

## Psychopathology in Animals<sup>1</sup>

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Animal models in physical medicine are common and they are equally necessary in psychological medicine. Just as natural animal afflictions assist medical practice so might natural animal behavioural anomalies assist psychological investigations. This paper cites case illustrations from several sources of animal behaviour disorders.

The case for the study of animal models in medicine has been vigorously argued by Gay (1967), and Leader (1969) reports several examples of their value. Criteria for valid animal models of psychopathology are given by Ellison (1979) and Seligman (1975), and the relevance of animal studies for theories of human neurosis has been argued by Wolpe (1967) and Hinde (1962). Mostly these arguments and criteria pertain to laboratory-created models but, as Leader (1967) notes, natural animal afflictions can also illuminate human disease processes.

For psychopathology also it is instructive to seek similarities between natural animal and human afflictions. In this paper I shall illustrate with examples from farms and zoos, from the wild and the home, and from normal laboratory studies, animal psychopathologies that were not intentionally created. I do not propose to argue about definitions of abnormality, either in animals (Ferguson, 1968) or in humans (Mowrer, 1950), or about alternatives to the medical

model of aberrant behaviour (Siegler & Osmond, 1974). I use psychopathology purely for descriptive convenience.

### 1. Farms and zoos

Among farm animals, "Chadiot mentions the case of a 1½-year-old dog which was accustomed to play in the fowl house with the hens and acquired the habit of having sexual connection with them . . . Most of the hens so misused were killed; only one allowed itself to be raped with equanimity". (Hutyra, Merek & Manninger, 1949, p. 477), and there are reports of intromission phobia in the bull (Fraser, 1957), hysteria in hens (Sanger & Hamdy, 1962), neurosis (Croft, 1951) and tonic immobility (Fraser, 1960), in goats, horses and cows, and gastric ulcers in domestic pigs (Blackshaw, 1978). Discussing psychosomatics in veterinary medicine, Chertok and Fontaine (1963) include collective epilepsy among dogs; nymphomania in cats; post-emotional trauma in horses, dogs and cats; metabolic and endocrine disorders in pedigree bitches; gastric and duodenal ulcers in pigs; dyspepsia, anorexia and paroxysmal hypotonia in dogs and cats; as well as impotence in the bull and pseudopregnancy in the rat. To these, Brion (1964) and Levy (1944) add a variety of spontaneous animal tics, convulsions and seizures. Table I is a condensation of

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Table 1  
*Functional nervous diseases in animals\**

1. Dizziness (vertigo) in horses and dogs.
2. Epilepsy (falling sickness) in dogs.
3. Tetany (muscular spasms) in various animals.
4. Catalepsy, e.g., convulsions, muscular plasticity in cows.
5. Neuroses of pregnancy, parturition and lactation; milk fever (coma).
6. Chorea, complex involuntary arrhythmic muscular movements.
7. Twitch spasms (tics).
8. Muscular tremors.
9. Psychoses: feeble-mindedness
  - traumatic dementia
  - staggers in horses
  - fainting fits in goats
  - mass panic in herds (stampeding)
  - hysteria in dogs (fright disease, running fits)
  - degenerative psychopathic constitution (sex perversions)

\* Condensed from Hutyra, Marek & Manninger, *Special pathology and therapeutics of the diseases of domestic animals*, Vol. 111, 1949.

several more "functional nervous diseases in animals" described in a standard textbook of veterinary medicine.

With regard to animals in zoos, Meyer-Holzappel (1968) lists a variety of animal abnormalities, including repetitive stereotypic movements and non-adaptive escape reactions, which she interprets as the result of thwarted flight reactions on the one hand and undeveloped social learning on the other. Laboratory support for these interpretations appears in the form of cage stereotypes (Berkson, 1967) that result from isolation-rearing (Cross & Harlow, 1965), which prevents social learning, and from confinement in small cages (Draper & Bernstein, 1963), which prevents the possibility of flight.

Ellenberger (1960) draws on animal-human parallel based upon observations of captive animals in zoos and humans confined in hospitals and prisons. He distinguishes between the disease processes for which patients are hospitalized in the first place, and the reactions of the patients to the hospital environment after admission. Unlike Seligman (1975), who claims a parallel between an animal and a human disease process, Ellenberger claims a parallel be-

tween animal and human reactions to a common situation—confinement. The value of the comparison is not so much in the identification of common animal and human psychopathologies but in the differentiation of manifestations of reactions to hospitalization from those responsible for hospitalization. If psychiatric diagnosis is a desirable enterprise (Kendell, 1975) then this differentiation is an essential pre-requisite for improving reliability and validity.

Ellenberger selects four characteristics of zoo animal behaviours for comparison with human confinement reactions. These are (a) *captivity trauma*, exemplified by acute agitation, prolonged stupor and refusal to eat; (b) nestling, or the establishment of a territory; (c) *social competition and frustration syndromes*, as in the formation of dominance patterns and age and sex inter-relationships; and (d) *emotional deterioration*, expressed as repetitive stereotyped movements, like pacing and swaying, coprophagia, and signs of apathy and depression. Comparable human responses to commitment, either to hospital or to prison, are listed as: (a) anger, withdrawal and negativism, as the human counterpart of the trauma of captivity; (b) the hospital patients' nestling into the hospital as a home, with particular seating and eating locations, as the human equivalent of territoriality in animals; (c) interpersonal jealousies and pettiness as frustration syndromes, and (d) "alienation" in the form of infantile regressions, catatonic gestures, aggressiveness, agitation and delusions, corresponding to the emotional deterioration reported in animals.

As for particular cases, examples can be found among observations of animals in the wild, among household pets, among animals maintained in laboratories and field research stations, and as side effects of experiments using animals for the study of normal psychological processes.

The following are accounts of illustrative clinical cases, none of which was a result of a deliberate attempt to produce it. The cases illustrate natural animal behaviour disorders, although most of them appear under unnatural circumstances. They are examples of animal analogues of human behavioural

reactions, although they are not intended to be animal models of the human disabilities that in some cases they resemble.

### 2. *In the wild*

Merlin was a 6-year-old chimpanzee, orphaned at the age of three years, described by van Lawick-Goodall (1971). Merlin was "adopted" by his older sister Miff but failed to develop normally, socially, especially after a violent encounter with a dominant male.

#### CASE 1. *Merlin (Chimpanzee)*

"When he was four years old Merlin was far more submissive than other youngsters of that age: constantly he approached adults to ingratiate himself, turning repeatedly to present his rump, or crouching pant-grunting before them. At the other end of the scale, Merlin was extra-aggressive to other infants of his own age . . . As Merlin entered his sixth year his behaviour was becoming rapidly more abnormal. Sometimes he hung upside down . . . suspended almost motionless for several minutes at a time. Hunched up with his arms around his knees, he sat often rocking from side to side with wide open eyes . . ." (van Lawick-Goodall, 1971, p. 227).

This description of the behaviour of an orphaned chimpanzee in the wild resembles that exhibited by primates laboratory-raised in isolation. Mason (1968) describes a primate deprivation syndrome which includes *abnormal postures and movements*, like huddling and rocking, *motivational disturbances*, like the excessive fearfulness and aggressiveness of Merlin, *poor motor integration*, as shown in inadequate sexual performance, and *deficient social communication*. Among the latter are the inability to recognize dominance characteristics in others and to emit appropriate submissive and avoidance responses. Such deficiencies are apparent in Merlin's encounters with displaying males who, when threatened, he would run towards instead of to the safety of the group.

### 3. *Among pets*

The case of a pet chimpanzee, Lucy, has some affinities with that of Merlin, although neither deprivation nor trauma are involved. Lucy was raised in the home of a clinical

psychologist and as far as possible treated in the same way as a human child.

#### CASE 2. *Lucy (Chimpanzee)*

"Lucy rocks when frustrated . . . she will sit still and rock back and forth, her movements regular and repetitive, looking neither to the right nor to the left, staring straight ahead. She at these times exhibits a kind of repetitive behaviour often seen in autistic children . . . While this behaviour may have a self-stimulation function, it elicits a quick comforting response from her mother . . . When Lucy is locked in her room she may protest and rock, but the rocking disappears when Jane leaves, only to return when Lucy hears Jane's footsteps approaching." (Temerlin, 1975, p. 38, italics added).

This example suggests a differentiation between the origination and the maintenance of an anomalous behaviour, which is initiated by frustration but possibly maintained by the comforting response of the mother, which in turn is initiated by the rocking of the child and reinforced by its cessation.

Behaviour pathologies can also occur in more common household pets to the extent that Tuber, Hothersall and Voith (1974) have proposed a clinical psychology of animals. They illustrate their proposals with cases where psychological principles and procedures derived from normal animal research served to alleviate animal distress. Higgins is one such case:

#### CASE 3. *Higgins (Dog)*

"Higgins is an affable four-year-old Old English Sheep Dog of Goliath proportions whose tranquil demeanor was breached only by an intense fear of thunderstorms. At the first indication of an impending storm, Higgins would begin an accelerating pattern of aimless pacing, profuse salivation and marked panting which was rapidly climaxed by the hurtling of his 110-pound body against any obstacle in a futile attempt to escape." (1974, p. 763).

Higgins was "cured" by Wolpe's (1958) method of desensitization by counter-conditioning. A stereophonic reproduction of a thunderstorm was played to Higgins at increasingly louder intensities as he learned to

tolerate each intensity level without any signs of fear, and when a real thunderstorm occurred after several sessions "the owner reported that Higgins initially exhibited only a mild version of the original fear . . ." (Tuber *et al.*, 1974, p. 764). Additional cases of canine phobias and reactions to separation are discussed by Hothersall and Tuber (1979).

#### 4. *During care and maintenance*

Severe behavioural disturbances can occur in animals in zoos and laboratory stations as a result of routine management procedures. Hebb (1947) describes spontaneous neurosis in chimpanzees maintained in a research colony, and Stout and Snyder (1969) report ulcerative colitis and eventual death among Siamang gibbons separated and moved to unfamiliar quarters in zoos. The following cases of Dennis (Ferster, 1966), and Cupid (Tinklepaugh, 1928) also show unexpected effects of changes in sexual partners in a laboratory chimpanzee and a macaque monkey. The cases of Zagreb and Azov (Startsev, 1976) demonstrate effects of changes of quarters in Hamadryas baboons. The animals were moved from a smaller to a larger enclosure, which was in sight of older, more dominant animals. This, rather than confinement, was probably the source of the pathological reaction. In a laboratory study Ewing (1967) reported that subordinate members of pairs of cockroaches often die with no sign of physical injuries after attacks by dominant partners who ignore submissive postures.

#### CASE 4 *Dennis (Chimpanzee)*

"Although the goal in these experiments was to build and then analyze a complex cognitive repertoire, we occasionally made errors, as any parent might, which weakened the overall repertoire of an animal seriously. One such incident occurred when we were forced to replace the female of the pair . . . When we substituted another female the result was a profound disruption of the male's behaviour. He . . . bit her, pummelled her with fists, kicked her, or pushed her. He entered the work chambers fewer times than before and worked for shorter times whenever he did enter. For several weeks his food intake was less

than 80 per cent of normal. The quality of his work, when it occurred, was not impaired. We could have described Dennis as angry and depressed, and we would not have been too far off the mark . . . (Ferster, 1966).

#### CASE 5. *Cupid (Macaque Monkey)*

"Topsy was returned to Cupid's cage . . . and Psyche (his preferred mate) was taken out again. Cupid mounted Topsy and was about to copulate with her, when he jumped away from her and began biting his feet . . .

(Later) with no previous signs of anger or particular emotion, Cupid lurched to the end of his chain and began to bite himself. In a few seconds he tore huge jagged rents in his already lacerated legs. Then, as though in intense pain, he jumped into the writer's arms. He jumped down again and this time tore a three inch gash in his hip, ripped his scrotum open, lacerating and exposing one testicle . . .

During a period of about four months following the time of his self-mutilation, he frequently seemed to be in a state comparable to the depression of some psychoses."

(Tinklepaugh, 1928, p. 230).

#### CASE 6. *Zagreb (Baboon)*

"On August 7, 1965, (Zagreb and Ambarchik) were simultaneously transferred to a large cage . . . Outside the cage, separated by a transparent barrier, were several full grown males, who greeted their new young neighbours with threatening gestures and vocalizations . . . In the very first minutes both showed a gait disturbance characterized by incoordination and a posture with the knees half flexed . . . During the subsequent 3 days (Zagreb's) movements reflected a steadily progressive hypotonia: he sat continuously with arms extended and head sunk down between his knees . . . (Later) one of the animal handlers attempted to catch him . . . and he fell to the floor, struggled a short time, and died. A careful autopsy revealed no anatomical lesion to which one could attribute such severe motor impairment." (Startsev, 1976, pp. 131-132).

*CASE 7. Azov (Baboon)*

A hysterical motor disorder was produced in the baboon Azov under similar circumstances. He was transferred from a small home cage to a large cage, which contained a female and was located within view of several other mature males. He had shown brief spasmodic attacks previously under the stress of being driven from one side of the home cage to the other; but now he developed frequent and prolonged convulsive attacks with paresis and paralysis of quite a different character." (Startsev, 1976, pp. 134-135).

5. *As experimental side-effects*

In a sense the case of Dennis (Case 4) is an experimentally caused disturbance, but it was not an experimental procedure as such that disturbed the animal. In other cases unintentional effects have happened in experiments conducted for other specific purposes. The most famous one is Shenger-Krestovnikova's dog, Vampire, whose experimental neurosis, exemplified by disruption of established conditioned responses and emotional responses to the experiment, occurred after several weeks' study of a difficult discrimination during conditioning (Pavlov, 1927). A similar Russian finding occurred as a side-effect of a conditioning experiment on generalization (Yerofeeva, 1916).

*CASE 8. Vampire (Dog)*

The differentiation (between secretion to the circle or not to the ellipse) proceeded with some fluctuations, progressing at first more and more quickly, and then again slower, until an ellipse with ratio and semi-axes of 9:8 was reached. In this case, although a considerable degree of discrimination did develop, it was far from being complete. After three weeks of work upon this differentiation, not only did the discrimination fail to improve, but it became considerably worse, and finally disappeared altogether. *At the same time the whole behaviour of the animal underwent an abrupt change.* The hitherto quiet dog began to squeal in its stand, kept wriggling about, tore off with its teeth the apparatus for mechanical stimulation of the skin, and bit through the tubes con-

necting the animal's room with the observer, a behaviour which never happened before. On being taken into the experimental room the dog now barked violently, which was also contrary to its usual custom; in short it presented all the symptoms of a condition of acute neurosis. (Pavlov, 1927, p. 291, italics added).

Another early example of anomalous behaviour as an experimental side-effect occurred in a "Kasper Hauser" experiment described by Katz (1937). Kasper Hauser was a mysterious Austrian youth raised to maturity in social isolation, and his name is sometimes given to studies of maturation without training.

*CASE 9. Katz's "Kasper Hauser" Chick*

"... freshly incubated chicks were removed directly from the incubator to a warm illuminated box where they were watered and fed in total isolation to study the effects of maturation without training on behaviour. But, according to Brückner's account, after a week in isolation, the chicks began chasing stray flies "as if possessed". One chick ran back and forth knocking two or three times at the front and back walls of the box at each visit, and another, when offered a worm, "seized it with its beak, turned around as though other chicks wanted to snatch the worm away and ran in a circle much the same as if in a real chase..." (Katz, 1937, 217-218).

The next case involves a behaviour commonly observed in autistic children. The animal had been separated from its mother at birth and had been reared in a restricted visual environment. The experiment in which it was partaking was to do with visual reinforcement of a simple learned behaviour.

*CASE 10. Head Banging in a Rhesus Monkey*

"When the subject was 1 year old, the experimenter began training him to enter a transfer cage... The cage training took about 10 minutes each day. However, on 2 subsequent days, the door of the transfer cage accidentally dropped on the subject, glancing off his head and shoulders... After this, the introduction of the transfer

cage into his home cage was correlated with very emotional behaviour: refusal to enter the transfer cage, even when very hungry, biting of the cage door; racing out of the cage, crouching, rocking, and head banging. He would sit in the left rear corner of the cage and rhythmically bang his head against the plastic wall of the cage . . . An attempt was made to desensitize him to the transfer cage by extended, benign, and careful handling by a second experimenter, with little success." (Levison, 1970, p. 325).

The illustrations of anomalous behaviour as experimental side-effects given so far are from experiments on discrimination, generalization, complex learning and isolation rearing. In no instances were aversive situations deliberately employed. When aversive stimuli are employed in experiments, anomalous behaviours may appear in several ways, from self-punishment through freezing to schedule-induced aggression (Davis, 1979). With self-punishment, animals may respond so as to give themselves electric shocks (McKearney, 1968) or continue to traverse a punished route when an unpunished option is provided (Brown, 1969). Freezing occurs during shock-escape or shock-avoidance studies with rats to the extent that the animals hold down a lever and receive electric shocks when they need only release and repress the lever to ward off shocks entirely.

An extreme example is reported by Davis (1977). The case involves lever holding (freezing) by one of a pair of rats in a situation designed to elicit schedule-induced aggression, where the barholding behaviour borders on tonic immobility:

*CASE 11. Davis's catatonic rat*

"During one such bout of aggression, the more submissive animal remained "frozen" on its back with its right front paw extended. After . . . several shocks in this position we became concerned for the animal's safety and terminated the session . . . (W)hen a nose twitch revealed that some degree of life remained, we carefully placed our still-frozen subject, right side up, back on the grids. His extended front paw fit perfectly over the lever and re-

sulted in a leverpress and hold which lasted for several trials after the session resumed." (Davis, 1977, p. 236).

Other examples of anomalous behaviours generated as by-products of normal behavioural experiments are audiogenic seizures and schedule-induced polydipsia in rats. Audiogenic seizures were incidental discoveries when airblasts were used to force rats to respond to insoluble problems in Lashley jumping stands (Finger, 1947). Schedule-induced polydipsia was likewise discovered accidentally during experiments on the physiological determinants of normal thirst (Falk, 1961). In the former case rats exhibited tonic-clonic seizures to high frequency noises; in the second they imbibed excessive quantities of water when subjected to periodic feeding with small meals. These anomalous behaviours may be regarded as analogues of human epilepsy (Auer & Smith, 1940) and alcoholism (Gilbert, 1976), respectively, or they may be analyzed as legitimate behavioural characteristics of laboratory animals in their own right (Keehn, 1979; Kruchinskii, 1962).

In either event there is no shortage of examples of natural psychopathologies in animals that resemble both in form and in origination psychopathologies of human children and adults. These examples offer encouragement to seekers of animal models of human disorders (Keehn, 1979; Maser & Seligman, 1977) both with respect to the validity of the enterprise for human purposes and also for the benefit of afflicted animals. Such is the case with Higgins (Case 3) who was treated with a method based on experimental work with cats.

### Conclusion

I have provided examples of animal psychopathologies ranging from unconfinement in the wild through domesticated animals and pets to animals confined in laboratories and zoos. I have mentioned anomalous behaviours peculiar to laboratory animals and noted that animal-human similarities often occur, but I have omitted consideration of animal models deliberately created as analogues of human mental illness. It has become fashionable lately to criticize animal

experimentation in psychology both as cruel and as fallacious, and there are undoubted instances of suffering in experimental animals. But researchers in this field are no less aware of their moral obligations (Marcuse & Pear, 1979) than are psychologists in other fields (Keehn, 1982) and considerable experimental effort is directed to animal welfare (Kilgour, 1978; McDonald & Dawkins, 1981). Many of my case examples illustrate the need for this.

Concerning fallacy, Bannister (1981) argues that animal experimentation in psychology is fallacious because psychology should be about human experience not about mankind's animal nature. This anthropocentric view is not new, nor is it notable for promoting kindness to animals (Evans, 1898). To argue for animal experimentation in abnormal psychology merely for the sake of human happiness is itself anthropocentric and can lead to the abuse of animals in research. But if we recall that humans are not alone in suffering from "functional nervous diseases" it is possible to engage in animal experimentation in psychopathology that is neither fallacious nor cruel.

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