CHAPTER 6

THE USE OF ANIMALS IN THE PSYCHOLOGICAL AND BEHAVIOURAL SCIENCES

Introduction

6.1 The phrase 'psychological and behavioural sciences' is used throughout this chapter as a generic term to cover a number of diverse but partially overlapping fields of research. These include ethology, comparative psychology and physiological psychology.

6.2 Comparative psychology is that branch of psychology which deals with the comparison of behaviours of organisms of different species. Physiological psychology explores the physiological bases of behaviour including the anatomical structures and physiological processes which are related to psychological events and mental functions. The central nervous system and neurological processes are central areas of concern. Ethology is the study of animal behaviour:

> In addition to being a challenging science, worthwhile in itself in the same way in which other explorations of Nature have been, ethology is also increasingly assuming a practical role. In almost every case where man takes decisions concerning other animals - in zoos, wildlife refuges, laboratories - a knowledge of animal behaviour can aid his understanding of the problems. Whether the aim is exploitative (persuading poultry to lay the greatest number of eggs), concerned with welfare (assessing possible adverse effects of intensive indoor husbandry), 'pest' control (limiting the damage caused by the bearers of

> disease or by pests on food crops), or conservation (reserve management and design), the key to success often lies in a proper understanding of animal behaviour. Many ethological experiments are undertaken with the aim of solving a particular practical problem in fields like these ...[1]

Ethology is mainly dealt with in Chapter 8.

6.3 There are, however, difficulties in precisely defining the boundaries of the behavioural sciences in general and the discipline of psychology in particular.

6.4 Much of the research in the field of physiological psychology, for example, is similar to basic biomedical research. The University of Newcastle noted:

> The definitive line between these areas is not necessarily obvious because although psychological research is directed at the Central Nervous System (CNS) and the brain, the techniques are often common with other research areas.
>
> Thus in order to identify those projects involved in 'psychological and behavioural research' we include those studies which address questions concerning the function of the CNS and brain disorders and which incorporate any behavioural techniques including general observation.[2]

6.5 The scope of experimentation and the extent of its overlap with other areas of biomedical research is illustrated by the following six subject areas under which research projects in psychological and behavioural research carried out at the University of Newcastle during 1986-87 were classified:

- Behavioural Manipulation of the Immune System.
- The Pharmacology of the Drug Withdrawal Response.
- Hormonal and Neurochemical Effects of Psychological Stress.

- Biochemical Control of Sleep Patterns.
- Neural Basis of Visual Perception and Memory.
- Cortical Mechanisms Underlying Psychosis.[3]

6.6 Professor Bond from Macquarie University made a similar point:

> ... I think there is considerable evidence that many of the disorders that one sees are, in fact, physiologically-based and then often require animal research to tease out problems associated with them. I am thinking of things such as schizophrenia, manic-depression, the various dementias, Alzheimer's disease and movement disorders such as Parkinson's disease, disorders associated with substance abuse like Korsakoff's disease and so forth. The use of animal research in psychology in examining these sorts of problems has been both to have a look at what happens in normal situations and what happens in abnormal situations. In that respect I do not see them as standing outside, for example, other biomedical sciences.[4]

Extent of Psychological and Behavioural Research in Australia

6.7 The Australian Psychological Society submitted that most psychological and behavioural research conducted in Australia and overseas does not involve the use of animals. It stated:

> The use of infra-human animals in Australian psychology is not extensive. Indeed, research with animals, despite its theoretical impact, probably constitutes considerably less than 10% of published work. At an international level, 7.4% of papers abstracted in Psychological Abstracts in 1979 used animals as subjects.[5]

6.8 Experiments range from observation of animals in their natural state to experimental studies of the behaviour of animals which have been reared and maintained in laboratories. Laboratory studies extend from those which are relatively non-invasive (for example, studies of maternal behaviour in rats) through to those

which place animals in situations of varying levels of stress; studies of patterns of behaviour influenced experimentally by food deprivation or aversive stimuli (for example, by electric shock); and invasive studies which include pharmacological, surgical and other physical interventions.

6.9 As was noted in Chapter 2, comprehensive figures on animal experimentation in Australia are not available. The breakdown of figures collected by the Victorian Bureau of Animal Welfare provides, however, some indication of the extent of animal use in psychological and behavioural experiments within that State. The figures are set out in Tables 6.2 and 6.3 for the five years from July 1982 to June 1987. Table 6.1 covers only animals used for research purposes. The category of animals used for teaching purposes does not include a breakdown of the various subject areas in which animals are used.

Table 6.1: Animals Used in Psychological and Behavioural Research in Victoria by Techniques

Type of Vertebrate	Interference with special senses for behavioural studies					Interference with central nervous system other than special senses for behavioural studies					Use of aversive stimuli					Induction of psychological stress other than by aversive stimuli				
	1982–3	1983–4	1984–5	1985–6	1986–7	1982–3	1983–4	1984–5	1985–6	1986–7	1982–3	1983–4	1984–5	1985–6	1986–7	1982–3	1983–4	1984–5	1985–6	1986–7
Mouse	740	–	–	50	457	160	180	–	–	379	726	188	–	–	–	1	–	–	–	–
Rat	2,188	1,160	386	283	327	905	853	500	548	887	15	–	193	170	–	212	–	198	125	–
Guinea Pig	–	2	1	–	–	–	–	–	–	–	–	–	36	–	–	–	–	–	–	–
Other Rodent	4	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rabbit	–	–	7	–	–	–	50	12	15	4	67	–	–	–	–	–	–	–	4	–
Cat	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Dog	–	–	–	–	–	–	4	–	1	–	–	–	–	–	–	–	–	–	–	–
Other Carnivore	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–
Horse, Donkey	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bovine	40	–	–	–	–	–	–	9	–	–	–	–	–	–	–	–	–	–	–	–
Sheep	–	–	11	–	7	–	14	5	10	23	2	–	297	–	–	–	–	–	4	–
Goat	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	–	–	–	–	–
Deer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pig	–	–	124	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–
Other Ungulate	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Marsupial	6	6	–	12	–	–	20	–	–	5	–	–	–	–	–	–	–	–	–	–
Primate	–	–	–	–	–	2	–	–	2	–	–	–	–	–	–	–	–	–	1	–
Other Mammal	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Domestic Fowl	–	200	–	–	312	13,732	10,825	10,030	8,780	20,585	–	–	–	–	–	–	–	–	–	–
Other Domestic Poultry	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Other Birds	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10
Amphibian	–	–	1	–	–	–	–	–	–	–	25	–	–	–	–	–	–	–	–	–
TOTAL	2,978	1,368	533	347	1,103	14,799	11,946	10,556	9,356	21,885	835	225	526	170	8	213	–	198	134	10

SOURCE: Department of Agriculture and Rural Affairs. Statistics of Animal Experimentation, Victoria. June 1984, May 1985, September 1986, October 1987, December 1987. Extract from Table 8, Numbers of Animals Used by Type of Vertebrate and Special Techniques Used.

Table 6.2: Animals Used in Psychological and Behavioural Research in Victoria

	Annual Total
1982-3	18,825
1983-4	12,704
1984-5	13,358
1985-6	10,007
1986-7	23,006

Table 6.3: Experiments to Study Behaviour in Animals

Types of Vertebrate	1982-3	1983-4	1984-5	1985-6	1986-7
Mouse	951	2,513	-	200	150
Rat	1,304	796	314	1,001	922
Guinea Pig	-	-	76	2	25
Other Rodent	-	-	-	-	18
Rabbit	-	-	-	11	4
Cat	-	-	-	7	-
Dog	-	-	-	-	-
Other Carnivore	4	5	4	26	-
Horse, Donkey	-	-	-	-	-
Bovine	-	-	-	-	67
Sheep	-	19	324	119	411
Goat	-	-	-	80	210
Deer	-	-	-	-	-
Pig	12	24	50	33	490
Other Ungulate	-	-	-	-	-
Marsupial	34	50	105	53	71
Primate	-	-	-	-	-
Other Mammal	84	24	12	-	-
Domestic Fowl	1,185	550	-	-	366
Other Domestic Poultry	-	-	-	-	-
Other Bird	-	-	1	7	30
Amphibian	-	-	-	-	-
TOTAL	3,574	3,981	886	1,539	2,764

SOURCE: Department of Agriculture and Rural Affairs. Statistics of Animal Experimentation, Victoria. June 1984, May 1985, September 1986, October 1987, December 1987. Extract from Table 2 Numbers of animals used by type of vertebrate and major purpose of animal use.

6.10 The Committee received information through the AVCC from 15 Australian universities on the extent to which animals were used in research and teaching in the psychological and behavioural sciences. The numbers of animals used in those universities in 1986 and 1987 are tabulated in Table 6.4. Three out of the 15 universities were not involved in animal use for research and teaching in this field. Only four of the 15 universities used animals for teaching purposes in the psychological and behavioural sciences.

6.11 The increase in the number of animals used in 1987 was largely due to the increased use of chickens at La Trobe University. The experiments involving chickens were explained by Dr Coleman of La Trobe University:

> There is a research team in our department which is basically looking at the physiology of memory. What it has been doing is to develop a model of the phases through which the acquisition of information goes from short-term memory when it decays very quickly to permanent memory. Basically what the team is trying to do is to tease out what the physiological mechanisms of these are - which proteins are involved and so on. Each chick is only ever used once. It pecks once at something and that is it. That is why the numbers of units are so large.[6]

Table 6.4: Statistics of Animals Used in Teaching and Research in the Behavioural Sciences in Australian Universities

	1986	1987
Rats	8,940	8,486
Mice	1,816	3,262
Fish	50	192
Chickens	13,626	31,252
Birds	40	88
Australian Native Mammals	503	558
Cats	10	2
Rabbits	100	100
Guinea Pigs	220	171
Primates	10	10
Fish	5	5
Cattle	600	600
Sheep	600	600
Goats	600	600
TOTAL	27,120	45,926

SOURCE: AVCC (Universities for which statistics were not available were: University of Melbourne, University of Queensland, University of Western Australia, Murdoch University).

6.12 The Australian Association for Humane Research submitted to the Committee in May 1984 a survey of psychological and behavioural research conducted within Australia between 1966 and 1983. The survey was based upon a search of the Psycinfo computer data base which provides a coverage of the literature in psychology and the behavioural sciences. The experiments reported in the literature survey are classified by:

(a) species of animals used;
(b) type of experiments; and
(c) institution at which the study was conducted.

The information is reproduced in Tables 6.5, 6.6 and 6.7.

Table 6.5: Australian Behavioural Research Literature Survey 1966-1983 - Species of Animals and Numbers of Experiments

Species of Animals Used	Number of Experiments	Species of Animals Used	Number of Experiments
Rats	92	Mice	2
Pigs	2	Pigeons	1
Parrots	1	Octupii	1
Cattle	1	Spiny Anteater	1
Chickens	15	Fish	1
Dogs	2	Shrimp (fresh water)	1
Cats	4	Un-named	1

Table 6.6: Australian Behavioural Research Literature Survey 1966-1983 - Types of Experiments

Types of Experiments	
Avoidance Conditioning	83
Operant Conditioning	5
Aversive Conditioning	14
Escape Conditioning	5
Other	18
TOTAL	125

Table 6.7: Australian Behavioural Research Literature Survey 1966-1983 - Number of Experiments Performed at Various Institutions

Name	Number
Macquarie University	31
University of N.S.W.	8
Sydney University	5
Newcastle University	15
Queensland University	1
Australian National University	1
La Trobe University	20
Western Australia University	8
University of New England	4
Monash University	5
Melbourne University	1
Adelaide University	6
Flinders University	1
Otago University (N.Z.)	1
Animal Research Institute (Werribee, Vic.)	2
N.S.W. College of Paramedical Studies	2
Royal Childrens Hospital (Parkville, Vic.)	1
Secondary Teachers College (Melbourne, Vic.)	1
Lincoln Institute (Carlton, Vic.)	2
Psychiatric Research Unit (Rozelle, N.S.W.)	2
Austin Hospital (Heidelberg, Vic.)	1
C.S.I.R.O. Division of Food Research (Sydney, N.S.W.)	1
Health Commission of N.S.W.	1
Australian Military Forces Research Report	1
Department of Agriculture (Perth, W.A.)	1
Division of Occupational Health (Lidcombe, N.S.W.)	2
Cumberland College of Health Sciences	1

The Use of Animals in Psychological and Behavioural Research

6.13 Proponents of the use of animals in this area of research presented similar arguments to those advanced in the previous chapter on biomedical research. They emphasised the benefits to both humans and other animals based on results derived from psychological and behavioural experiments.

6.14 The Australian Psychological Association submitted that animal research has provided the basis for the development of therapeutic techniques for the treatment of a wide range of psychopathologies. Teaching practices have also benefited from such experiments.

> In addition to therapeutic practice and models of psychopathology, principles of learning derived from animal research have profoundly influenced teaching practices. The influences include the use of positive reinforcement (reward) instead of punishment as the basis of effective teaching and classroom management and systems of programmed learning. More recently in Australia, animal research on classical conditioning has prompted a re-examination of certain problems that arise in teaching children to read, namely, the interference between pictures and words.[7]

6.15 Such experiments were viewed by the Society as being technically necessary or at least highly desirable if certain types of information were to be obtained. Developmental studies, in which age as a function of behaviour is examined, are an example of this category of experiment. This is because there are difficulties in doing developmental studies on humans. They are expensive; samples of different age groups have to be used; and there are various cultural factors which add to the variables which may distort the results. Because of the short life span of animals, longitudinal studies over the life of animals can be done, reducing the risk of variables, other than age, affecting the results. Experiments on animals can also be done in an environment which removes cultural differences from among individual animals.[8]

6.16 Another argument supporting the use of animals in behavioural research by the Australian Psychological Society was that:

> Many hypotheses about human behaviour are derived from research with animals that could not be performed with humans. For example, animal research has frequently been able to model a variety of psychological problems (e.g., psychopathology, addiction) which occur in humans. Research of this kind provides fundamental knowledge about the processes that are involved in a variety of disorders.[9]

6.17 The Australian Psychological Society also outlined in its submission the benefits for animals derived from experiments on animals, such as the non-lethal control of animals that are harmful to crops, improvements in the care of farm animals and 'the design of optimal captive environments for the protection and breeding of endangered species'.[10]

6.18 The Society submitted that human benefits from psychological experiments on animals ranged from the application of behaviour therapy and behaviour modification to treat various disorders including enuresis, phobias, anxiety, anorexia nervosa amd stuttering. These techniques are also used in connection with sexual dysfunctions, disorders of conduct and self care in psychiatric institutions.[11]

6.19 Many types of psychological and behavioural experiments mentioned above by the APS are not and have not been conducted in Australia. They were put forward as a general case supporting the use of animals in psychological and behavioural research.

6.20 Some pyschologists deny that experiments involving animal behaviour are at all relevant to human psychology.[12] ANZFAS submitted that it:

> ... questions the principle underlying the reasons for using animals in psychology research, that is, that interference and modification of animal behaviour patterns constitute a suitable model for the study and treatment of human behavioural problems.

> Finally, it may be noted that the humanistic school of psychology, which involves counselling of individuals, does not make use of the results of animal experimentation and opposes the theory of the behaviourist school. Techniques of the humanistic school are appropriate to many neuroses, addiction and anxieties, etc.[13]

6.21 The use of animals in psychological and behavioural research has been questioned, not only on the grounds of the humane treatment of the animals, but also in what Andrew Rowan refers to as 'the psychologist's paradox'.

> Since we should, if consistent, confer moral worth according to some property (or properties) of the organism's nervous system, then the more suitable the animal is as a model of the human psyche, the greater should be the attention to the ethical issues relating to the research. The paradox boils down to this - the better the animal is as a model of the human psyche, the more restricted its use should be. As a result of this paradox, psychologists using animal models to gain insight into human psychology must show:
>
> 1) that the animal is being studied in a manner that does not raise moral issues, using human criteria as a guide but not necessarily as absolute standards; or
> 2) that the animal is sufficiently different from human beings in its psychological and mental makeup to create no moral problems and that it is still a relevant model for learning about a particular question in human psychology; or
> 3) that the animal's psyche has relevant similarities to the human psyche, but that this does not create a moral problem.[14]

6.22 This view was not accepted by some scientists. Addressing this 'paradox', Dr Bond told the Committee that he assumed that the ethical standards remained the same for all animals and that standards did not vary according to the similarities between various animals and humans. He also did not believe that experiments on particular animals were conducted

just because of similarities between those species and humans. Sometimes a species is chosen because of the differences between it and humans in order to get a broader view of the subject. He added, however, that if a species were 'a totally unreasonable model, then of course it should not be employed'.[15]

6.23 The manner in which animals are used in psychological research has been strongly criticised. The issue of pain and stress was raised in the ANZFAS submission and a number of examples of experiments conducted within Australian institutions in recent years were cited. These included use of electric shocks to study aversive behaviour[16]; administration of substances subjected to abuse by humans[17]; and aggression research.[18]

6.24 The actual extent of pain caused in the procedures involving the use of electric shocks was queried by experimenters representing the Australian Psychological Society.[19] They pointed out that the effect on the animal depended not just on the intensity but also on duration and other factors. They argued that in aversive experiments in Australia, low intensity shocks have been used.

6.25 As mentioned earlier, there are various forms of psychological and behavioural experiments, ranging from observational to invasive or aversive conditioning experiments. Some of these experiments overlap with biomedical, agricultural or veterinary research. The levels of pain or distress caused to animals by these experiments range from insignificant to severe. It is not possible, therefore, to categorise psychological or behavioural experiments as an homogeneous whole. Similarly, the recommendation by ANZFAS that psychological experiments be banned by legislation is inappropriate.

6.26 From the evidence available, it appears that there is a greater awareness by scientists that some types of experiments are either unacceptable to the public or are no longer regarded as necessary from a scientific point of view. It also seems that greater use is also being made of alternatives in the teaching of psychology.

6.27 The Committee concludes that although it does not believe that a ban on psychological or behavioural experiments is justified, each protocol involving such experiments should be considered carefully by the relevant ethics committee and funding body to determine whether the project is necessary and whether it conforms to the Code of Practice. Although it is inappropriate to use humans in some psychological and behavioural experiments, consideration should always be given to their use. Liaison between animal and human ethics committees in such cases would be desirable.