horse could apparently answer questions related to numerical problems and past and future events correctly, if the questions

were written down and showed to her owner. Reports of Lady's ability in the popular press claimed that she had successfully located missing children (Candland, 1993). Rhine and Rhine (1929a) conducted a series of tests using various methods of screening the horse from possible facial or bodily cues from the owner. Lady was tested when her owner was blindfolded, had her movements restricted or was behind a screen. Initial trials indicated that Lady could perform above chance even if her owner did not know the correct response to the test questions, as long as someone present knew the answer, suggesting a possible telepathy effect. Although there appears some evidence of the operation of psi in this case, this was heavily dependent on certain aspects of the horse-owner relationship. Although Lady did obtain some success on trials when her owner was placed behind a screen or was absent, her motivation was noticeably worse during these trials. In a few trials conducted towards the end of this testing period, just before the family were due to move house, Lady's performance dropped below chance. At this time, Lady's owner appeared to be under some stress, and had less control over the horse.

In a follow-up investigation a year later, Lady performed below chance unless her owner knew the answer to the question *and* was in full view. Only by imitating the owner's movements and gestures could other observers obtain a result, suggesting that any success in these later trials was due wholly to cueing (Rhine and Rhine, 1929b). However, an interesting aspect of this later investigation was the fact that the relationship between Lady and her owner had deteriorated somewhat since the earlier trials. The horse's owner had become noticeably more nervous and impatient with Lady, scolding her and using a whip with greater frequency. Rhine and Rhine (1929b) conclude that the earlier trials represent good evidence for psi; however, they note that the best performance in the earlier trials occurred when the horse was in a passive, relaxed and almost sleepy state. This state was not observed in the later, less successful trials. Research suggests that states in which human participants are more passive and relaxed are more conducive to the expression of psi (Braud, 1974, 2002; Sherwood, 2002); the Rhines' report suggests tentative but intriguing evidence that this kind of state may also be psi-facilitative in animals.

Due to their long association with humans, and their highly developed social skills it is perhaps unsurprising that dogs have featured as potential agents for telepathy. An early investigation by Becterev (1949) explored the abilities of two circus trained dogs to obey mental commands issued by their trainer Durow. By imagining the task that the dog was expected to perform, such as fetching a book from a table, or running and sitting on a particular chair, Durow claimed to be able to

telepathically direct the dogs' behavior. Bechterev conducted a number of trials designed to control for sensory cueing by Durow. The dogs performed well, even when Durow was blindfolded and behind a screen. Trials where other individuals acted as the agent were also largely successful. Of particular interest in this case is the assumption that physical proximity to the dog facilitated telepathy, as the trainer Durow described:

I take his head between my hands as if I am symbolically inculcating in him the thought that he is entirely in my power...I fix my eyes upon his...I pull together all my nerve power and concentrate so that I entirely forget the outer world, impressing upon myself mentally the outlines of the object in which I am interested...I turn the dog towards myself with an imperious gesture and look into his eyes, somewhere into his interior. I fix into his brain what I just before fixed into my own...Then I mentally give him the command, or rather the mental push: "Go!" (Bechterev, 1949, pp. 167-168)

The dogs were often observed to become restless and eager to get free while this visualization process was happening; upon release, the response was usually to rapidly go to the desired object/area without hesitation. From the few trials which Bechterev reports, it is clear that this process of holding the dog's head and gazing into his eyes, even if done by individuals other than the trainer, produced greater success than those trials in which the trainer or experimenter was behind a screen. However, some trials were successful even when the trainer or experimenter was restricted to merely *imagining* looking into the dog's eyes from behind the screen.

Considered by both White (1964) and Morris (1977) to be the best study of its type, the investigation of Chris, the 'Wonder Dog' was prompted by his apparent ability to give the correct response to arithmetical problems by pawing the appropriate number of times on his owner's arm. Wood and Cadoret (1958) conducted a number of trials in which Chris was trained to associate each card in a standard ESP deck with a number, and to identify face-down cards by pawing the appropriate number. Trials conducted with Wood (Chris' owner) presenting the cards to the dog were highly significant, even in clairvoyance trials where Wood did not know the correct card. However, when Cadoret observed the trials, performance was significantly below chance. Wood and Cadoret (1958) consider whether psi-missing in this case may be due to the often cited effects of stress on performance in observed trials. To the extent that the source of psi in this study is unclear, the process by which possible stress affected performance (i.e. whether psi-missing was due to the mental strain of the dog,

the owner, or both) is also difficult to elucidate.

The difficulty of disentangling human from animal psi in these kinds of trials is discussed by White (1964) in a review of ESP in dogs. White (1964) reports on her investigations of five domestic dogs, all of whom were reported to be able to bark the appropriate number of times when asked what number their owners were thinking of. Three of the five dogs were found to score above chance, even when controls were introduced, such as separating the owner and dog by a screen, a door, or even placing them in separate rooms. However, White (1964) points out that complete control of all possible sensory cues was not possible in these trials, and that their main utility lies in delineating important issues for future research, such as managing the motivation of both dog and owner in order to maximize performance. This account also usefully discusses more qualitative aspects of behavior which impact upon performance, such as the tendency for the best performances to occur when the owner-dog relationship was a close one.

The potentially crucial role of the human-animal relationship to potential ANPSI in dogs is also considered by Rhine (1971) in his report of trials conducted in 1952 for the U.S. defense department, exploring whether dogs could detect underground dummy mines. Two dogs were used that had been previously trained to detect underground objects, and the close nature of the trainer-dog team was considered crucial to the possible success of the trials. The dogs were trained to indicate the presence of a buried box by sitting near one of a number of markers. Trainers were blind to where the boxes were buried, and efforts were made to conceal potential visual clues by raking and smoothing the sand after concealment of the boxes. Significant results were obtained, even in trials where the boxes were buried in sand under shallow water; however, performances declined substantially over time. In discussing the identity of the psi agent in these trials, Rhine (1971) questions "...whether it was perhaps the team and not either man or dog alone that produced such results." (p. 20). In an unpublished account of these trials produced for the ERDL defense laboratory Rhine (1953) notes aspects of the changing dynamics of the trainer-dog relationships that may potentially have affected performance. On one series of trials, the dog Binnie performed particularly poorly, and Rhine (1953) noted that she had been roughly treated by the trainer, Simpson, in the previous tests. A reason for this can perhaps be found in Rhine's observation that over the course of the trials Simpson had become "...manifestly nervous, slightly irritable with his dogs, and, judging by little signs which one learns to look for, not enthusiastic about going on with the project." (p. 10). Although the closeness of the trainer-dog relationship had been initially seen as important to possible success, Rhine (1971) admits

that he later considered this factor as a methodological weakness, clouding the identity of the psi-source. However, in trying to explain the findings, he concludes that this close coordination of human and animal may be necessary: "The man-dog team was built up with such a tightly bound common need to locate mines that a functional integration of man and dog mentalities existed." (p. 31).

The closeness of the relationship between human and animal is particularly pertinent when considering whether ANPSI can facilitate the location of a distant owner, or the prediction of an owner's return. In their early survey of psi-trailing, Rhine and Feather (1962) discuss a range of criteria for assessing this kind of evidence, such as obtaining evidence from independent witnesses, and searching for physical and behavioral characteristics of the returning animal (e.g. scars, unique deformities, unusual behavior patterns). They conclude by suggesting that naturalistic field experiments may assist in the investigation of more spontaneous aspects of animal psi that may be difficult or impossible to reproduce in a laboratory setting.

An example of such spontaneous behavior is the purported ability of some animals to predict their owner's return from a distant location. Typically, the animal is observed to wait by a door, gate or window even when the owner is distant enough that no normal visual, olfactory or auditory cues indicate their approach. There are many popular accounts of such behavior which usually, though not always, involves domesticated dogs and cats (Sheldrake, 1999a). In surveys of the general public, about half of respondents tend to believe that their pet dogs can anticipate arrivals, while between about one tenth and a third of cat owners believe so (Sheldrake & Smart, 1997; Brown & Sheldrake, 1998; Sheldrake, Lawlor & Turney, 1998).

A series of studies conducted over the last ten years by Sheldrake and his colleagues provides interesting, if contentious, evidence that ANPSI may feasibly be investigated in a naturalistic setting. To be adequate, such investigations need to be grounded in careful observations of the animal's spontaneous behavior, so that testing permits a full range of behavior to be sampled. To this end, Sheldrake and Smart (1998) conducted a set of preliminary observations investigating the ability of Jaytee, a dog belonging to Pamela Smart (PS), to anticipate her arrival home. Jaytee was usually left with PS' parents in her absence, and informal observations over a number of years suggested that the dog seemed to wait at the window for PS at about the same time that she departed from her destination to return home. This occurred in the absence of any sensory cues, or cues from PS' parents (who usually did not know at what time she would return). Detailed records were kept over a period of nine

months recording the time at which PS left the house, and the time she started on her return journey, the means of return (e.g. taxi, her own car, friends' cars etc.) and the times at which Jaytee went to the window. Additional information was also recorded by PS' parents, who noted any other distracting events that appeared to affect Jaytee's usual behavior at the window, such as events, or other animals outside the window, or Jaytee being ill. The results indicated that Jaytee seemed able to predict PS's return on 86 out of 100 occasions, and that there was a highly significant relationship between the length of time that the dog spent waiting, and the duration of PS' return journey, suggesting that the dog was detecting the time at which PS began to set off on her return journey.

In a later study, Sheldrake and Smart (2000a) tested Jaytee in two different environments: PS' parents flat, and PS' sister's flat. Blind coding of Jaytee's videotaped behavior was carried out by an independent observer. The results showed that the dog spent significantly more of the time at the window when PS was returning than at other times. In PS' sister's flat, Jaytee showed the same general pattern of behavior, but the difference between time periods was not significant. One possible contributing factor to this difference was the fact that in PS' sister's flat Jaytee had to balance on the back of a sofa to see out of the window, which resulted in less time overall being spent at the window. Graphical representations of the pattern of behavior shown in each ten minute period for each trial indicate a sharp increase in the time spent at the window in the 'pre-return' period, which appears clearly distinct from the behavior observed in the rest of each period.

The criterion by which an animal's performance should be judged in these kinds of trials has been subject to some debate in the literature. Following a television program featuring Jaytee's behavior, Wiseman, Smith and Milton (1998) tested the dog's performance in four experiments, lasting 3 hours each. Each testing period was broken down into ten minute periods, and Jaytee's behavior was videotaped throughout. In each experiment, the time at which PS set off to return from a distant location was randomly allocated by one of the experimenters. The criterion by which Jaytee's performance was measured differed in these trials from Sheldrake and Smart's (1998) earlier criterion. Wiseman, Smith and Milton (1998) classed the first time that the dog visited the window inexplicably for more than two minutes, as his 'signal' that he was detecting PS's intention to return. They concluded that, based upon this criterion, Jaytee did not show evidence of being able to detect PS' intention to return.

In a reply to Sheldrake's (1999b) criticism of their use of this criterion, Wiseman, Smith and Milton

(2000) insist that testing Jaytee's ability to anticipate PS' return "...did not require plotting our data and looking for a pattern, but instead simply involved determining whether Jaytee's 'signal' matched the time that PS started to return home." (p. 2). The question of how particular behaviors are interpreted is central to field experiments, where a great quantity of often complex behaviors are displayed. In such settings, careful preliminary observations are needed to determine which aspects of a dynamic pattern of behavior are central to testing a hypothesis. The detailed observations of Jaytee's behavior by Sheldrake, Smart and her family, as well as the large evidence base of anecdotal reports of similar anticipatory behavior by other animals (e.g. Sheldrake, 1999a) indicate that the behavior of interest is the *sustained attention* of the animal over a period which coincides with the owner's intention to return and their initial homeward movements. It follows that a single frequency measure of attention (rather than a duration measure) could not be expected to capture the complexity of the purported behavior in these cases.

Sheldrake (1999b) has argued that by examining the duration of time spent at the window during the whole of each experimental period (rather than just the first two minutes spent at the window) the pattern of behavior in Wiseman et al's (1998) results mirrors that found in his own trials. Wiseman et al. (2000) suggested that this pattern of behavior might be found if Jaytee was merely spending increasing amounts of time at the window during the period of PS' absence. However, the findings of Sheldrake and Smart (1998, 2000a) indicate that the amount of time at the window did not increase through the absence period, rather there was a sharp increase in the period immediately prior to PS starting her homeward journey.

Sheldrake and Smart (2000b) have also tested similar behavior in another dog-owner pair and found a corresponding pattern of results, with the dog, Kane, spending significantly more time at the window when his owner was on her way home than at other periods of each trial. However, unlike Jaytee, Kane appeared to respond only when his owner had actually started her homeward journey, rather than responding just prior to this. The elimination of normal sensory cues in this set of studies suggests the operation of animal psi. It seems unlikely that in these trials the dogs were obtaining information telepathically from individuals other than the owner, since in most cases these individuals were not aware of the time of the owner's return; Sheldrake and Smart (2000b) have suggested that the most parsimonious explanation for the findings is direct telepathy between animal and owner.

A more recent study by Sheldrake and Morgana (2003) has pioneered the use of a language trained

animal to investigate animal psi. Morgana's African Grey parrot N'kisi was the subject of the study; the bird had been trained to acquire more than 700 words, and was able to appropriately use grammar to speak in sentences. N'kisi was tested to see if he could respond to Morgana's thoughts and intentions. Care was taken to construct a testing paradigm which reflected the bird's natural behavioral responses and provided a context in which possible psi responses might operate. In informal observations, Morgana had established that N'kisi's utterances seemed to reflect her own thoughts, mostly at 'moments of discovery' when Morgana had been engaged in looking for something, or noticing something for the first time. Instead of using Zener cards, which were assumed to be too repetitive, the tests involved Morgana opening sealed envelopes containing different photographs. Both Morgana and the bird were filmed in separate rooms and the behavior of both later transcribed blindly by independent witnesses. The findings were highly significant, suggesting that the words uttered by N'kisi upon Morgana's opening of each envelope reflected his, presumably telepathic, awareness of each photograph.

In considering some of the trials in which N'kisi did not score a hit (i.e. when he did not utter the word most appropriate to the photograph) analysis of his utterances within the context of the way he used language is instructive. For example, on one trial, N'kisi failed to respond with the word "car" to a photograph in which a driver in a stationary car had his head out of the window. Instead he said "Uh-oh, careful, you put your head out." (Sheldrake and Morgana, 2003, p.613) Although counted as a miss, this illustrates the complexity of responses possible in animals that have acquired a greater level of language ability within a social context, and suggests interesting questions regarding the most fruitful contexts in which to search for animal psi.

Discussion: Critiquing the evidence for animal psi.

Taken as a whole, the evidence from ANPSI research points to a psi effect that is small, not easily replicable, subject to fluctuations and decline effects, and whose source is largely unclear. Like humans, animals appear to vary in terms of possible psi ability, and as with human psi research, ANPSI research indicates the central importance of the dynamics of the experimenter-participant relationship. It might be argued, however, that this relationship becomes both more important and more complex in ANPSI work, due to the extra layer of interpretation necessary to understand non-human responses. The difficulty of interpreting behavior even in those species assumed to display relatively simple

responses illustrates this point. For example, Morris (1977) highlights the difficulty of predicting the responses of rats in a precognitive test featuring impending euthanasia. He suggests that the tendency of rats to freeze in response to an immediate predator can explain his findings that rats to be euthanased 10 minutes hence were less active (Morris, 1967b). At the same time, the tendency of rats to take evasive action when faced with a more distant predator may explain Craig's (1973) findings that rats to be euthanased in 24 hours time were *more* active. Thus assumptions about likely responses need to be informed by a detailed knowledge of typical species-specific behaviors, as well as a recognition of the role of motivational factors and even personality differences in shaping responses (see Gosling, 2001 for a review of animal personality research).

A related problem concerns unexamined assumptions about the cognitive and emotional bases of animal psi. In fact, to speak of a more or less unitary ability called 'animal psi' is perhaps too simplistic; there are many different species of animals, with varying levels of social, mental and emotional complexity. In a broad generalization, Griffin has suggested that while humans display more 'expressive psi' (e.g. telepathy, poltergeists, PK) animals may excel at more 'passive' aspects of psi (e.g. psi-trailing, anticipation of danger) (Griffin, 1993, cited in Armstrong, 1996). Armstrong (1996) speculates that this might be because "The animal psyche is more closely bound to the immediate situation – to what is going on in that place and at that time." (p. 144). The value of such broad conceptualizations, however, lies mainly in their use as starting points for a more detailed examination of species specific abilities. It is problematic, for instance, to assume that all animal awareness is mostly unconscious and non-figurative. There is now good evidence of previously unrecognized levels of complexity in animal social intelligence (Whiten & van Schaik, 2007) emotional awareness (Panksepp, 1998, 2005a, 2005b; Preston & de Waal, 2002) and abstract thinking (Aust, Range, Steurer, & Huber, 2008; see also Bekoff, Allen & Burghardt, 2002 for a useful general review of work in animal cognition). These findings permit a more precise understanding of some of the characteristics of awareness in different species.

A methodological challenge that is more acute in studies of animal compared to human psi is the relative difficulty of understanding and predicting the motivation of an animal in a particular testing situation. The effects of handling and emotional stress on animal behavior are now well charted (McMillan, 1999) and highlight the difficulty of producing natural behavior patterns in artificial testing environments. The importance of motivation to successful performance is especially clear from ANPSI research in more naturalistic settings, such as Rhine's (1971) work with the dog-handler teams, and

Wood and Cadoret's (1958) investigation of the dog Chris. The evidence suggests that motivation is closely tied up with the quality of the relationship between animal and owner or experimenter, such that in some cases animal psi seems to be directly facilitated by close emotional bonds with a human. Indeed, in some contexts, such as psi-trailing, or anticipation of an owner's return, this close bond is a necessary precursor of animal psi.

From a traditional objectivist perspective, the development of a relationship between experimenter and animal is considered to be a potentially confounding factor. So Schmidt (1970b) laments the fact that he is unable to rule out an effect of experimenter psi, due to his dislike for his cockroach subjects, while Osis (1952) wonders whether the affectionate relationship between himself and one of his experimental kittens is responsible for the animal's unusually high scoring rate. It is clear that experimenter psi can be considered a function of the type of relationship between the experimenter and the animal and may be elicited accordingly. But it may play a more central role in the expression of psi. In discussing his dog-handler clairvoyance trials, Rhine (1971) suggests that instead of seeing experimenter psi as an unwelcome confound, future experimental designs might foster "...a deliberate attempt by the experimenter to *invade and augment* the subject's mental system and undertake to help or hinder him in his psi efforts". (p.32, italics added). In the dog-handler team that Rhine tested, the close connection between dog and human, and the common goal of both may have functioned to reinforce psi in both participants. From this perspective, the experimenter effect perhaps signifies that in close relationships psi is more usefully conceptualized as a joint expression of the intentions or needs of *both* participants (Reed, 1994; see also White, 1976a, 1976b).

If psi is especially apparent in close relationships then it could be assumed to serve an adaptive function. The findings of Peoc'h (1988) that PK appears to be augmented by the imprinting process suggest that psi may be an evolutionarily based need-serving function. This was the central assumption in Stanford's (1974) psi-mediated instrumental response (PMIR) model, which holds that organisms unconsciously use psi to scan the environment for information relevant to their biological needs. Cases such as psi-trailing, the anticipation of an owner's return, and unexplained detection of danger to the owner at a distance are all examples of how psi may benefit the animal. However, the assumption that psi in such cases is analogous to the detection and processing of an information signal is still open to debate. In his later rejection of the PMIR model Stanford (1977, 1978) proposed instead a systems based model, the 'conformance behavior model', which explained psi as a tendency for organisms to bring about (in a teleological way) a goal which serves a need. In this model, both experimenter and

participant become part of the same system: a system that is predisposed to bring about a goal: – the success of the experimental task (Edge, 1978). This model more easily accounts for the evidence that the type, quality and intensity of the human-animal relationship affects psi performance in ANPSI research. Moreover, it may be that the desire to maintain and reinforce the human-animal relationship may function as a need in itself.

The evidence from animal psi research therefore points to the necessity of reconsidering traditional information transmission models of psi in favor of frameworks which more readily encompass the interconnectedness that seems characteristic of many psi experiences (Williams, 1996). This suggests that future research needs to focus more on the relational aspects of psi within a much broader social and environmental context. For instance, Radin (2002) has suggested that the ability of animals to track their owners' whereabouts may be due to an psi-mediated ability to process non-local orientational information. It is likely that, as with humans, this ability may fluctuate in response to changes in the geomagnetic field (GMF). Radin (2002) compared trials in which the dog Jaytee failed to anticipate his owner's return to levels of GMF and other environmental variables during the experimental period. The findings showed that Jaytee's performance was better on days with a lower GMF flux, suggesting psi ability in both animals and humans may be strongly affected by environmental factors.

In generating appropriate explanatory frameworks within which to explore and understand psi, ANPSI research highlights some of the methodological debates which characterize parapsychological, and psychological, research in general. Early ANPSI researchers focused their energies in the laboratory, assuming that animal psi could be better isolated and controlled in this traditional setting. Although much of the evidence for a psi ability in animals stemmed from anecdotal or lay reports of spontaneous behavior, the fact that such reports often concerned a single animal (or were based on very small samples) and were difficult to verify and replicate meant that their evidential status was considered problematic. In Rhine and Feather's (1962) survey of psi-trailing, for instance, the authors argued that an assessment of the reliability of such cases should ideally focus on defining physical, rather than behavioral, characteristics of the returning animal. Yet the recognition of a returning pet inevitably involves assessing whether the animal behaves in the same way as the lost pet, whether it interacts in a similar way with the owner and family. Consider the case of the dog King, for example, who disappeared from his home in Idaho and turned up three months later in front of the door of the family's new home in California (Rhine & Feather, 1962). The new arrival was the size, shape, and

color of King, and even had a scar in the same place, but also displayed the same idiosyncratic behaviors that the family remembered, such as his dislike of hissing noises and his tendency to always shake hands with the left paw. Through their interactions with the dog, the family were convinced that the newcomer was in fact King. It is only in the context of interaction and relationship that these kinds of judgements can be made, yet they are often assigned low evidential status. Rhine and Feather (1962) suggested for instance that future investigation of ostensible psi-trailing cases might more fruitfully seek even more reductionistic proof of identification, such as blood tests, as more desirable criteria.

The present debate within the social sciences concerning the validity of different types of evidence is of central importance to efforts to understand and explain psi phenomena. In the current positivist paradigm, quantitative evidence from traditional experimental settings is privileged over more qualitative accounts of spontaneous experiences. Substantial effects using large samples are sought, and smaller, more intimate, studies of the complex behavior of individuals are neglected. Yet evidence from ANPSI work indicates that a richer account of animal psi may be gleaned from protracted observations in more naturalistic study settings, in which the relationship between animal and researcher is seen as an integral part of research design. For such an approach to be considered adequate, more sophisticated methodological frameworks may be required that accept the valuable role of direct observation, phenomenological experience and inter-subjective, process-oriented explanations of psi (e.g. White, 1990; Braud, 1994; Braud & Anderson, 1998).

Essentially the same tension between experimental and naturalistic forms of enquiry has characterized recent debates about the difficulties of studying animal consciousness. In contemporary behaviorist and cognitive accounts of animal awareness, thinking is assumed to be a mode of information processing and manipulation, which is best studied using abstract cognitive tasks in the laboratory (Dutton & Williams, 2004). Concurrent with this view is the more insidious assumption that alternative accounts of animal mind that feature subjective awareness, motivation, intention or emotion are necessarily biased, anthropomorphic and perhaps a little naïve. Like some debates in parapsychology, the debate about the existence of animal awareness has often been polarized, being portrayed as involving 'believers' and 'skeptics', as involving 'killjoy' interpretations waging war on 'sentimental' or 'anthropomorphic' accounts, and as being a battle between lay assumptions and more 'hard-nosed' scientific explanations. Parapsychologists will be familiar with the tenor of such debates, which often reflect rhetorical aims rather than informed criticism (see Zingrone (n.d.) particularly her

discussion of the rhetoric involved in the Wiseman et al. (1998, 2000) critique of the Sheldrake studies, and also Zingrone, 2006).

A useful development in the comparative cognition field has been a call for a more 'critical anthropomorphism' (Burghardt, 1985; Mitchell, Thompson and Miles, 1997). This approach rejects both uncritically anthropomorphic and excessively mechanistic approaches in favor of a more rigorous comparison of human and animal awareness that is grounded in the knowledge of the behavioral and sensory world of a particular species. It also incorporates a reflective awareness of our own role in that world, in our relationships with animals and the assumptions and attributions we make about their experience (Davis & Balfour, 1992). The models of animal psi that we construct and the methodological approaches we use for its investigation, are similarly structured by prevailing conceptual and methodological assumptions about animal awareness, motivation, and the role of the human-animal relationship in research. A more complete understanding of animal psi demands greater awareness of such assumptions, and calls for a more participatory context in which to study potential psi abilities in animals.

References

- Armstrong, S. J. (1996). Souls in process: A theoretical inquiry into animal psi. In M. Stoerber & H. Meynell (Eds.), *Critical Reflections on the Paranormal* (pp. 133-158). New York: SUNY.
- Aust, U., Range, F., Steurer, M., & Huber, L. (2008). Inferential reasoning by exclusion in pigeons, dogs, and humans. *Animal Cognition*, *11*, 587–597.
- Bechterev, W. (1949). 'Direct influence' of a person upon the behavior of animals. *Journal of Parapsychology*, *13*, 166-176.
- Bekoff, M. Allen, C. and Burghardt, G. M. (Eds.). (2002). *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition*. Cambridge (MA): MIT Press.
- Braud, W. G. (1974). Relaxation as a psi-conducive state. *Bulletin of the Psychonomic Society*, *3*, 115-118.
- Braud, W. G. (1976). Psychokinesis in aggressive and nonaggressive fish with mirror presentation feedback for hits: Some preliminary experiments. *Journal of Parapsychology*, *40*(4), 296-307.
- Braud, W. G. (1994). Honoring our natural experiences. *Journal of the American Society for Psychical Research*, *88*(3), 293–308.
- Braud, W. G. (2002). Psi –favorable conditions. In V. G. Rammohan (Ed.), *New Frontiers of Human Science: A Festschrift for K. Ramakrishna Rao* (pp. 95-118). Jefferson, NC and London: McFarland.
- Braud, W. & Anderson, R. (1998). *Transpersonal Research Methods for the Social Sciences: Honoring Human Experience*. London: Sage.
- Brown, D. J. & Sheldrake, R. (1998). Perceptive pets: A survey in north-west California. *Journal of the Society for Psychical Research*, *62*, 396-406.
- Burghardt, G. M. (1985). Animal awareness: Current perceptions and historical perspective. *American Psychologist*, *40*(8), 905-919.
- Candland, D. K. (1993). *Feral Children and Clever Animals: Reflections on Human Nature*. New York & Oxford: Oxford University Press.
- Chauvin, R. (1986). A PK experiment with mice. *Journal of the Society for Psychical Research*, *53*(804), 348-351.
- Craig, J. G. (1974). The effect of contingency on precognition in the rat. In W. G. Roll, R. L. Morris & J. D. Morris (Eds.), *Research in Parapsychology, 1973* (pp. 154-156). Metuchen, NJ.: Scarecrow Press.
- Craig, J. G. (1975). The effect of the experimenter on precognition in the rat. In J. D. Morris, W. G. Roll, & R. L. Morris (Eds.), *Research in Parapsychology, 1974* (pp. 97-102). Metuchen, NJ.:

Scarecrow Press.

- Craig, J. G. & Treurniet, W. (1974). Precognition in rats as a function of shock and death. In W. G. Roll, R. L. Morris & J. D. Morris (Eds.), *Research in Parapsychology, 1973* (pp. 75-78). Metuchen, NJ.: Scarecrow Press.
- Dalton, K. (1997). Is there a formula to success in the ganzfeld? Observations on predictors of psi-ganzfeld performance. *European Journal of Parapsychology, 13*, 71-82.
- Davis, J. (1979). Psi in animals: A review of laboratory research. *Parapsychology Review, 10*(2), 1-9.
- Davis, H. & Balfour, D. (Eds.). (1992). *The Inevitable Bond: Examining Scientist-Animal Interactions*. Cambridge: Cambridge University Press.
- Dutton, D. & Williams, C. (2004). A view from the bridge: subjectivity, embodiment and animal minds. *Anthrozoös, 17*(3), 210-224.
- Duval, P. & Montredon, E. (1968a). ESP experiments with mice. *Journal of Parapsychology, 32*, 153-166.
- Duval, P. & Montredon, E. (1968b). Further psi experiments with mice. *Journal of Parapsychology, 32*, 260.
- Edge, H. L. (1978). A philosophical justification for the conformance behavior model. *Journal of the American Society for Psychical Research, 72*, 215-231.
- Eysenck, H. J. (1975). Precognition in rats. *Journal of Parapsychology, 39*, 222-227.
- Gosling S. D. (2001). From mice to men: What can we learn about personality from animal research? *Psychological Bulletin, 127*, 45-86.
- Green, P. R. & Thorpe, P. H. (1993). Tests for PK effects in imprinted chicks. *Journal of the Society for Psychical Research, 59*(830), 48-60.
- Griffin, D. R. (1993). Parapsychology and philosophy: A Whiteheadian postmodern perspective. *Journal of the American Society for Psychical Research, 87*(3), 217-288.
- Hardy, A. (1965). *The Living Stream: Evolution and Man*. New York: Harper & Row.
- Hewitt, J. K., Fulker, D. W. & Eysenck, H. J. (1978). Effect of strain and level of shock on the behavior of rats in PSI experiments. *Psychological Reports, 42*(3, 2), 1103-1108.
- Johnson, M. H. (1989). Imprinting and ANPSI: An attempt to replicate Peoc'h. *Journal of the Society for Psychical Research, 55*, 417-419.
- Kennedy, J. E. (1979). Exploratory PK experiments using light as the stimulus. *Journal of Parapsychology, 43*, 358-359.
- Levin, J. (1975). Unpublished manuscript.

- Maeterlinck, M. (1901/2006). *The Life of the Bee*. New York: Dover Publications Inc.
- McMillan, F. D. (1999). Effect of human contact on animal well-being. *Journal of the American Veterinary Medical Association*, 215, 1592-1598
- Mitchell, R. W., Thompson, N. S. & Miles, H. L. (Eds.). (1996). *Anthropomorphism, Anecdotes, and Animals*. New York: SUNY.
- Morris, R. L. (1967). Some new techniques in animal psi research. *Journal of Parapsychology*, 31, 316-317.
- Morris, R. L. (1970). Psi and animal behavior: A survey. *Journal of the American Society for Psychological Research*, 64(3), 242-261.
- Morris, R. L. (1977/1986). Parapsychology, biology and ANPSI. In B. B. Wolman, L. A. Dale, G. R. Schmeidler & M. Ullman (Eds.), *Handbook of Parapsychology* (pp. 687-715). Jefferson, NC: McFarland and Co.
- Osis, K. (1952). A test of the occurrence of a psi effect between man and the cat. *Journal of Parapsychology*, 16, 233-256.
- Osis, K. & Foster, E. B. (1953). A test of ESP in cats. *Journal of Parapsychology*, 17, 168-186.
- Panksepp, J. (1998). *Affective Neuroscience: The Foundations of Human and Animal Emotions*. New York: Oxford University Press.
- Panksepp, J. (2005a). Beyond a joke: From animal laughter to human joy. *Science*, 308, 62-63.
- Panksepp, J. (2005b). Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition*, 14, 30-80.
- Parker, A. (1974). ESP in gerbils using positive reinforcement. *Journal of Parapsychology*, 38(3), 301-311.
- Peoc'h, R. (1988). Chicken imprinting and the tyroscope: An ANPSI experiment. *Journal of the Society for Psychological Research*, 55, 1-9.
- Peoc'h, R. (1995). Psychokinetic action of young chicks on the path of an illuminated source. *Journal of Scientific Exploration*, 9(2), 223-29.
- Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25, 1-72.
- Radin, D. (2002). A dog that seems to know when his owner is coming home: Effect of environmental variables. *Journal of Scientific Exploration*, 16(4), 579-592.
- Reed, H. (1994). Intimacy and psi: A preliminary exploration. *Journal of the American Society for Psychological Research*, 88(4), 327-360.

- Rhine, J. B. (1950). Parapsychology and biology. *Journal of Parapsychology*, 14(2), 85-94.
- Rhine, J. B. (1951). The present outlook on the question of psi in animals. *Journal of Parapsychology*, 15, 230-251.
- Rhine, J. B. (1953). Unpublished report. Available from http://www.thememoryhole.org/mil/animal_esp.htm
- Rhine, J. B. (1971). Location of hidden objects by a man-dog team. *Journal of Parapsychology*, 35(1), 18-33.
- Rhine, J. B. (1974). Comments: A new case of experimenter unreliability. *Journal of Parapsychology*, 38, 215-225.
- Rhine, J. B. and Rhine, L. E. (1929a). An investigation of a 'mind-reading' horse. *Journal of Abnormal and Social Psychology*, 23, 449-466.
- Rhine, J. B. & Rhine, L. E. (1929b). Second report on Lady, the 'mind-reading' horse. *Journal of Abnormal and Social Psychology*, 24, 287-292.
- Rhine, J. B. & Feather, S. B. (1962). The study of cases of 'psi-trailing' in animals. *Journal of Parapsychology*, 26, 1-22.
- Schmidt, H. (1970a). Personal communication to Morris (cited in Morris, 1977).
- Schmidt, H. (1970b). PK experiments with animals as subjects. *Journal of Parapsychology*, 34, 255-261.
- Schouten, S. A. (1972). Psi in mice: Positive reinforcement. *Journal of Parapsychology*, 36(4), 261-282.
- Schouten, S. A. (1973). Psi in mice: Role of target, spatial position of target and response preferences. Unpublished manuscript.
- Selous, E. (1931). *Thought Transference in Birds*. London: Constable and Co.
- Sheldrake, R. (1999a). *Dogs That Know When Their Owners Are Coming Home And Other Unexplained Powers of Animals: An Investigation*. New York: Crown.
- Sheldrake, R. (1999b). Commentary on a paper by Wiseman, Smith and Milton on the "Psychic pet" phenomenon. *Journal of the Society for Psychical Research*, 63, 306-311.
- Sheldrake, R. (2000). The "Psychic Pet" phenomenon. *Journal of the Society for Psychical Research*, 64, 126-128.
- Sheldrake, R., Lawlor, C. & Turney, J. (1998). Perceptive pets: A survey in London. *Biology Forum*, 91, 57-74.

- Sheldrake R. & Morgana, A. (2003) Testing a language-using parrot for telepathy. *Journal of Scientific Exploration*, 17(4), 601-616.
- Sheldrake, R. & Smart, P. (1997). Psychic pets: A survey in north-west England. *Journal of the Society for Psychical Research*, 61, 353-364.
- Sheldrake, R. & Smart, P. (1998). A dog that seems to know when its owner is returning: Preliminary investigations. *Journal of the Society for Psychical Research*, 62, 220-232.
- Sheldrake, R. & Smart, P. (2000a). A dog that seems to know when his owner is coming home: Videotaped experiments and observations. *Journal of Scientific Exploration*, 14, 233-255.
- Sheldrake, R. & Smart, P. (2000b). Testing a return-anticipating dog, Kane. *Anthrozoös*, 13, 203-212.
- Sherwood, S. J. (2002). Relationship between the hypnagogic/hypnopompic states and reports of anomalous experiences. *Journal of Parapsychology*, 66, 127-150.
- Sherwood, S., Roe, C., Holt, N., & Wilson, S. (2005). Interpersonal Psi - Exploring the Role of the Experimenter and the Experimental Climate in a Ganzfeld Telepathy Task. *European Journal of Parapsychology*, 20(2), 150-172.
- Stanford, R. G. (1974). An experimentally testable model for spontaneous psi events. I. Extrasensory events. *Journal of the American Society for Psychical Research*, 66, 34-57.
- Stanford, R. G. (1977). Are parapsychologists paradigmless in psi land? In B. Shapin & L. Coly (Eds.), *The Philosophy of Parapsychology* (pp. 1-16). New York: Parapsychology Foundation.
- Stanford, R. G. (1978). Toward reinterpreting psi events. *Journal of the American Society for Psychical Research*, 72(3), 197-214.
- Taylor, R. (2003). Evolutionary theory and psi: Reviewing and revising some need-serving models in psychic functioning. *Journal of the Society for Psychical Research*, 67.1(870), 1-17.
- Terry, J. C. (1976). Continuation of the rodent precognition experiments. In J. D. Morris, W. G. Roll, & R. L. Morris (Eds.), *Research in Parapsychology, 1975* (pp. 11-14). Metuchen, NJ.: Scarecrow Press.
- Terry, J. C. & Harris, S. A. (1975). Precognition in water-deprived rats. In J. D. Morris, W. G. Roll, & R. L. Morris (Eds.), *Research in Parapsychology, 1974* (p. 81). Metuchen, NJ.: Scarecrow Press.
- Watkins, G. K. (1971). Possible PK in the lizard *Anolis sagrei*. *Proceedings of the Parapsychological Association*, 8, 23-25.
- White, R. A. (1964). The investigation of behavior suggestive of ESP in dogs. *Journal of the American Society for Psychical Research*, 58, 250-279.
- White, R. A. (1976a). The influence of persons other than the experimenter on the subject's scores in psi experiments. *Journal of the American Society for Psychical Research*, 70(2), 133-166.

- White, R. A. (1976b). The limits of experimenter influence on psi test results: Can any be set? *Journal of the American Society for Psychical Research*, 70(4), 333-369.
- White, R. A. (1990). An experience-centered approach to parapsychology. *Exceptional Human Experience*, 8, 7-36.
- Whiten A. & van Schaik, C. P. (2007). The evolution of animal 'cultures' and social intelligence. *Philosophical Transactions of the Royal Society: Biological Sciences*, 362, 603-620
- Williams, C. (1996). Metaphor, parapsychology and psi: An examination of metaphors related to paranormal experience and parapsychological research. *Journal of the American Society for Psychical Research*, 90, 174-201.
- Wiseman, R., Smith, M., & Milton, J. (1998). Can animals detect when their owners are returning home? An experimental test of the 'psychic pet' phenomenon. *British Journal of Psychology*, 89, 453-462.
- Wiseman, R., Smith, M., & Milton, J. (2000). The 'psychic pet' phenomenon: A reply to Rupert Sheldrake. *Journal of the Society for Psychical Research*, 64, 46-49.
- Wood, G. H. & Cadoret, R. J. (1958). Tests of clairvoyance in a man-dog relationship. *Journal of Parapsychology*, 22, 29-39.
- Zingrone, N. L. (n.d.). Failing to go the distance: On critics and parapsychology. *Skeptical Investigations*. http://www.skepticalinvestigations.org/exam/Zingrone_critics.htm.
- Zingrone, N. L. (2006). Complicating the conversation: Rhetoric, substance, and controversy in parapsychology. *Journal of Parapsychology*, 69, 3-21.

¹ We would like to thank Fundação Bial for support during the preparation of this paper

² Defined as "...those cases in which an animal, separated from a person or mate to whom it has become attached, follows the departed companion into wholly unfamiliar territory and does so at a time and under conditions that would allow the use of no conceivable sensory trail." (Rhine & Feather, 1962, p.3).