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Robert A. Hinde

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The biological perspective

ANIMALS AND HUMANS

The two principle themes in this book are closely inter-related. One involves the view that full understanding of human nature requires the judicious use of a biological perspective, though this is not to be understood as one involving direct comparisons between man and animals, or as one concerned merely with the evolution¹ of behaviour. The second is that the integration of biological with more conventional approaches requires clearer understanding of the relations between successive levels of human social complexity than have been apparent in the writings of biologists, or indeed of many social scientists, in the past. This chapter introduces the first of these themes.

Many social scientists are, with some justice, resistant to the view that studies of animals can contribute to the understanding of human behaviour. Much of this book is concerned, not with proving them wrong, but with showing that they are only partially correct, and with specifying the sorts of contributions that ethology can make, in certain limited but important ways, to the human social sciences. Indeed it goes further than that, for the argument implies that a view of mankind that neglects the biological perspective is necessarily not merely impoverished but also inaccurate. It should be taken as a plea for what is (at any rate in the author's opinion) a balanced view, a view that rejects on the one hand biological determinism, and on the other the insistence by some social scientists that we are above biology.

Although parts of this book apply principles derived from an animal-based ethology to our own species, for most readers it will be unnecessary to emphasize that human behaviour is much more complex than, and in some ways fundamentally different from, that of any animal. However,

¹ In this book the term 'evolution' is used in a biological sense, and implies genetic changes. Social scientists often use it more broadly to refer to any form of directed change.

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misunderstandings do arise, and it seems worthwhile to devote part of this first chapter to considering some limitations of ethology, which has its roots in the study of animal behaviour, for the understanding of human behaviour. Much of the rest of the book is concerned with the contributions it can make.

(i) Differences in cognitive abilities

The first and obvious issue is that human cognitive abilities are very much superior to those of any animal. The increased brain size and longer period of development permits greater phenotypic (including behavioural) variability, and thus more capacity to adapt to circumstances (Changeux, 1983). More importantly, every human group has a spoken language much more complex than the signal system of any animal, and this in itself sets humans apart from all other species. The capacity for language has further consequences for cognition, permitting the individual to manipulate symbols in a manner that would not be possible without language. Indeed it is a reasonable assumption that, in adult humans, all behaviour is in some sense social, since it depends upon internalized previous social experience. Furthermore language permits communication with other individuals about events distant in space and time and, perhaps even more important, about their own thoughts and feelings (Humphrey, 1986; Burling, 1986). This last capacity provides further opportunities for cognitive development through understanding of the difficulties experienced or solutions achieved by others.

No animals show behaviour approaching this complexity. Of course all animal species are capable of inter-individual communication, and it may be that the higher apes are capable of a degree of symbolic communication that approaches in some limited respects human language. Chimpanzees have been taught a sign language in which words are represented by gestures of the hand and arm, and are able to combine signs into 2–5 word sequences (e.g. Fouts, 1975). A chimpanzee has learned to use 120 plastic shapes to represent words (Premack, 1978) and another has learned an artificial grammar through a computer keyboard which displayed word symbols on a screen (Rumbaugh, 1977). However their abilities are limited, especially in the capacity to coin new phrases (e.g. Terrace, 1979), and there is no evidence that any animal has a linguistic ability comparable to our own. Although research continues to reveal new subtleties in the behaviour of many species, and it is clear that some operate at a much more complex cognitive level than has been suspected hitherto (e.g. de Waal, 1982; Kummer, 1982; Goodall, 1986), yet none comes near the human level.

This difference in cognitive level means not only that men and women

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do things that animals cannot do, but also that apparent similarities between human and animal behaviour can be deceptive. For example, parallels have been drawn over the effects of crowding. High densities can bring a deterioration of behaviour, and inter-individual aggression, in both rats and humans. However, the extent to which an individual human is affected by crowded conditions is markedly influenced by how much sense he can make of the situation. In an ingenious experiment Chandler (1985) placed children armed with rulers in a small room and asked them to arrange themselves in order of height. The groups contained children at different stages of cognitive development. Some had as yet no notion of relative size. Others could order by magnitude objects that could be directly compared, and successfully seriate by height things that could be stood back to back. Yet others were capable of unit measurement, being able to use rulers to assess the relative size of objects that could not be compared directly. The experiment was conducted under two conditions – namely with a flat floor and with a floor with a number of irregular steps in it so that it was at several levels. The children were more disturbed (as assessed by a variety of psychological and physiological measures) in the latter situation than in the former. But how disturbed they were was related also to their level of cognitive development. Children experiencing an irregular floor who lacked unit measurement skills failed in their efforts to find or recognize their place in the emerging social organization, and experienced the room as crowded. In brief, experience of crowding was related to how much sense they could make of the situation. Now making sense of the situation may be important also to rats, but the issue has been totally neglected in animal experiments, perhaps because the sort of sense rats can or do make of such a situation is likely to be very different from the children's, and in any case there is no clear way for us to find out about it. Thus simple comparisons are likely to be misleading.

(ii) Culture

The second issue, closely related to the last and indeed depending on the capacity for language, is the possession of discrete 'cultures'. The precise definition of culture is notoriously difficult (see note 2). When we talk about human cultures, we refer to differences between societies in such matters as the tools and other artefacts made, their knowledge of and beliefs about nature, their cosmology, customs, values, laws and so on. These are matters that, by or large, do not apply to animals, and we can thus speak of the possession of 'culture' as being a uniquely human attribute. Of course this does not imply that 'culture' is uniform across human groups: indeed it is better regarded as a convenient label for many

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of the diverse ways in which human practices and beliefs *differ between groups*.

Biologists sometimes claim a sort of proto-culture for animal species on the grounds that they have traditions, concerning for instance methods of obtaining food, that are passed on from individual to individual. A frequently cited example is the troop of Japanese monkeys in which one individual 'invented' a technique for washing sand off potatoes, and another technique for separating grain from sand by throwing it onto the surface of the sea and allowing the sand to sink: these techniques spread through the troop and are being handed down to successive generations (Kawamura, 1963). Again, the making of tools, formerly regarded as a specifically human ability, is well-known in chimpanzees and other species (Goodall, 1986). Furthermore tool use requires a great deal of practice (Schiller, 1957) and chimpanzee groups differ in the sorts of tools that they make and use: for instance the use of hammer and anvil to open palm nuts, widespread in parts of West Africa, is unknown at the Gombe Stream in Tanzania (McGrew, 1985). But the existence of these traditions (see also Mainardi, 1980) does not imply culture in the sense in which human societies have cultures.²

² A terminological note is necessary. Culture is used in this book to refer to those ways in which human social groups (or sub-groups) (see footnote p. 24) differ that are communicated between individuals. For instance the capacity for a spoken language is not a cultural phenomenon, but differences between languages are. It is acknowledged that there is a potential difficulty in putting the emphasis on differences because, by this definition, a characteristic possessed by all groups except one would be a cultural characteristic, whilst a characteristic possessed by every single group would not. However this purely theoretical difficulty is of minor importance compared with those that arise from ascribing a particular mechanism (such as learning) to the acquisition of cultural characteristics. For instance, if there were common features of all languages that owed their existence to the fact that gravity acts 'downwards', or that causes precede effects (in so far as that is not a matter of definition), these features of languages would not be aspects of culture even though learning were involved in their acquisition.

'Culture' can be used in a descriptive sense, to refer to the artefacts, customs, institutions, myths etc. as described by an outsider (or indeed by a member of the society). Such a description, however, tends to imply a static whole external to individuals. In practice culture is best viewed as existing in the minds (separately or collectively) of the individuals of a society and as in a continuous process of creation through the activities of individuals in their relationships. Of course individuals differ somewhat in their perceptions of the customs and so on of their society, and those differences can be an important source of creative change (cf Goody, in press; Barth, in press). Whilst 'culture' often refers to features common to all (or most) individuals, it must not be forgotten that aspects of the culture may be the special responsibility of particular categories of individuals. With this admittedly mentalistic view, the actual artefacts, institutions, myths etc. are seen as expressions of the culture. Of course they may in turn act back upon and influence culture in the minds of individuals.

The customs, institutions, myths etc. of a society are inter-related in diverse ways (see Chapters 8 & 9). Thus here the whole – the parts and relations between them – are referred to as the 'Sociocultural structure'. Again, the sociocultural structure can be described, but it is not an entity and exists only in the minds of individuals (at least in non-literate societies: the

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Thus the human language-based capacity for culture has consequences much more fundamental than those of these animal traditions, affecting virtually all aspects of our behaviour and experience. The manner in which we perceive the world depends upon acculturation within the society in which grew up. The particular language used in that society plays a major role in the manner in which we group our percepts into categories. Language-based culture permits the members of each group to share linguistic symbols that impose order on the world, and that classify natural phenomena in ways that are more or less specific to that group, and different from those found in other groups. Language-based culture permits the concepts thus formed to be manipulated to make higher-order concepts, including deities and fictitious creatures and myths that have no direct correspondence with the real world. Furthermore the belief systems that unite these concepts and relate them to behaviour in the real world are adjusted to minimize contradictions – at least within each of the several domains of life (cf Goodenough, 1963). (But, to anticipate later chapters, nothing that is being said justifies a view of ‘culture’ as a force uniquely *determining* the nature of concepts, beliefs, etc.).

Perhaps most important of all, the language-based capacity for culture permits the labelling of relationships between individuals, and the classification of such relationships into types. This permits the existence of a limited set of roles, involving specified rights and duties, within institutions within each society. Thus ‘husband’ and ‘wife’ are roles, each with its specified rights and duties (some obligatory and some merely expected, and differing between societies), within the institution of marriage. In British society Prime Minister and Member of Parliament are roles in the institution of Parliament. Non-human species have no such roles or institutions. The term ‘role’ has sometimes been applied to non-human species to refer to individuals who perform a particular function with respect to the group as a whole – for instance, the ‘leadership role’ or the ‘lookout role’ (e.g. Gartlan, 1968). However in the human case ‘roles’ are internalized as goals and thus causes of behaviour (‘He tried to play the role of good husband’) as well as referring to the consequences. This implies an ability to conceptualize the role, and there is as yet no substantial evidence that such an ability is shared by

advent of literacy is likely to be an important issue here (Goody, 1968)). Real-life relationships within the group may or may not have counterparts in the socio-cultural structure, and idealised relationships in the socio-cultural structure may be realised to only a limited extent in actuality. The socio-cultural structure as perceived in the consciousness of individuals has a regulatory function. Thus the socio-cultural structure affects group structure, relationships and individuals. However, as we have noted, at the same time it is to be seen as continuously being created by the activities of individuals in their relationships.

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non-human species. Of course pairs are formed in non-human species, and in some cases their maintenance may be affected by their reproductive success, but this does not imply an institution of marriage with its constituent roles, each with their attendant rights and duties. Apparent similarities can be misleading, and thus great care is necessary in specifying where parallels can validly be drawn.

This problem arose in an acute form in the study of non-verbal communication. Human spoken language is accompanied by a variety of non-verbal signals that augment or qualify its meaning. Thus we may raise or lower our voice, accentuate certain words, gesticulate, raise our eyebrows and so on. In addition, we use non-vocal signals in the absence of words. We smile, frown and so on. Indeed we may use the two in association: the doctor who welcomes his patient with a smile and by rubbing his hands together as he says 'Well, what can I do for you?' is both making a genuine enquiry and conveying the message 'I'm a very competent doctor and you can trust yourself in my hands.' Now biologists have also been interested in non-verbal communication, for animals use postures, vocalizations and other signals in situations of aggression, courtship and so on. Inevitably, parallels were drawn between the non-verbal signals used by animals and humans. These parallels were reinforced by the finding that some human non-verbal signals, such as smiling and crying, develop normally in children born deaf and blind, so that imitation and most forms of learning cannot be essential to their development. Although most biologists were careful in their claims, acknowledging that 'Many of the expressive movements in man are certainly passed on by tradition' (Eibl-Eibesfeldt, 1972), others overstated the role of genetic factors and as a result some anthropologists fiercely resisted the view that there could be anything in common between animal and human signals. Thus Leach (1972) wrote "'Qui dit homme, dit langage, et qui dit langage, dit société' (Lévi-Strauss 1955; 421). This is a viewpoint which I share, and which leads me to an extreme scepticism about the alleged similarities between the communicative processes of men and other animals" (Leach 1972, p. 317).

Partial resolution came through a classification of human non-verbal signals by Ekman and Friesen (1969) which emphasized that some were pan-cultural, and developed independently of specific experience, in these respects resembling many (but not all) animal signals, whilst others were culture-specific or even idiosyncratic, and acquired by individual learning. Beyond that, even those that are pan-cultural may be modified by learning and all may carry culture-specific subtleties of meaning of a sort as yet unknown in animals (see pp. 87–98). Indeed many (and some would say all) human activities that at first sight appear to have merely

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practical significance also carry a symbolic meaning which can often be understood only in relation to the social experience of the individual and to the structure of the society. This means in turn that the analysis of behaviour in man is very much more complicated than in any animal: only rarely can behaviour in a social situation be interpreted in terms of a specific motivation.

Such issues are of particular importance in later chapters. We shall see that many of the misunderstandings between biologists and social scientists have been due to inadequate attention to the dialectical relations between characteristics of individuals, and especially their pan-cultural propensities, and the successive levels of social complexity.

(iii) The problem of diversity

The third limitation on the utility of animal/human comparisons arises from the very diversity of animal species and human cultures. There is a very large number of species of animals, each with a behavioural repertoire adapted to its own peculiar way of life. There is also a not inconsiderable number of human cultures. It is thus not too difficult to find parallels between animal and human data that will support practically any thesis. Straight comparisons between particular aspects of animal behaviour and particular human characteristics are almost bound to be misleading.

Indeed there is diversity to reckon with even within the species. Aggressive behaviour is a case in point. Some biologists have been happy to draw lessons about our own species from the study of animals. They forget that there is a variety of types of aggressive behaviour on both sides. Let us define as aggressive behaviour those behaviours directed towards causing harm to another individual. Most vertebrate species show aggressive behaviour in a variety of contexts – for instance in defence of territory, food, young, mates etc. The aggressive behaviour shown in each case may differ in a number of ways – in the eliciting situation, the motivating conditions, the motor patterns used, and so on (Moyer, 1968). Man also shows a variety of kinds of aggression. Amongst children, at least four types have been recognized: instrumental aggression, directed towards securing some object or situation; hostile or teasing aggression, with no such objective; defensive aggression appearing in response to an attack; and games aggression, escalating out of rough-and-tumble play. Again these differ in a variety of ways – the motivating circumstances, the methods used, their association with other types of behaviour in the individual, their ontogenetic course, and so on (Feshbach, 1970). In adults aggressive behaviour is even more diverse:

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indeed the diversity is so great that there is no general agreement as to how it should be categorized. One system for subdividing the use of violence by adults includes: instrumental or planned aggression; emotional aggression; felonious aggression, committed in the course of another crime; bizarre or psychopathic violence; and dyssocial violence, approved of by the reference group (Tinklenberg & Ochberg, 1981).

In view of this diversity, even if the differences in cognitive level are taken into account (see above), it is clear that generalizations between human and animal aggression must be treated with great caution. This is especially the case with discussions involving modern warfare. Aggressive disputes between groups of individuals are extremely rare in animals, though cases are known – some, indeed, in the higher primates (Goodall, 1986). Whether useful parallels can be drawn between these and war between non-industrialized human groups is at least problematic – though Durham (1976) has argued that the incidence of war in small stateless societies is compatible with the view that individuals maximize their survival and reproduction by participating in collective aggression when access to scarce resources is at stake. But parallels between war amongst such groups and war as now conceived in the western world would be totally erroneous. Aggressive disputes between neighbouring non-industrialized societies usually involve relatively small numbers of individuals, confronting each other face to face, with leaders often actively involved in the fray, and with the combatants on the two sides often personally known and even related to each other. A variety of mechanisms operate, though of course not invariably with full success, to minimize the number of casualties. Modern industrialized warfare, by contrast, is concerned with access to resources or to matters of national prestige or power that are only very distantly related to the life goals or to the immediate motivation of the individuals who do the fighting. It involves massive numbers of individuals, with participants on the two sides usually miles apart, and with their leaders occupying relatively safe positions far removed from the conflict. The brakes on killing that operate in hand to hand conflict, the inhibition produced by signs of surrender or suffering, are not present (Lorenz, 1966; see Chapter 8).

Of course, nothing that has been said here denies the existence of some common features in the different types of aggression shown by an animal species, or in the aggressive behaviour of different animal species, or indeed in some aspects of animal aggression and some aspects of human aggression. For instance, aggressive behaviour is often associated with fear, and is less subject to inhibitions when directed towards strangers, in many cases both animal and human. The point being made is that slick comparisons between animal and man may be misleading.

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A final issue concerns the difficulty of knowing the level of analysis at which to search for parallels between animal and human species. Thus some have sought for parallels at a global level, comparing for instance the human propensity to seek for exclusive group or individual rights over a particular area with animal territoriality, whilst others work at a lower level of analysis, for instance searching for animal models of the mechanisms of depression. In either case it is important to remember that superficial similarities in behavioural/psychological characteristics do *not necessarily* imply similar underlying mechanisms or similar functional significance. The converse, of course, is also true.

In yet other cases, the problem is to find the right level for making comparisons. An example is provided by some experiments on the effects of separating rhesus monkey infants from their mothers. These experiments were initiated at a time when children who had to go into hospital often saw little or nothing of their mothers for days or weeks at a time. It was suspected that such separations could have long-term adverse effects on psychological development, but the only evidence was retrospective: some teenagers with behaviour problems were found to have had separation experiences early in life. In view of the importance of the issue, an experimental attempt to demonstrate a causal link between early experience and subsequent behavioural disturbance seemed justified. In the initial experiments, mothers of 20–30 week rhesus monkey infants were removed from the groups in which they had been living for 6 days, and then returned. Although the infants continued to live in the same physical and social situation as before, apart from the absence of their mothers, some were severely affected. They went through phases of ‘protest’ (with much calling) and ‘despair’ (with lowered activity, sitting around in a hunched ‘depressed’ posture) comparable to those seen in human children. When the mother was returned, the mother–infant relationship returned only slowly and erratically to its previous course. Some consequences of the separation experience could be detected a year later. However, not all infants were affected equally: those with the more rejecting mothers suffered the more adverse consequences.

In later experiments the separation was performed the other way round, the infant being removed from the group to spend six days on his/her own, the mother staying with the group. In this case ‘protest’ lasted much longer, and ‘despair’ was delayed. Furthermore, on reunion the mother–infant relationship soon returned to its previous course.

Now although there are no precise data, this last finding is exactly the opposite from that which would be expected in the human case. A child

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left by his or her mother in familiar home surroundings with other family members would surely be less upset than a child taken out of its family and sent to a strange hospital (eg. Robertson, 1970). The monkey and human data seem to agree in showing that there could be long-term sequelae, but to disagree in the variables that are important.

However, the data can be reconciled at a different level of analysis. When the mother monkey was removed and then returned, she had to re-establish her relationships with her group companions as well as to cope with the demands of her infant. Because she had to devote herself to this additional task, the mother–infant relationship was re-established only slowly, and was sometimes permanently affected. When it was the infant that was removed, the mother had no such task and was much more prepared to devote herself to the demands of her infant when it was returned. Thus the greater effect on the infant in the former case can be ascribed to the greater disturbance to the mother–infant relationship. This is also in harmony with the individual differences within the ‘mother-removed’ group of monkeys: with the more rejecting mothers the mother–infant relationship was re-established with greater difficulty after reunion. Thus in the monkey case the re-establishment of the mother–infant relationship is a crucial variable (Hinde & McGinnis, 1977).

With human children, the child in hospital is (or was, with the hospital practices then current) largely deprived of relationships with adults previously familiar to him, whilst this is not true for most children who remain at home whilst their mothers go to hospital. Thus in so far as it is in fact the case that the effects of a mother leaving her child at home for a spell are less than those of sending a child to a strange place for a similar period (see Robertson, 1970), it is probably because important relationships are disrupted less. This would also be in harmony with the finding that a period of separation produces long-term effects only in psychosocially disadvantaged families (Rutter, 1972). Thus monkey and human data seem to disagree over the type of separation that produces the greater effect, but agree in that in both the most severe outcome is produced by those conditions of separation that most severely disrupt the mother–infant relationship. The monkey data highlight the importance of the mother’s emotional availability to the infant after reunion.

To summarize the argument so far, there are at least four issues that seem to make it improbable that studies of animals can contribute much to the understanding of human behaviour – man’s incomparably superior cognitive abilities, his possession of cultures specific to groups of individuals, the diversity of both animal species and human groups, and the difficulty of finding the appropriate level of analysis. These matters indicate that direct comparisons between animal and human behaviour