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An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.

A complete listing of his writings at http://kmbpsychology.jottit.com.

CONTENTS

1. COGNITIVE ABILITIES OF DOGS

1.1. INTRODUCTION

The human-dog relationship has existed for over 14 000 years, and, over that time, characteristics prized by humans, like willingness to be subordinate, have been selectively bred (Topal et al 1997). Though dogs show a number of cognitive abilities, sometimes better than chimpanzees, part of the domestication process has been to suppress problem-solving abilities and to encourage co-operation/interaction with humans, particularly in pet dogs. For example, tamed wolves can solve problems better than dogs (eg: Frank and Frank 1982).

Topal et al (1997) compared the problem-solving abilities of sixteen dogs in a "companion relationship" with their owners (ie: kept in family home as pet) and twelve in a "working relationship" (eg: guard dog). The problem-solving task involved gaining access to food dishes after observing the experimenter or as communicated by the owner. "Companionship" dogs were less likely to access the food without the commands of the owner (ie: these dogs were more socially dependent).

1.2. UNDERSTANDING LABELS

Kaminski et al (2004) reported the case of a male border collie, "Rico", who knew labels for over 200 items. He was tested by his owner instructing him to retrieve randomly chosen items in another room. The owner and the experimenter were in a different room, so Rico could not be inadvertently cued to the correct answer. In this experiment, Rico correctly retrieved 37 of forty items. This showed the ability to comprehend words.

Kaminski et al then tested the ability to learn new words. Ten new objects were introduced and named, and later Rico had to retrieve one of them from among seven familiar objects in an adjacent room. He was correct on seven out of ten sessions. Four weeks later, he retrieved 50% correctly. Overall, Rico's performance was equivalent to a three year-old human. The ability to learn new words

very quickly is called "fast mapping" in humans (Bloom 2000).

The researchers favoured a "pluralistic account of word learning where some mechanisms are shared among children and long-trained animals, and others are uniquely human" (Fischer et al 2004 p481). An example of the latter would be the ability to understand intention.

Markman and Abelev (2004) argued that Rico's performance with new objects was due to a preference for novelty rather than word comprehension. A control condition should have been used where the command was "fetch" to see what he retrieved.

Fischer et al (2004) refuted this criticism because Rico fetched familiar objects upon request before the novel item. Thus showing the ability to control his interest in novelty.

1.3. INTERNAL REPRESENTATION OF INFORMATION

Akiko Takaoka (quoted in Douglas 2008) played dogs a series of unfamiliar human voices accompanied by pictures of male or female faces. If the gender of the face did not match that of the voice, the dogs stared longer at the picture suggesting that their expectation had been violated. Having an expectation violated suggests an internal representation of information exists.

1.4. IMITATION

Observation learning or imitation is an important way to acquire behaviour for human children. "Second-person imitation" is direct one-to-one teaching (ie: copying), whereas "third-party imitation" is an "eavesdropper" learning from observing A copy B's behaviour (Tennie et al 2009).

Both types of imitation have been found in dogs. For example, Topal et al (2006) reported that a highly trained assistant dog for a disabled owner could copy the actions of a human demonstrator in a "Do as I Do" task (second-party imitation).

While dogs will copy other dogs in terms of finding food. Heberlein and Turner (2009) allowed an observer dog to watch a demonstrator dog disappear behind one of four screens where there was food or not. The majority of observer dogs went behind the same screen as the demonstrator dog had. This showed that observational learning was used.

In terms of third-party imitation, Range et al (2007) set up a box containing a reward that could be accessed by pressing a bar with the nose or the paw. Observer dogs watched a human teach a demonstrator dog

how to access the reward. The observer dogs tended to copy what they had seen (ie: use of nose or paw to press the bar). However, the observer dogs had been pre-trained on both ways of pressing the bar (Tennie et al 2009).

Tennie et al (2009) investigated third-party imitation in a way that overcame that weakness in the Range et al (2007) study - ie: actions that dogs had not been trained to do. The researchers randomly allocated 202 family dogs to one of five conditions. After each demonstration, the observer dog was tested for the behaviour. The conditions were:

1. Untrained action condition - A demonstrator dog ("Mora") is rewarded for performing an action that the observer dog has never been trained to perform ("playing dead" upon the verbal command "josep"). This tests third-party imitation.

2. Pre-trained action condition: basic - The observer dog sees Mora lie down on her belly and be motionless (sphinx-like position) at the command "tennie". The observer dog had been trained to perform this action by their owner in response to a different command.

3. Pre-trained action condition: non-contingent rewards - This condition was the same as the previous one, but the observer dog received a reward irrelevant of copying the observed behaviour.

4. Pre-trained action condition: dog owner as experimenter - The dog owner performed the experiment as in condition 2.

5. Pre-trained action condition: ostensive cues - This condition was the same as condition 2 with the added use of cues to get the observer dog to watch (eg: calling the name of the observer dog).

Conditions 2-5 all had control groups involving no experimenter.

In condition 1, which was the key condition in relation to imitation, no observer dogs (out of 20) copied the action. While in the other conditions, the likelihood of copying was no greater than chance compared to the control groups. The study is taken as evidence that dogs are not good at copying behaviour, especially third-party imitation.

1.5. UNDERSTANDING INTENTIONALITY AND GESTURES

Juliana Kaminski (quoted in Douglas 2008) placed a

reward under one of two containers in front of a dog. The containers were then moved around and the dog could not tell under which the reward was hidden. They had to rely on the human, who would point or gaze at the correct container in one condition or do abstract things, like checking their watch, in the other. The dogs found the reward more often when the human pointed or gazed. The response to such gestures suggests an understanding of the intention of the person performing the gestures.

Previously, Miklosi et al (1998) had reported that eleven dogs could find the hidden food in response to a human pointing, bowing towards, nodding at, head-turning towards, or glancing at the correct bowl.

Monkeys do not perform well in experiments to show understanding of human gestures. Capuchin monkeys can choose the correct object if a human points, but not if the cue is head movements or eye direction (Anderson et al 1995). Rhesus monkeys do better if their own species is making the visual cues (Soproni et al 2001).

Povinelli et al (1999) compared juvenile chimpanzees and three year old human children in four conditions of finding an object - pointing, nodding towards ("at target"), looking above the object ("above target"), or glancing towards the objects ("eyes only"). The chimpanzees performed well on all conditions except "eyes only". Children were only significantly above chance on pointing and "at target".

Soproni et al (2001) tried a similar experiment with eight female and six male dogs. The study took place in the owners' homes and the task for the dogs was to find a ball hidden under one of two identical brown plastic flower pots. After brief training with the animals, the experimenter performed the gestures:

- Pointing and gazing at the correct pot (pointing);
- Head movement and gaze towards pot (at target);
- Whole body oriented and looking above pot to upper corner of the room (above target);
- Eye movement only towards pot (eyes only).

The direction of the correct pot (ie: right or left) was randomised. Each gesture was tested in eight trials.

The dogs were almost always correct on pointing after training, but only significantly above chance (50%) in the "at target" condition. However, in all conditions the dogs' performance improved with each trial.

Ludwig Huber et al (quoted in Douglas 2008) compared dogs and human toddlers in an experiment about understanding intention. An adult demonstrates how to turn off a light switch using their forehead either with their hands free or tied. The toddler did not copy in the

latter case, but only in the former. In this case, the adult is choosing to turn the light off with their forehead and the toddler by copying showed they understood intention.

The dog equivalent experiment was a demonstrator dog pulling a lever with its paw instead of the usual mouth. When the demonstrator had a ball in its mouth, viewers did not copy, but they did copy when no ball in the mouth.

Understanding intentionality is an element of "theory of mind". But some researchers are not convinced that dogs have a rudimentary version of this.

If dogs are sensitive to gaze, head, and body orientation as social cues in humans, are they sensitive to gaze in other dogs. Horowitz (2009) observed over 200 dogs in a park in California via videotape, and analysed the social play between dogs. It was found that when one dog in pair was visually inattentive to its partner, the other dog used attention-getting strategies. This showed that the dogs understood the importance of visual attention in communication, and they seem to be "sensitive to the mental states of others: they acted with attention to attention" (Horowitz 2009).

1.5.1. Pointing

Pointing can be used in two ways (Povinelli et al 2003):

i) To indicate what is wanted ("give me that") (instrumental gestures);

ii) To draw the attention of others to something ("look at that") (proto-declarative gestures).

"Although chimpanzees learn to produce gestures that look and function like instrumental (or imperative) pointing gestures.. there is virtually no evidence that they use such gestures in a declarative fashion, and little strong evidence that they comprehend such gestures as anything other than a simple cue to direct their behaviour.." (Povinelli et al 2003 p78).

Yet dogs are better able to understand proto-declarative gestures.

1.6. FAIRNESS AND MORALITY

Range et al (2009) taught dogs to raise their paws for a treat. Then the dogs were not rewarded anymore. A lone dog would continue the behaviour despite no reward. In another condition, two dogs were used, but only one

dog was rewarded. The unrewarded dog stopped the behaviour suggesting some understanding of fairness.

Each condition involved thirty trials (table 1.1). Technically, the dogs were significantly less likely to continue responding in the reward inequity (RI) condition only (median: 20 trials responding compared to 30 in ET condition).

This is evidence of inequity aversion (the refusal to co-operative if another receives a greater reward for that co-operation). Range said: "Dogs show a strong aversion to inequity.. I prefer not to call it a sense of fairness, but others might" (quoted in Douglas 2008 p34).

CONDITION	DOG	PARTNER
Alone baseline	Low reward *	-
Alone no reward baseline	No reward	-
Equity baseline (ET)	Low reward	Low reward
Quality inequity (QI)	Low reward	High reward **
Reward inequity (RI)	No reward	Low reward
Effort control (EC)	Low reward for behaviour	Low reward for doing nothing

(* bread; ** sausage)

Table 1.1 - Conditions in Range et al (2009) experiment.

Bresnan and de Waal (2003) found that female brown capuchin monkeys were less willing to co-operate when inequity existed. One monkey had to give a token to an experimenter to gain a food reward, and then the partner did the same thing. The second monkey could only participate if the first monkey had done so. Sometimes the second monkey was given the same reward as the first (piece of cucumber - reward equity) or sometimes a better reward (grape - reward inequity). There were significantly less participations by the first monkey in the reward inequity condition.

1.7. APPENDIX 1A - HUMAN UNDERSTANDING OF DOG BARKS

Most of the focus is upon humans communicating with dogs, but there is research on dogs communicating with humans.

Pongracz et al (2005) found that human listeners could distinguish between the different barks made by the Murdi breed of dogs. Twelve Murdi owners, twelve other-dog owners, and 12 non-dog owners were played three bark recordings for each of six situations - response to stranger, aggression, going for a walk, left alone, and

two situations of playing. All three groups recognised the situations of the barks significantly above chance level [1], with the greatest accuracy for stranger, aggression, and alone situations, and poorest for the walk barks.

Human listeners ability to classify cat meows tends to be linked to cat ownership and experience (Nicastro and Owren 2003). Not so in the Pongracz et al study as all three groups of participants were similar in their level of accuracy.

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[1] Around 40% correct compared to chance at 16.67% (ie: 3 out of 18). Listeners were offered the choice of six situations for categorising each bark.

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2. INDIVIDUAL DIFFERENCES AND PERSONALITY AMONG NON-HUMAN ANIMALS

2.1. INTRODUCTION

Do non-human animals have personalities? That is, do they show individual differences in certain aspects of behaviour? A number of species have been tested including octopus, cat, dog, fish, goat, pig, rat, snake, and primates, and a number of traits have been investigated including aggressiveness, curiosity, extraversion, fear, and trainability (table 2.1) (Morris et al 2002).

STUDY	DETAILS
Gosling & Bonnenburg (1998)	Owners of dogs, cats, ferrets, rabbits, horses, and hedgehogs rated their pets on fifty personality traits.
King & Figueredo (1997)	100 chimpanzees in twelve zoos rated on 43 personality traits.
Wemeisfelder et al (2000)	Individuals interacting with growing pigs produced 36 descriptive terms.

Table 2.1 - Three studies of personality characteristics in non-human animals.

The biggest concern about applying the idea of personality or human personality traits to non-human animals is anthropomorphism. This is the inappropriate attributing of human behaviours and characteristics to the behaviour of non-human animals. The suggestion that non-human animals have personality is controversial, and there are arguments for and against such an idea (table 2.2).

ARGUMENTS FOR

1. Individual differences have evolutionary benefits, particularly in response to the changing environments.

2. Animals show learning, and such changes in behaviour will produce variability between individuals.

3. Differences in the central nervous system can be seen as the

origin of individual differences. In relation to human personality, Eysenck and Rachman (1965) linked introvert-extravert to differences in the reticular activating system (RAS) in the brain.

ARGUMENTS AGAINST

1. The risk of anthropomorphism. This is the attribution of human qualities to non-human animals. Individuals who work with animals become attached to them and can want them to be more than they are; eg: aquarium volunteers give octopuses names and ascribe personality types to them (Mather and Anderson 1993).

2. "Personality" is "a word loaded by its use on humans", and researchers at the 1991 International Ethological Congress workshop on individual differences in animal behaviour preferred the term "temperament" (Mather and Anderson 1993). However, this term also has connotations in relation to its use with human babies.

3. Are these individual differences learned from experience as the animal grows or something they are born with? Human personality theories tend to see the latter and argue for a biological origin (eg: Eysenck and Rachman 1965).

Table 2.2 - Main arguments for and against the existence of "personality" in non-human animals.

2.2. HORSES

If human personality has a biological basis, then similar biological processes will occur in non-human animals based on evolution, and thus there will be evidence of personality (eg: responsiveness of amygdala and fear). Consequently, personality is tested by reactivity to novel situations, for example (eg: response of horses to toy pig; Anderson et al 1999).

Morris et al (2002) investigated the personality of horses using the human personality test, the NEO-PI Five Factor Inventory (Costa and McCrae 1992), which measures the characteristics of Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (table 2.3). The applicability to non-human animals of the characteristics varies with Openness to Experience and Conscientiousness being more appropriate to humans only.

- Neuroticism

Worries a lot; has inferiority feelings; when stressed can be very anxious; not a horse to feel lonely; often tense and jittery; has very low self esteem; feels anxious and fearful quite a lot; gets angry with the way people treat him/her; is likely to be discouraged and give up; can get sad and depressed; often feels helpless and needs the support of others; can experience shame and want to hide.

- Extraversion

Prefers to be on his/her own; has a good sense of humour; is rather light hearted and cheerful; enjoys interacting with others; likes to be where the action is; prefers to be on his/her own rather than with others; often seems to be bursting with energy; is cheerful and high spirited; is an optimist; life for him/her is fast paced; is very active; would rather go his/her own way than be a leader of others.

- Openness to experience

Has day dreams but does not like day dreaming; sticks to established habits; gets enchanted by the natural world around him/her; likes poetry; will try new foods; indifferent to other people's or horses' feelings; has a strong moral sense; is excited by the beauty of his/her surroundings; spends time speculating about the nature of the universe; is very curious and likes to explore; thinks about ideas and abstract thoughts.

- Agreeableness

Is well mannered; can get into arguments; is selfish and egotistical; is better at co-operation than competition; is suspicious of others; feels others will take advantage if they can; he/she is popular with others; is rather cold and calculating; is hard headed and tough minded; is thoughtful and considerate; if he/she doesn't like you, you soon know it; can use others to get them to do what he/she wants.

- Conscientiousness

Keeps a neat and clean stable; is well organised in getting things done; is methodical; is conscientious; is orderly and systematic; takes a long time to settle down to the task in hand; is a hard worker; is reliable and won't let you down; is dependable and reliable; will always get the job done; is rather disorganised; strives for excellence in everything he/she does.

(Source: Morris et al 2002 p73)

Table 2.3 - Characteristics of NEO-PI Five Factor Inventory as applied to horses.

Nine staff at a naval riding centre were asked to rate ten horses that they had worked with. The staff showed high levels of agreement (reliability [2]) for the horses, especially for the characteristics of Neuroticism and Extraversion.

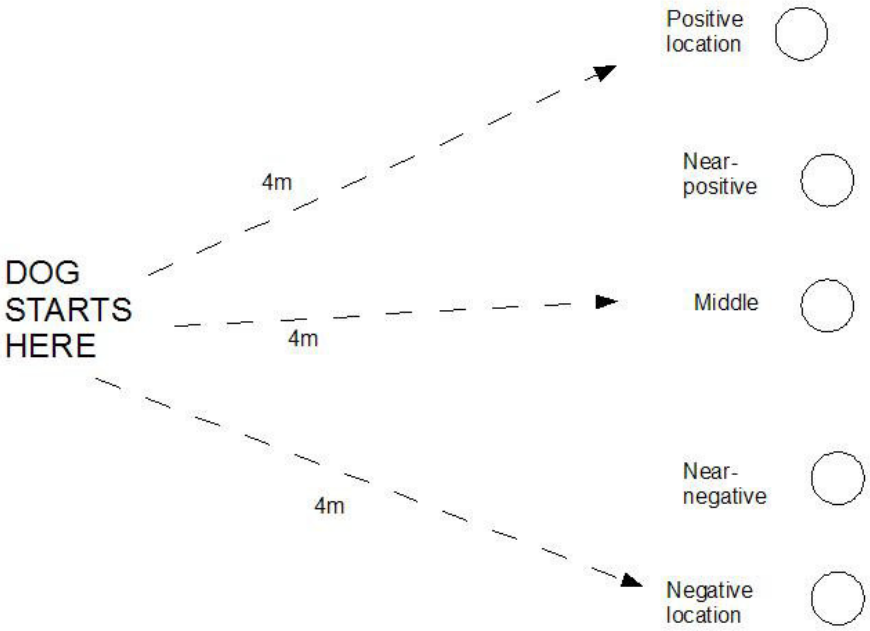
[2] Reliability in the judgment of personality is influenced by three factors (Morris et al 2002):
i) Precision and stability of the measuring instrument;
ii) The behaviour of the judges using the measuring instrument (eg: some people are better judges than others);
iii) Nature of the personality being evaluated (eg: some individuals are judged more easily than others; some traits are judged more easily than others).

2.3. DOGS

Many domestic dogs when left home alone show undesirable separation-related behaviour (SRB), like vocalising, destruction, or toileting. Mendl et al (2010) found that high levels of SRB are related to an underlying "pessimism" in the dogs.

Twenty-four dogs at two animal re-homing centres in the UK were left alone in a room for five minutes and their behaviour video-recorded. This gave a SRB score.

An "optimism" or "pessimism" score was calculated based on the dog's behaviour in an ambiguous situation ("cognitive bias" test). The dogs were taught that a bowl placed in one position in the room contained food (positive location) and in another position no food (negative location). Then a bowl was placed in an ambiguous position - towards the positive location (near-positive), towards the negative location (near-negative), or in the middle (figure 2.1). The speed of movement towards the middle position was used as the measure of "optimism" (moves quickly) or "pessimism" (moves slowly).



(My redrawing of figure 1 pR840 Mendl et al 2010)

Figure 2.1 - Representation of "cognitive bias" test.

The dogs with more SRB behaviour showed a more "pessimistic" response to the ambiguous bowl (figure 2.2).

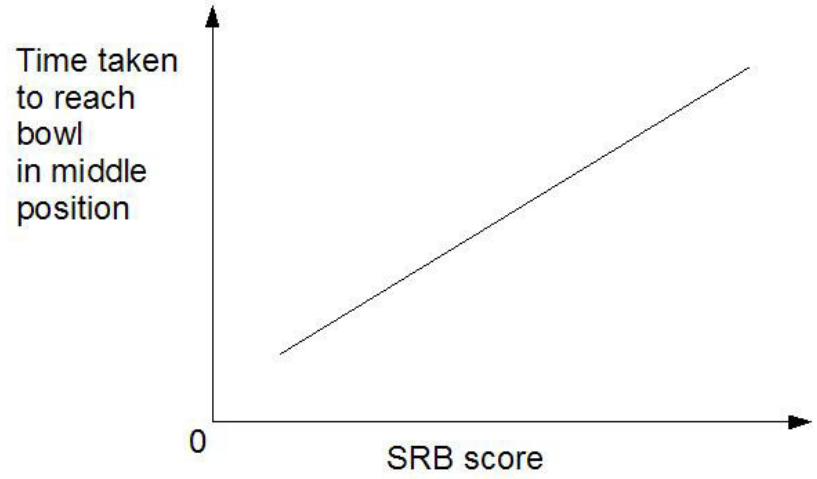


Figure 2.2 - Positive correlation between time taken to reach ambiguous bowl and SRB score.

The "personality" of dogs can also be categorised based on their response to their owner leaving the room (ie: attachment behaviour) and/or the presence of a stranger. Topal et al (1998) adapted the Strange Situation Test (SST) (Ainsworth et al 1978) used to measure the attachment behaviour of human infants to their mothers (table 2.4).

- Introductory episode (30 secs) - The observer introduces the owner and dog to the experimental room and leaves.
- Episode 1 (2 mins): owner and dog - The owner is a non-participant while the dog explores. After 1.5 mins, a signal (a knock on the wall) is given to the owner who stimulates play.
- Episode 2 (2 mins): stranger, owner, and dog - A stranger enters and sits down. After 30 secs, she initiates conversation with the owner. At the 2nd-min mark, the stranger approaches the dog and tries to stimulate playing. At the end of this episode, the owner leaves as unobtrusively as possible, but the dog's leash remains on the chair.
- Episode 3 (2 mins): stranger and dog - This is the first separation episode. The stranger's behaviour is geared to that of the dog. During the 1st min, the stranger tries to engage the dog and keep him or her out of the door by playing. If the dog is not ready to play, the stranger tries to engage the dog by petting. At the 2nd min-mark, the stranger stops playing. If the dog initiates petting, it is permitted.
- Episode 4 (2 mins): owner and dog - This is the first reunion episode. The owner approaches the closed door and calls the dog. The owner opens the door and pauses a moment to allow the dog to respond. The owner greets and comforts the dog. Meanwhile, the stranger leaves. After 2 mins, the owner leaves and says to the

dog 'stay here'. The leash is left on the chair.

- Episode 5 (2 mins): dog alone - This is the second separation episode.

- Episode 6 (2 mins): stranger and dog - This is a continuation of the second separation. The stranger enters and gears her behaviour to that of the dog. During the 1st min, the stranger tries to engage the dog and keep him or her out of the door by playing. If the dog is not ready to play, the stranger tries to engage the dog by petting. At the 2nd min-mark, the stranger stops playing. Petting is permitted if it is initiated by the dog.

- Episode 7 (2 min): owner and dog - This is the second reunion episode. The owner opens the door and pauses a moment before greeting the dog, giving him or her an opportunity to respond spontaneously. Then the owner greets and comforts the dog. Meanwhile, the stranger leaves.

(Source: Topal et al 1998 p221)

Table 2.4 - Episodes in SST.

The whole SST was video-recorded, and the dogs behaviour towards the owner, the stranger, and the absence of the owner were scored (table 2.5).

- EXPO - exploration in the presence of the owner (eg: sniffing objects).
- EXPS - exploration in the presence of the stranger.

- PLYO - playing in the presence of the owner (eg: playing with toys in room).
- PLYS - playing in the presence of the stranger.

- PASO - passive behaviours in the presence of the owner (eg: lying down without any orientation towards environment).
- PASS - passive behaviours in the presence of the stranger.

- CONTO - physical contact with the owner.
- CONTS - physical contact with the stranger.

- SBYO - standing by the door in the presence of the owner (within one metre).
- SBYS - standing by the door in the presence of the stranger.

(Source: Topal et al 1998 p221)

Table 2.5 - Main categories of dog behaviour scored in SST.

The dogs showed about three times more PLYO than PLYS, and about 50% more EXPO than EXPS. They also showed about five times more SBYS than SBYO, and twice as much CONTO than CONTS.

Factor analysis of the individual scores for each of the 51 dogs on the different variables produced three types of behaviour in the SST:

i) "Degree of anxiety" - eg: behaved passively in the presence of the stranger, and strove for physical contact with the owner.

ii) "Acceptance of the presence of the stranger" - eg: long-lasting physical contact with the stranger.

iii) "Attachment" - eg: high level of contact with owner.

These three behaviours were found to vary among different dogs into five clusters (table 2.6).

Type	Anxiety	Accept	Attach	Description
1a	low	medium	low	Not anxious with stranger, and little attachment to owner
1b	low	low	medium	More attachment to owner than 1a
2	high	high	high	Does not distinguish between owner and stranger for contact
3a	medium	medium	low	Little attachment to owner compared to other humans
3b	medium	medium	medium	Bonded to humans generally

Table 2.6 - "Personality" types of dog attachment behaviour.

2.4. OCTOPUS

Mather and Anderson (1993) described individual differences between forty-four adult Octopus rubescens studied that could be called "personality". The animals studied were captured off Seattle, USA.

The octopuses' responses were tested in three ways and nineteen behaviours were recorded:

i) Alerting - the researcher stood above the tank and looked down at the animal. Seven different responses were recorded including skin colour changes ("colour change") and moves away from observer ("shrink");

ii) Threat - the octopuses were touched briefly with a brush. The seven different responses included "squirt" (jets water at the brush), "ink" (squirts ink) or "grasp" (grabs brush);

iii) Feeding - prey were dropped into the tank. There were five different responses noted.

The different responses in the three tests were submitted to factor analysis to look for clusters of behaviours. Three dimensions of "personality" were found:

Activity (active-inactive), Reactivity (anxious-calm), and Avoidance (avoiding-bold). Table 2.7 shows how each "personality" responded on the three tests.

	ALERTING	THREAT	FEEDING
ACTIVITY	Stay in den	Grasping brush	Alert
REACTIVITY	Shrink	Squirt water or ink, but does not swim away	Alert
AVOIDANCE	Colour change	Stay in den	Stay in den

Table 2.7 - "Personality" types and behaviours among octopuses.

Mather and Anderson (1993) felt that the individual differences they had observed were more than just situation-specific, and were longer lasting, thus the label "personality".

2.5. CATS

Another way to look at individual differences is in terms of lateralised behaviour or handedness (ie: preference for use of one hand/limb over another), which humans show. Such preferences have also been reported in other species, like dogs and paw preference (eg: Wells 2003).

Wells and Millsopp (2009) explored forepaw preference among 42 neutered domestic cats with three tasks. The cats were tested in their own homes in Northern Ireland. The first task involving retrieving a food treat from a small jar. The experimenter recorded the paw preference that was first used by the cat to gain the food. The next task was reaching for a toy mouse suspended above the cat's head. The final task was stopping a slowly moving object in front of them. Each cat was tested many times on each task over ten days (100 paw responses per animal per task).

The cats only showed a significant preference (compared to chance) on the first task. While, overall, male cats were more likely to use their left paws and females their right.

The first task was the most challenging, and the fact that the cats showed a preference for one paw (left or right) fits with the manipulation complexity hypothesis (Fagot and Vauclair 1991). This proposed that more complex tasks produce more lateralisation (ie: preference for one paw).

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3. ASPECTS OF PET OWNERSHIP

3.1. OWNERS LOOK LIKE THEIR PETS

An everyday observation is that owners resemble their dogs. Roy and Christenfeld (2004) investigated the accuracy of this belief by asking 28 undergraduates to match pictures of 45 dogs and their owners. Twenty-five of the dogs were purebreds, and the others were non-purebreds. Background cues that may aid matching were removed from the photographs. A match was based on the majority of judges agreeing (ie: more than 14 participants).

There were significantly more matches between owners and dogs for the purebreds (16 out of 25) than the non-purebreds (7 out of 20). The accuracy of matching was not related to the length of ownership.

Two basic mechanisms were proposed to explain any similarity between owners and dogs - (i) individuals select dogs who look like them, or (ii) the features become similar over time. The results supported the former idea.

3.2. DOG-OWNERS AND RESPONSIBLE BEHAVIOUR

Dog-owners vary in their behaviour, and in particular in relation to their dog fouling public places. Some owners are responsible and clean up after their dogs, while others do not. Webley and Siviter (2000) investigated the difference between the two groups.

They recruited participants based on observing the behaviour of owners after the dog had fouled in different locations in south-west England. Fouling was illegal in all the locations with clear signs saying so. Of 101 incidents of fouling observed, sixty were cleared up (59%). This figure was 70% for incidents in parks.

Participants were given a questionnaire to complete which included items on dog-fouling (eg: "it's too unpleasant to clear up the mess"), and on behaviours like risk-taking and self-centredness.

Thirty-six questionnaire were completed by owners who were observed not to clean up after their dogs

("irresponsible owners" [3]) and 51 by owners who did clean up ("responsible owners").

Significant differences were found between the groups on certain items in the questionnaire. The irresponsible owners were:

- More tolerant of fouling (eg: agreement with items like "it's biodegradable" and "it's natural waste").
- More critical of bylaws on dog fouling as illegitimate and restrictive (eg: "too many places where fouling is forbidden").

But there were no significant differences on demographic characteristics (like age and gender), and general measures of behaviour that might explain rule-breaking.

3.3. BENEFITS OF PET OWNERSHIP

Dog ownership may enhance psychological well-being through dogs being a catalyst for human-human interactions. Messent (1983) observed that dog owners walking in a park had more, and longer, chance conversations when their dogs were present than not [4].

McNicholas and Collis (2000) performed a participation observation study with a Labrador trained by the Guide Dog for the Blind Association in the UK. For five days the dog accompanied the female experimenter in her daily routine, and this was compared to five days without the dog. The number and length of interactions in both conditions were recorded. Overall, three times more interactions occurred when the dog was present, but with strangers it was 65 to three interactions without a dog (figure 3.1).

In a second study, McNicholas and Collis (2000) varied the appearance of the dog owner and the dog. The same male owner and black Labrador were either dressed smartly or in torn, dirty jeans, and the dog had a studded leather collar. Data were collected in four locations in an English city on Saturdays.

There were more interactions with strangers when a dog was present than not, and there were more interactions with a smartly dressed dog owner than a scruffy one. But there were more interactions when the dog appeared rough than smart irrelevant of the appearance of the owner (figure 3.2).

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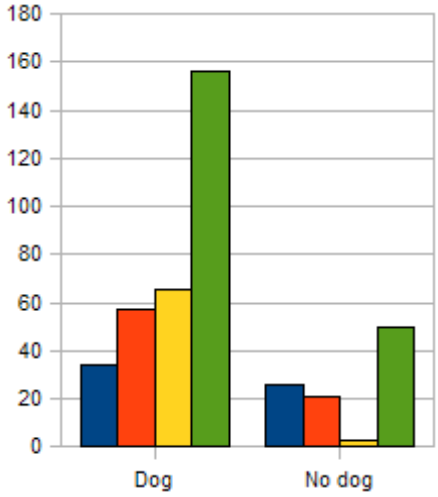
[3] Fourteen of these claimed in the questionnaire to always clean up after their dog. This showed that self-reports have to be handled with care.

[4] This "social lubrication" effect has also been reported when walking with a pet rabbit or tortoise (Hunt et al 1992).



Blue = friends; orange = acquaintances; yellow = strangers; green = total

Figure 3.1 - Number of interactions with and without dog.

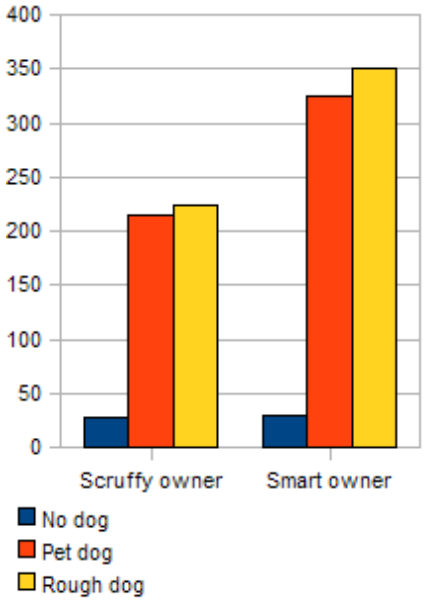


Figure 3.2 - Number of interactions in each condition.

3.3.1. Health Benefits of Pets

Pet ownership can enhance psychological and physical well-being. For example, pet owners in Australia were found to have a lower risk for cardiovascular disease than non-owners, especially for men over forty years old (Anderson et al 1992).

A number of studies have found that pet owners do better than non-owners on certain health measures, like higher survival rates after heart attack (Friedmann et al 1980), less use of GP services (Headey 1998), and general

well-being among older community-dwelling adults (Raina et al 1999) [5].

"Animal-assisted therapy" is the use of pets in a therapeutic way with humans (eg: to aid recovery from illness) (Levinson 1962).

Vaccari and Almeida (2007) found animal (eg: dog, guinea pig) visits to thirteen young children (3-6 years old) in a private Brazilian hospital was positive. All children interacted more with hospital staff after the animals' visits. While, for example, two children became more responsive to physiotherapy, and two children complained less about pain. The authors concluded:

> Animals' visits make children happy and help them, at least for some time, to forget the hospitalisation trauma. They have some good memories of the pets.
> The animals' company can, even temporarily, relieve pain, sadness and fears, and fill the emptiness of lonesomeness. It also fosters the development of positive feelings and the exchange of affection that can also be applied to strengthen bonds with human beings. The fun and distraction provided by pets has a remedial, balmy, and restoring effect (p115).

McNicholas et al (2005) outlined three possible relationships between pet ownership and health (figure 3.3):

i) No effect - The link is only a correlation, but other factors, like personality or economic status, actually cause the improvement in health not pet ownership. Most studies have controlled for such variables, so it seems that this relationship is not supported by evidence.

ii) Indirect effect - Pet ownership enhances social interactions with other people, and it is this that improves well-being and health. This is important for individuals at risk from social isolation.

iii) Direct effect - The presence of a pet reduces the perception of a stressful event and thus the effects of stress, and aids health in that way.

On the negative side, pet ownership can lead to disregarding or non-compliance with health advice if it involved giving up the pet as well as the distress of the

[5] However, other research has not supported the finding of less use of GP services (Parslow and Jorum 2003), or better well-being for older adults (Parslow et al 2005).

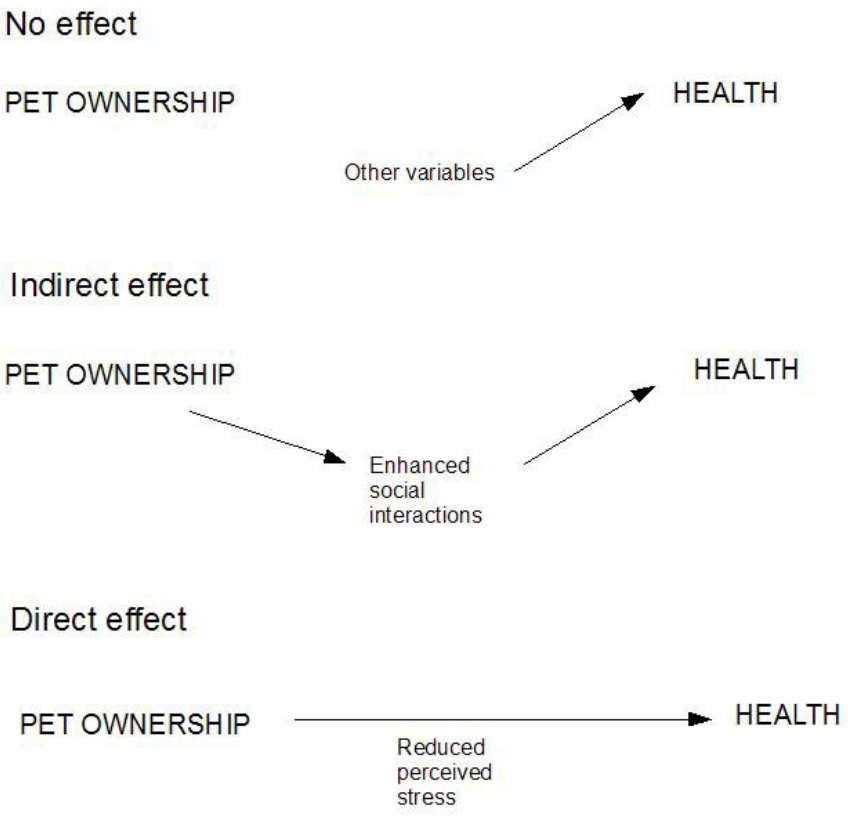


Figure 3.3 - Three possible relationships between pet ownership and health.

pet's death.

"The question of whether someone should own a pet is never as simple as whether that pet has a measurably beneficial or detrimental effect on the owner's physical health. The emotional bond between owner and pet can be as intense as that in many human relationships and may confer similar psychological benefits. Death of a pet can cause grief similar to that in human bereavement, whereas threat of loss of a pet may be met with blunt refusal and non-compliance with advice on health" (McNicholas et al 2005 p1252).

3.4. ATTACHMENT TO PET

There are different types of human attachment (Archer 1997):

- Child to parent - based on security seeking and protection.
- Parent to child - based on care-giving and protection.

- Adult to adult - both of above.

The relationship with a pet seems to mirror the parent to child attachment. Berryman et al (1985) used a repertory grid technique with thirty pet owners, who were asked to devise constructs (similarities and differences between them) for six humans and two pets (current and previous). The pets were viewed as similar to "own child".

However, dogs have been found to provide security as in the child to parent attachment. Thus, owners agreed with statements like, "When upset or anxious I turn to my dog for comfort", and "I enjoy feeling my dog sitting close to me" (Archer et al nd; quoted in Archer 1997).

The intensity of attachment to pets is hard to dispute based on the amount of money spent on them for their grooming and health care, buying them presents, feeding them "luxury" foods, and offering rewards when lost.

Katcher et al (1983) interviewed pet owners at a veterinary clinic with ten statements about attachment to their pets. For example, 48% defined their dog as a family member, 67% carried its photograph with them when separated, and 73% let it sleep in the bedroom.

The attachment strength is also seen in the grief shown at the loss of the pet, including seeking bereavement counselling as well as it contributing to psychiatric problems (Archer 1997). Archer and Winchester (1994) found that three-quarters of owners said that their thoughts kept returning to the bereaved pet, and two-thirds reported that specific other animals reminded them of their pet. These are symptoms shown in relation to human bereavement. But there was less depression or anxious among owners as compared to typical human bereavement.

3.5. EXPLANATIONS FOR PET OWNERSHIP

Archer (1997) outlined four possible explanations for pet ownership.

1. Inadequacy in person's relationships with humans.

This is the negative view that attachment to a pet compensates for a failure to develop adult relationships (eg: adult living alone who dotes on their pet).

Serpell (1986) argued that pet ownership is too

widespread throughout the modern world [6] and history [7] to be entirely explained in this way. In fact, individuals with secure attachments to other adults are those with the strongest attachment to their dogs, for example (Archer et al nd; quoted in Archer 1997).

2. Pet ownership as a product of modern Western living.

This is not supported by the evidence as the association between humans and dogs has a long history (ie: throughout the evolutionary history of humans).

However, the increase in single-person households in the West today does accentuate pet ownership and attachment (Archer 1997).

3. The beneficial consequence of pet ownership, like improved health and well-being.

From an evolutionary viewpoint, pet ownership and attachment is a maladaptive behaviour. "Pet ownership is a very common human activity, and people lavish much affection and money on their pets. From a Darwinian perspective, it is a puzzling form of behaviour, as it entails provisioning a member of another species, in return for which there are no apparent benefits connected to fitness" (Archer 1997 p237). But the health and well-being benefits may make pet ownership evolutionary adaptive (Serpell 1986).

In evolutionary theory there is the concept of social symbiosis (Wilson 1975) where two different species interact closely. This has three versions - mutualism (both species benefit equally), commensalism (one species benefits, but for the other the effect is neutral), and parasitism (one species benefits at the expense of the other). Table 3.1 applies these three types of social symbiosis to the dog.

Serpell (1986) argued for mutualism, whereas Archer (1997) pointed out that pets do not aid in the evolutionary fitness of humans (ie: in passing genes into the next generation).

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[6] For example, there are estimated to be 600 million cats as pets worldwide including 1 in 3 US households (Driscoll et al 2009).

[7] For example, cats as pets first appeared 10 000 years ago around the Eastern Mediterranean (Driscoll et al 2009). In terms of evolution, DNA studies have found that all domestic cats come from one of the five wildcat families, the Middle Eastern wildcat (Felis silvestris lybica) (Driscoll et al 2007).

TYPE OF SOCIAL SYMBIOSIS	BENEFIT TO DOG	BENEFIT TO OWNER
Mutualism	caring, feeding	exercise when walking, emotional attachment, protection
Commensalism	feeding on leftovers	no interest in dog
Parasitism	caring, feeding	cost of looking after

Table 3.1 - Three types of social symbiosis and dogs.

4. Pets as a special form of social parasitism.

Leading on from the last point, Archer (1997) saw pet ownership as parasitism (ie: pets benefit at the expense of humans). Pets succeed in this because they are able to manipulate the evolutionary response towards infants (ie: to trigger the release of parental feelings towards them). This is then reinforced by the relationship between the owner and the pet [8], and the tendency of humans to impute feelings and thoughts onto non-human animals and inanimate objects (anthropomorphism). The anthropomorphism is manifest in giving the pets individual names, feeding them from their own bowls, celebrating their birthdays, and even dressing them up like humans (Archer 1997).

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[8] The characteristics of pets that are rated highly by owners are dependence, source of fun, play, and relaxation with the absence of demands (Berryman et al 1985).

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