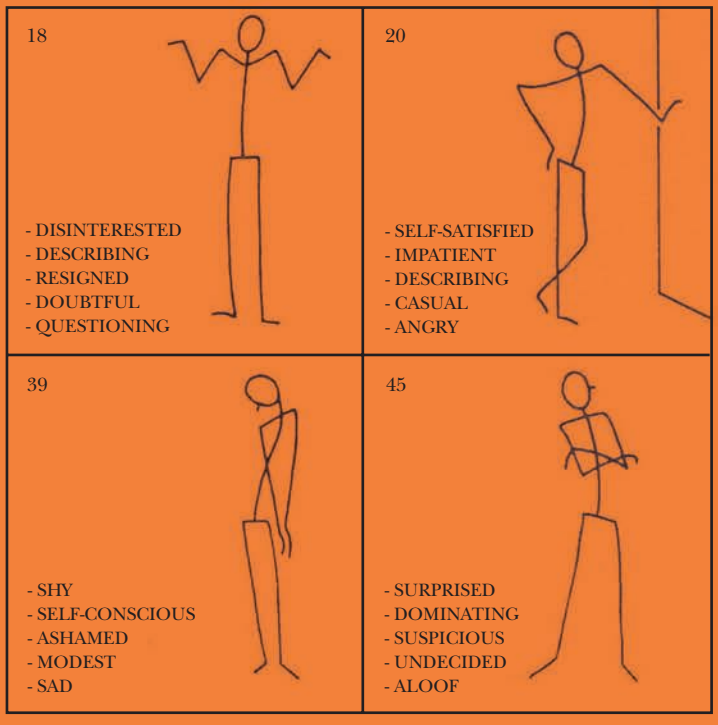
Social Interaction

Michael Argyle



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Preface

This book is intended as a textbook for students of social psychology and other social sciences. It covers some of the same ground as *The Psychology of Interpersonal Behaviour* but in considerably more detail.

The approach of this book differs from that of other books about social behaviour in two main ways. Firstly it analyses social behaviour in terms of the basic elements of interaction – bodily contact, proximity, orientation, gestures, facial expression, eye-movements, the verbal and non-verbal aspects of speech. Secondly it relates social interaction to its biological roots, and to the surrounding culture.

I have drawn freely from the writings of researchers in interpersonal psychiatry, primate ethology, anthropology, developmental psychology, organisational psychology, as well as those in experimental social psychology. I am particularly indebted to the pioneers of research into interaction and non-verbal communication – E. D. Chapple, J. R. Davitz, Paul Ekman, E. H. Erikson, Ralph Exline, Erving Goffman, E. T. Hall, Sidney Jourard, Albert Scheflen and T. R. Sarbin.

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I

Introduction

A NEW LOOK AT THE STUDY OF SOCIAL BEHAVIOUR

There seems to be widespread support for the view that man's achievements in the physical sciences and technology have outstripped his powers to control them, and that it is up to the biological and social sciences to provide the necessary understanding of human nature. It may be argued that the most pressing social problems are concerned with the relationships between people, and that these are an essential and central part of human nature. Human beings are reared in families, on which they are at first completely dependent, and in which they acquire most of their learnt behaviour. The death of a close relative is a deeply disturbing experience (Gorer, 1965) and can permanently impair the personality of other members. In all communities there is work to be done, to provide food and shelter, and to satisfy other needs; this work is always performed by cooperative working groups. Outside family and work, human beings at most stages of life seek the company and support of friends. Much individual unhappiness, including that caused by mental disorder, is associated with a breakdown of relationships with other people. Most social problems consist of the breakdown of communication, interaction and cooperation between different races or classes, or between groups at work.

For many years very little was known about the process of social interaction – there were no concepts to describe it or methods to study it. During the last few years several different groups of research workers have started to look at social behaviour in a new way. They have focused their attention on the sequence of events taking place during social interaction – at the level of bodily contact and proximity, facial expression, bodily posture and gesture, head movements and direction of gaze, the verbal and non-verbal contents of speech. They looked at what happens in social encounters in more detail, and in a more concrete way than had been attempted before. We now know how these

different elements function in social behaviour. The research has been carried out by workers in a number of different fields – experimental social psychology, psychotherapy research, anthropology, linguistics and animal behaviour. The advances in each of these fields are in some cases closely related, though the investigators were working quite independently. For example the research by experimental social psychologists on 'non-verbal communication' was carried out in ignorance of the work on signalling in non-human primates. Other groups have been in contact for some time. The link between work on human verbal communication and on non-verbal behaviour has hardly been made at all.

This work constitutes something of a 'new look' in the study of social behaviour. Parts of it have sometimes been referred to as 'human ethology', 'interpersonal psychiatry', 'kinesics' and 'paralinguistics'. In view of its interdisciplinary character, and since it is based on concrete interpersonal events, it is possible that it may contribute towards the integration of the biological and social sciences. Kuhn, in his account of *The Structure of Scientific Revolutions* (1962), points out that scientific advances are rarely produced by the refutation of earlier theories, but are brought about by groups of scientists working out alternative ways of studying or conceptualising the problems in question.

Social behaviour is often thought to be the special province of social psychology, yet some of the main advances have come from outside this field by workers in the other disciplines mentioned. It is the view of the present author that social psychology has become too isolated from other behavioural sciences, and has suffered by restricting itself too narrowly to 'social psychology' experiments and theories. A great impetus was given to social psychology by the development of experimental techniques for studying small social groups, and the early results were very interesting (cf. Cartwright and Zander, 1959; Hare, Borgatta and Bales, 1955). However, there are signs that this vein has been worked out. 'Cohesiveness' for example is a central variable here, and much of the research on small groups has been concerned with its causes and effects. Lott and Lott (1965) have produced a comprehensive review of it, from which it seems to this author that (a) little remains to be done, and (b) nothing very exciting has been found out. Mann (1967) comments:

> Ask a group therapist, a trainer, or a teacher what use he can make of the voluminous outpouring of empirical research on small groups. The unhappy fact is that many, if not most, of the potential consumers of such work feel that such research is constantly asking the wrong

questions in the wrong ways and that it is at best irrelevant and at worst inaccurate and misleading (p. 7).

Recent textbooks of social psychology take a very different approach from the 'new look' approach. They use rather abstract terms such as 'frequency of interaction' (regardless of what is said or done), and 'small social group' (regardless of whether this is a family, a work-group, etc.). Little is said about the actual behaviour taking place in social encounters. Contrasted with the new look approach they place most emphasis on laboratory experiments, often under highly artificial conditions.

Social behaviour occurs in animals and has evolutionary origins. Ethologists have been making careful, descriptive studies of animal behaviour for some time. Since about 1960 the earlier work of Tinbergen (1951) and Lorenz has been extended into field studies of the social behaviour of monkeys and apes (DeVore, 1965). The findings of this research are closely parallel to findings of new look research carried out on humans during the same period – for example showing the importance of non-verbal signals in regulating interpersonal relationships. The link with ethology is an important part of the new perspective – it draws attention to the evolutionary and instinctive roots of social behaviour, the sensory channels and methods of signalling used, and the biological and other drives which produce social interaction. It is this similarity which has led to the new look research being described as 'human ethology'. In so far as it involves the careful descriptive study of human interaction in more or less natural habitats, this is an accurate description, but it also includes a range of experimentation some of which would not be acceptable to ethologists proper.

There is one striking difference between the social behaviour of men and that of apes and monkeys – we use language, where they can only emit a small range of grunts, signalling emotion and interpersonal attitudes. Most human behaviour involves speech, but students of social behaviour until very recently have paid very little attention to the content of what is said, and have simply measured how long utterances lasted. Linguists on the other hand have paid no attention to the social setting of speech. New look research has been concerned with the two main channels used in human social interaction – hearing and vision – and the ways in which these are linked. Verbal communication depends in a number of ways on the accompanying non-verbal signals – for example to control the timing of utterances and to obtain feedback on what is being said.

Ethologists maintain that animals should be studied in their natural

habitats; however, much recent work in social psychology has used highly artificial laboratory situations which are unlike anything in the outside world. There is a particular objection to this for the study of human social behaviour: we learn to interact in a number of different kinds of social situation – in the family, at school, with friends, etc. – in each of which there are definite rules and role-relationships between the interactors. For this reason it is essential to study social behaviour in specific cultural settings. Sociology and anthropology have been concerned mainly with such uniformities of social behaviour, and these consist basically of interaction patterns. A social structure consists of regularities of social behaviour between people occupying different positions.

Psychologists, of various kinds, are concerned with human behaviour; social interaction is one of the most important kinds of human behaviour and must depend on the same neurophysiological and cognitive processes as other behaviour. Earlier approaches in psychology, emphasising rather elementary learning processes, were not very helpful to the study of social behaviour. However, certain advances in experimental psychology have provided a model of human behaviour that can embrace some, though not all, of the phenomena of interaction. One of the most important developments in recent years has been the rediscovery of the importance of cognitive processes in behaviour, for example of the verbal mediation of behaviour. Other developments of importance for the study of social interaction have been the study of motor skill and the physiological basis of motivation. Developmental psychologists have been interested in the childhood origin of social behaviour for some time; there have been important advances in this area, as well as links with animal behaviour (Foss, 1961–5).

Psychiatrists have become increasingly aware that mental disorder has interpersonal as well as biological origins, that many of the symptoms are in the sphere of interaction, and that various kinds of social treatment can be useful (Argyle, 1964b). Psychotherapy may or may not cure patients; it is however a dyadic situation which it has been possible to study in great detail and which has added enormously to our understanding of social interaction.

One of the main achievements of the new research has been to establish the basic elements of social behaviour, such as the different kinds of bodily posture and looking; these are described, together with the processes producing them, in Chapter III. The study of person perception has been held back by a failure to take account of the interactional content – of what people are trying to find out and the cues

which they use, in different social situations; this is discussed in Chapter IV. Much of the new look research has been carried out so far in 2-person interaction, and even here the sheer quantity of data soon becomes unmanageable; the work is reviewed in Chapter V. The impact of the new look on small social groups has been small so far; we have concentrated attention on non-laboratory groups and the main types of group in the outside world (Chapter VI). Much remains to be done too in the field of social organisations; the main developments have been concerned with interaction associated with leadership and role conflict (Chapter VII). Individual differences have been found in social interaction between different personalities, normal and abnormal, making a somewhat unexpected contribution to the study of personality – for example in producing some new dimensions which are needed to deal with interpersonal behaviour (Chapter VIII). Interaction is also affected in special ways by identity and self-image (Chapter IX). Some of the main practical applications of social interaction research are in the development of methods of training for professional social skill, for social competence in mental patients, and training schoolchildren to perform competently in everyday social situations (Chapter X).

THE DILEMMA OF EXPERIMENTAL RESEARCH

Experiments are devised in order to test hypotheses which cannot be tested in ordinary situations. This usually results in constructing a situation which is in some way simplified or stripped down, which may lack some essential features of the original situation, and which may produce types of behaviour that would not normally occur. Bannister (1966) protested against experiments in human experimental psychology:

> Experimental psychology presents one aspect of our paradox in its sharpest form. In order to behave like scientists we must construct situations in which our subjects are totally controlled, manipulated and measured. We must cut our subjects down to size. We construct situations in which they can behave as little like human beings as possible and we do this in order to allow ourselves to make statements about the nature of their humanity.
>
> It may be that an imprisoned, minuscule man is all we are capable of studying but let us acknowledge that we do miserable experiments because we lack the imagination to do better ones, not claim that these are scientifically ideal because they are simple minded (p. 24).

Research in experimental social psychology has sometimes gone even further – it has compelled people to behave not only like rats but like *solitary* rats. In order to eliminate interfering variables, subjects may be placed in separate cubicles and have to communicate by pressing buttons or passing notes. A visitor to a new laboratory which consisted largely of such cubicles said 'but I thought this was supposed to be a *social* psychology laboratory'. In several areas of research in social psychology there has been a gradual shift to ever more stripped-down kinds of experiment as investigators have tried to hold constant supposedly extraneous variables, by eliminating them. How does one find out what the essential elements are? Clearly not by experimental methods. Psychoanalysts and clinical psychologists have made important contributions to psychology in the past because their detailed descriptive studies have thrown light on important phenomena, which were later studied more rigorously by experiments. Anthropologists and ethologists have played a similar role in the study of social behaviour; their data is rich and detailed, whereas experiments restrict the variables and processes operating, and prevent things happening which fall outside the conceptual scheme of the experimenter. On the other hand experimental research clearly does have certain crucial advantages – experiments can show that variable X affects Y, rather than vice versa, or both being an effect of Z; experiments can disentangle which of several possible variables or processes is most important, by holding the others constant; and experiments can show the strength of relationships, their mathematical form, and the range of conditions under which they operate.

We shall discuss three ways in which the results of experimental research can be misleading or actually wrong, and then consider how hypothesis-testing research can be conducted to escape from the dilemma described above.

1. *Key elements and processes may be omitted.* The 'stripped-down' kind of experiment has a certain appeal – it seems to enable the testing of hypotheses in a highly controlled manner, where the experimental variable operates without the interference of other features of the situation. An example is experiments on the 'minimal social situation', where two subjects are placed in cubicles unaware of the existence of each other. Each can press two buttons of which one gives the other subject a shock and the second switches a red light on for the other subject, and gives him a point. The task is to get as large a score as possible (p. 193 f). Another example is experiments with game-playing tasks in which subjects are asked to make as much money as possible, but are not

allowed to communicate with the other player (p. 196 f). There is a similarity between these experiments and those in which human subjects are asked to learn finger-mazes blindfold, or to learn nonsense syllables: because the forms of learning found in rats are used by subjects in the experiments, it does not follow that these processes operate under normal conditions. The social experiments referred to above exclude the following components of social behaviour: verbal and most non-verbal communication, the arousal of the usual social drives, perception of the other person, role-relationships, most aspects of the cultural background. Research of this kind has added some of these elements, one at a time – for example permitting some communication, or providing information about the other person (p. 197). Interesting results have certainly been obtained using these procedures, for example about reciprocity and helping behaviour (p. 171 ff), but there is a great danger that key elements and processes may be left out of account. The procedures described do not lend themselves however to the study of the process of interaction.

2. *The results may be exaggerated.* A good example comes from studies of the effects of mass communications. Hovland (1959) observed that in laboratory experiments the percentage of subjects showing attitude change is typically 30–50%, while in field situations it is only 5%. The reason for the discrepancy is that in the field situation a number of other factors operate to reduce the effects of the communications, such as selective exposure and the restraining influence of group norms. Similar considerations apply to interaction research. Person perception studies using photographs or brief exposure of the stimulus person have commonly found that spectacles, lipstick and untidy hair have a great effect on judgements of intelligence and other traits. It is suggested later that these results are probably an exaggeration of any effects that might occur when more information about a person is available (p. 135).

3. *The results may be wrong.* A number of experiments have been repeated under artificial and more natural conditions and have obtained quite different results. Laboratory experiments on operant verbal conditioning on the whole suggest that learning without awareness does not occur, and that the process involved is one of verbalised concept-formation (Spielberger, 1965). However, experiments carried out under naturalistic conditions appear to support a different conclusion (p. 176 ff).

There is a more general way in which laboratory research can produce the wrong results. When a subject steps inside a psychological laboratory

he steps out of culture, and all the normal rules and conventions are temporarily discarded and replaced by the single rule of laboratory culture – 'do what the experimenter says, no matter how absurd or unethical it may be'. This is shown by the results of experiments in which subjects comply with instructions to give other subjects very large electric shocks (e.g. Milgram, 1963).

Research on the social behaviour of animals in captivity has notoriously obtained misleading results. DeVore (1968) comments: 'From the perspective of modern field studies, the conclusions based on the behavior of primates in captivity bore as little relation to the behavior of free-ranging groups as would a monograph on middle-class society based solely on a study of inmates in a maximum-security prison' (p. 358). There are a number of other ways in which the results of experiments may be wrong or misleading, but these can usually be avoided by skilful techniques. The experimenter may confirm his hypotheses by giving subtle hints to subjects about what he wants them to do (Rosenthal, 1966); subjects may guess, rightly or wrongly, the point of the experiment and try to help the experimenter confirm the hypotheses; the experimental manipulation may have a different effect on the subject than that intended, and more than one process may be taking place (Aronson and Carlsmith, 1968). Experiments should be designed to make proper use of control groups, and to minimise the effects of practice, repeated testing, etc. (Campbell and Stanley, 1963).

Having seen the shortcomings of some kinds of experimental research, we must now consider how to escape from the dilemma which we posed originally – how to test hypotheses without creating situations which produce the wrong results. We are not concerned here so much with the details of different experimental designs, but with the general strategy or art of research; the same experimental design can be used successfully or unsuccessfully. We stressed above the importance of clinical and observational studies: here we shall be concerned only with hypothesis-testing designs.

1. *Natural experiments* and 'ex post facto' studies are the traditional solution to the problem (Argyle, 1957a), and a number of studies with groups and organisations have been of this form. However, our present concern is with the details of interaction processes, which cannot be studied after the event, so that this method is of rather limited value.

2. *Experiments on unsuspecting subjects.* Members of the public who are walking down the street or sitting in libraries are approached by trained

confederates, and the subject's behaviour is recorded either by the confederate or by another person. An example of this kind of research is Feldman's study (1968) of helpfulness to strangers in different cultures, in which confederates asked people the way or asked for help with posting a letter. The experiment on operant verbal conditioning by Verplanck (1955) is another example; experimenters held quite natural conversations with friends in their rooms or homes, but varied the pattern of reinforcement given for the expression of opinions, and recorded how many were expressed. This kind of research is really restricted to the study of one-way influences, and there are practical difficulties of recording the responses, but otherwise the method is most valuable.

3. *Laboratory experiments which re-create real-life situations.* In some studies subjects do not realise that they are taking part in an experiment – they may be studied while in the 'waiting-room' for example. In others they are asked to take part in a replica of a kind of encounter with which they are familiar, such as an interview. This serves to arouse the social conventions and some of the motivation present in real-life encounters, and the subjects may be friends, relations, or strangers. It is possible to create all kinds of experimental manipulations and still keep the situation fairly normal and conventional. The dilemma of experimental research becomes really acute when the experimenter wants to interfere with the situation to test some kinds of hypothesis. It is not clear whether the dilemma can in fact be resolved in some cases.

4. *Projective and mock-up methods.* Experimental problems are sometimes translated into projective and schematic situations. Thayer and Schiff (1967) constructed pairs of schematic faces where the elements of facial expression were varied; the pattern of motion between the pairs was also varied, and subjects were asked to infer interpersonal attitudes from the combination of facial and movement cues. This experiment shows another aspect of the original dilemma – the technique has the great advantage of eliminating 'interfering factors', but it remains to be seen whether too much has been stripped off, and whether the same results are obtained under more realistic conditions. Another example is an experiment by Tognoli (1968), who tested hypotheses about proximity by means of cardboard cut-outs. Cut-out A was moved nearer or further from cut-out B, and subjects were asked to show how they would expect B to respond. He was able to incorporate variations in status, sex, and situation, and test a number of hypotheses (p. 175).

Rather similar is the technique of providing a written description of some situation to subjects and asking how they would respond, as used by McPhail (1967) in studies of adolescent social behaviour (p. 398 ff). A difficulty with these techniques is that people are not aware of such variables as proximity, or bodily posture, and do not know how they would actually behave.

5. *The intensive analysis of sequences of normal interaction.* Very useful work can be done by making audio-, video- or interaction recordings of natural sequences of interaction, and then subjecting them to detailed statistical analysis. Kendon (1967) did this for conversations between people invited to 'get acquainted', and Scheflen (1965) did the same for psychotherapy interviews. The method can provide information about the correlation and sequence of different elements of interaction, but does not enable hypotheses to be tested so clearly as experimental designs do. It is possible to make causal inferences however; Kendon (op. cit.) showed for example that the absence of a terminal look at the end of an utterance resulted in a long pause before the other person replied. This method has mainly been applied to psychotherapy sessions and laboratory groups. It would be most valuable to have similar material on sequences of interaction in families, work-groups, etc.

There has been a growing interest in training groups (T-groups) because an extensive body of data can be collected over a series of meetings (see p. 260 ff). Mann (1967) succeeded in making a statistical analysis of the pattern of role-differentiation in these groups (p. 264 f). The difficulty with T-groups however is that they are quite unlike any other kind of small social group, and the results obtained will probably not be applicable to other groups – except perhaps in a very general sense, e.g. showing that there *is* role-differentiation in groups.

T-group practitioners maintain that investigators should take subjects fully into their confidence and discuss the empirical material with them. In experiments this is often impossible, since if subjects knew that, for example, their posture or eye-movements were being studied, they would behave differently. The author agrees with Jourard (1964) that subjects should be told as much as possible, treated as collaborators, and should normally be 'de-briefed' after the experiment. It is usually unnecessary to mislead subjects, and the author's practice is simply to tell them that this is a study of what happens in conversations (or groups, etc.), and that the specific hypotheses will be explained later.

In this book we shall give priority to investigations of the kinds just described. We shall also refer to more artificial investigations, where

these are the only ones available on a given problem, but we shall try to bear in mind their limitations.

THEORIES OF SOCIAL BEHAVIOUR

There are three reasons for having theories in science. Firstly they integrate diverse findings in a coherent and economical form. Secondly, they provide a frame of reference for looking at phenomena, suggest the variables to be studied and they make concrete predictions for further research. Thirdly, they give a satisfying feeling of 'explanation' which makes the phenomena seem less perplexing.

1. *Integrating diverse findings.* Current theories of social behaviour are based on a small body of empirical data, and then used to 're-interpret' a few other highly selected studies. For example 'exchange theory' appears to have been based originally on a small number of (non-experimental) studies, such as Blau's study of a bureaucracy (1955) and the reformatory study by Jennings (1950). A large number of further studies have been re-interpreted in exchange theory terms, by re-labelling some of the variables (e.g. by Secord and Backman, 1964). A similar account could be given of other theories in this area. The data accommodated by theories of social behaviour tends to be restricted to small groups of experiments carried out by workers in a particular tradition, and to have little application to familiar real-life phenomena. Bannister (1966) observes of theories in experimental psychology: 'It may be that psychology is the only science which has been able to produce concepts of its subject which are clearly more mean, more miserable, and more limited than lay concepts' (p. 26). The same is even more true of theories of social behaviour, and it must be concluded that the power of these theories to integrate existing findings is extremely weak.

2. *Providing the basis for research.* Most theories in this area have however generated research. But since the theories have usually been formulated in terms of simple, abstract concepts, the resulting research has often been of a greatly over-simplified, 'stripped-down', variety. Learning theory and games-theory result in experiments which exclude some of the essential factors in social behaviour – language, culture, a biological basis, and social interaction itself. It may be argued that if a theory generates experiments in which the crucial elements are lacking, then there is something missing from the theory. It is interesting that many of the most interesting experiments in social interaction have

either been very loosely linked to theory, or quite unconnected with theory.

3. *Giving a feeling of explanation.* This is perhaps the least important feature of theorising, from a scientific point of view. Furthermore, theories which are later found to be mistaken can provide this feeling as well as or better than the theories that replace them – Newton's account of gravitation seems better than Einstein's from this point of view. The author has noticed that psychologists tend to become satisfied by simply translating phenomena into the terminology of their favourite theory – introversion and extroversion, reward and punishment, super-ego and id, information flow and so on.

We would like to argue that theorising in the field of social behaviour is premature: theories have been constructed before the basic empirical phenomena in the field were discovered. In an attempt to provide a systematic way of describing the phenomena, they in fact say less than what everyone knows already. What is needed first is a working picture of what is going on in social situations. This means mapping the sensory channels of communication, listing the biological and other drives, and describing the basic sequences of behaviour which make up social interaction. This task has been most successfully achieved so far in the area of dyadic interaction.

II

The Biological and Cultural Roots of Interaction

This chapter is intended to provide an account of the biological and cultural background to social interaction. These topics will be treated relatively briefly, focusing on those aspects of them that are most relevant to the study of social interaction. It is believed that these matters are essential for an understanding of social behaviour.

Social interaction is to a great extent pre-programmed by innate neural structures which result from natural selection, and by cultural norms, which represent past collective solutions to the problems of interaction. In lower animals social interaction is largely governed by the innate programme; the sequence of interaction leading to copulation in pigeons for example is stereotyped (Fabricius and Jansson, 1963), and has presumably emerged from the process of natural selection because it has survival value. In the higher mammals infants are born with more 'open' instinctive programmes, that remain to be completed by early experiences in the family, which depend on instinctive patterns of rearing by the mother. Field studies of animals have shown how their social behaviour is related to basic biological needs – for food, shelter, defence against predators, reproduction and care of young. Recent studies of apes and monkeys have shown that there are remarkable parallels with the social behaviour of humans – in the types of social relationships that are formed and the ways of establishing these relationships by non-verbal signals. This work has provided a fresh perspective on human social interaction, showing in particular that interaction serves biological needs and has instinctive roots.

Human social interaction is pre-programmed in a second way: patterns of interaction have been worked out by earlier members of the society, embodied in cultural rules and norms, and are taught to the young. Each of these rules or patterns has been retained because it has been found to be a useful way of handling some situation, and the rules can take rather different forms in different cultures. It is not always easy to find out which is the origin of a particular programme; for example

hand-shaking or something like it is found in apes, and appears to have an innate basis, but in humans the particular method and occasion is defined by the culture.

Human infants are socialised in two ways – they acquire the basic drives of sex, affiliation, dominance, etc., which have an innate basis, but need completion through socialisation. They also learn the basic patterns of interaction and rules governing different social situations in their society. Furthermore, they learn a language, and this makes their subsequent behaviour very different from that of animals; their social interaction thereafter consists partly of speech, and they are able to learn, modify and pass on the contents of the culture.

THE SOCIAL BEHAVIOUR OF NON-HUMAN PRIMATES

Man is a branch of the primates that has evolved in a different way from the various species of apes (chimpanzees, gorillas, etc.) and monkeys (macaques, baboons, etc.). Chimpanzees are most similar to man in intelligence. The main differences are probably the power of language, the growth of culture, and the longer period of dependence on the family in humans. Men also eat other animals, stand upright, and use weapons and tools. Learning from the environment is more important for the non-human primates than for animals lower in the evolutionary scale; nevertheless primate social behaviour is species specific and clearly has a strong innate, instinctive basis.

It is not generally recognised by social psychologists that social behaviour has any innate origins. An important part of the social signalling system is the expression of emotions and interpersonal attitudes by postures and facial expression. Darwin (1872) argued that the pattern of emotional expression in animals and men is innate and reflects the biological structure of the autonomic system – producing weeping, baring of teeth, blushing, pupil expansion, hair erection, etc. He argued that these expressions appear in young children, are mainly outside voluntary control (and hence could not be learned), are found in the blind, in different races, and are very similar in men and animals. He recognised that this was less true of other signals such as head nodding and shaking. Darwin and later zoologists have been concerned with the evolutionary processes which have led up to such innate patterns of emotional response. Ethological research has used the same approach for the study of behaviour. Experiments with animals reared in isolation have confirmed the existence of innate patterns of social behaviour. For example Sackett (1965) found that rhesus monkeys reared alone in

closed cages responded to pictures of monkeys threatening and pictures of infant monkeys, by increased play, exploration, vocalisation and disturbance, and would operate a lever to expose these two pictures.

The study of animal behaviour by ethological methods began with the work of Tinbergen, Lorenz and their students, mainly on birds and fish. The ethological method is to carry out detailed field observations of the behaviour patterns of a species, to carry out laboratory experiments which are closely related to the normal life of the animal, and to interpret the results in relation to the biological needs met by behaviour, and the evolutionary processes leading up to it. Since about 1960 there has been a considerable amount of ethological research on monkeys and apes, both in the field and in the laboratory. The field studies have provided important information about the social behaviour of primates under natural conditions.

Field studies have been carried out of a number of species of primates (DeVore, 1965). There is some variation in the social behaviour of different species but it is possible to generalise about it to some extent (Mason, 1965a; Schrier, Harlow and Stollnitz, 1965). This work has been carried out during the same period as, and totally independently of, the work on human social interaction to be described later, and it is likely that ideas and findings from each field will stimulate work in the other. For example there is little primate research on the role of eye-contact in socialisation, on patterns of maternal behaviour, or on the social skills of dominance.

We can see how basic biological processes require patterns of social behaviour, which must have become selected in the course of evolution for this purpose. Hunger, thirst, reproduction, and care of young need patterns of behaviour in which (1) adult males cooperate in the defence of territory and group, (2) opposite-sex pairs mate, (3) mothers look after children. In addition there are (4) patterns of cooperative play apart from work, which may serve the function of restraining aggression and holding the group together.

Territory

Nearly all animals live in groups that inhabit a territory. The territory provides for the basic biological needs of hunger and thirst. Wynne-Edwards (1962) proposed the theory that there is a homeostatic mechanism to attain the ideal numbers and dispersion of animals in relation to the food available. When the density is perceived to be too great there is migration and fighting, when the density is too small the breeding rate

goes up. A different view was put forward by Ardrey (1967) who suggested that there is an innate disposition to occupy territory as a group and to defend it against invasion.

Monkeys and apes live in groups, or troops, of fixed membership, which may be as high as 750. Unlike many other animals however they do not have a permanent nest or hole, but wander over their territory, usually sleeping in temporary nests in the trees. The territory may be as large as 15 square miles (chimpanzees, gorillas, baboons) or as small as $\frac{1}{10}$ of a square mile (gibbons). Within these territories are core areas used exclusively by one group and containing trees for sleeping, and sources of food and water. Outside the core areas there may be considerable overlap of territories, but different troops keep apart and avoid fighting by hearing each other's calls. Under overcrowded conditions as for macaques in Indian cities, there is frequent fighting between the males of same and different groups. While some kinds of monkeys will drive off other groups with great ferocity, chimpanzees do not defend their territory, but they do not have groups of fixed membership either (Goodall, 1965; Jay, 1965a).

Aggression

Primates, like other animals, fight members of other species when competing for the same source of food, when hunting, and when attacked. They will also attack members of their own species if their territory is invaded, or if there is a severe shortage of food. It is necessary, for the survival of species and group, that aggression should take place to defend the sources of food and water.

They may also fight members of their own troop, but not with the intention of killing. Intra-group aggression is thought to serve four purposes, and to have evolved for these reasons. (1) It leads to members of the group spreading out evenly over the food-producing area. (2) Fighting between males for females results in the stronger males reproducing themselves (this can have useless consequences, such as the stag's antlers). (3) Fighting is useful in the defence of the young. (4) It leads to the formation of a stable dominance hierarchy; while preventing further fighting, this enables the older and stronger males to assume leadership of the group (Lorenz, 1963: Tinbergen, 1953).

When two males are going to fight they begin by making threatening gestures – 'The contestants circle one another in a characteristically stilted fashion, their bodies tense and stiff. They may bow, nod, shake,

shiver, swing rhythmically from side to side, or make repeated short, stylized runs. They paw the ground, arch their backs, or lower their heads' (Morris, 1967). This pattern of threat behaviour is partly the result of a conflict between the drives to attack and to flee; the conflict generates 'displacement activities', such as scratching, cleaning, yawning or stretching. The result is a somewhat ritualized pattern of threat behaviour. It is against the interests of the species for the fight to actually take place, and generally it does not; attacks on other animals are quite rare. The animal which has been threatened or attacked may react in three main ways. (1) It may run away, screeching, urinating and looking over its shoulder. (2) It may threaten or attack the first animal; eventually one submits or there may be an actual fight; however, most of these conflicts are resolved by bluff in the form of threat displays. (3) It may appease the aggressor, by cowering, curling up, holding out a hand, facing away, and lowering the eyes. In addition the submitting animal may try to re-motivate the other by trying to arouse a different drive: it may present its hindquarters (even if male) to arouse sex, beg for food like a child, or invite grooming by smacking its lips together (Morris, 1967; Lorenz, op. cit.).

Aggression between males for females is aroused only during the breeding season. Territorial aggression is aroused when an intruder invades the home territory. The aggressive response is particularly released by the sight or smell of a male of the same species. Apes and monkeys, like humans, become angry if frustrated from obtaining some expected satisfaction. It seems likely that aggression is the innate response to these releasing stimuli and situations. Some scientists have argued that aggression is also a positive appetite or drive, and can appear without external stimulation. It is true that the threshold for release of aggression falls when the organism is in certain internal states, but it probably needs *some* external stimulus (Tinbergen, 1968). It is certainly the case that much social play consists of a kind of aggression, though this is different from real aggression. On the other hand there are various social mechanisms, such as ritualisation, dominance hierarchy, and avoidance of other troops, which prevent aggression taking place.

Aggression depends partly on socialisation experiences in childhood. Harlow and Harlow (1965) report that the strength of aggression is affected by the presence or absence of mother or peers during childhood; probably it is the affiliative *restraints* on aggression which are most affected. Aggression may be the result of learning experiences with other

animals of different degrees of aggressiveness. Mason (1965b) reports that animals reared in isolation lack the 'social skills' of dominating others by the use of threatening gestures alone.

Sexual behaviour

Monkeys and apes live in groups whose membership is fairly stable. The relations between males and females within the group are usually much less long-lasting. The gibbon lives in a permanent family group of an adult male and female and their children, but this is an exception. A similar long-lasting relationship and intense relationship is found in geese. Lorenz (1963) suggests that this bond is created by the 'triumph ceremony', which consists of displaced aggressive responses that have the effect of appeasing and enabling habituation to overcome fear. A more common arrangement among the non-human primates is for a couple to consort together while the female is in oestrus for periods varying between a few hours and a few days. There may be a polygynous family consisting of one male, several females, and their children, as with patas monkeys. Or there may be a fairly high degree of promiscuity, with the dominant males having most access to females – females seek out the dominant males, and the latter prevent lesser males from copulating with their females.

Male sexual behaviour in the form of penile erection and thrusting is found shortly after birth; homosexual behaviour occurs in childhood; heterosexual intercourse occurs during adolescence, and the correct position is gradually acquired. Goodall (1965) reports that inexperienced chimpanzees are unable to copulate successfully, but that they watch their mothers in the act, and are later able to perform properly. One infant 'reached out one hand and felt in the region where the penis was inserted'. Those reared in isolation do not usually engage in sexual behaviour at all, though it is not yet known which are the crucial childhood experiences (Harlow and Harlow, op. cit.). The sexual instinct therefore is 'open' and needs certain environmental experiences for it to appear.

Females will normally copulate only when in oestrus, usually about a week of their monthly cycle. In addition some species have an annual cycle, and are receptive only during the mating season (Lancaster and Lee, 1965). Female chimpanzees are receptive for 6–7 days out of a monthly cycle of 35 days, for 4 months of the year (Goodall, op. cit.) It is observed that females are more responsive to some males than to others. Males continue to display sexual behaviour after castration; it

seems that in apes and monkeys sexual behaviour is less dependent on hormone concentration in the blood and more under cortical control than in lower mammals (Ford and Beach, 1952).

Females signal their readiness for copulation by their bodily colouring and swellings, and by presenting to the male. The male may also give a display – including erection of hair and penis, and gaze-fixation at the female; the female runs and is chased, and then presents. Copulation in monkeys and apes is very quick: there is very little foreplay, the male mounts, gives a few thrusts, and dismounts, the whole process lasting a few seconds. It may be repeated with the same female several times at short intervals.

Presenting and mounting may take place under other conditions as well. Both males and females may mount other animals, sometimes with intromission, as part of a dominance relationship; the other animal presents as an appeasement gesture (Wickler, 1967). Presenting is often used in greeting, probably to appease aggression on the part of the other animal. It is also a regular feature of social play, though it is less common than fighting.

Affiliation

Animals in a group constantly compete for food and females; this arouses aggression yet there is very little fighting between them. On the contrary there is a high degree of cooperation between them, in collective defence against predators and other groups, in seeking food and water, and in care of young. It seems likely that affiliative social bonds have survival value for the group and that innate affiliative patterns of behaviour have evolved. Relations between members of a group can be seen as an equilibrium between aggressive and affiliative processes: the affiliative forces hold the aggressive ones in check. It has been observed that a monkey or ape which leaves the group is usually unable to survive by itself – social cooperation is biologically necessary. Herbert Spencer (1904) regarded this as the biological basis for ethics – morals are innate because they have survival value for the group. There are other social bonds in primate groups, such as sex and the links between parents and children. It is now clear that sex is not the basis for primate cooperation – because females are available only at certain periods. Familial bonds are specifically directed towards children or parents, and are clearly a separate kind of affectional system.

Affiliative behaviour has been observed to follow a regular pattern of development; Harlow and Harlow (1965) suggest that there are four

main stages for rhesus monkeys. (1) In the reflex stage infant monkeys maintain close physical proximity to each other; it is suggested that this is due to orienting reflexes. (2) In the exploratory stage there is oral and manual exploration of all objects present. There is interest in moving objects, and particularly in other animals. Young primates seek more and more responsiveness until the others develop aggressive reactions. (3) Rough-and-tumble play, is described below and is followed by (4) aggressive play, in the course of which stable relationships are formed.

Affiliative behaviour is affected by socialisation experiences in the family, though the only variables to have been studied so far are the sheer presence or absence of mother or peers; nothing is known about the effects of different styles of maternal behaviour for example. Nor do the findings enable us to decide between the two main theories about the origins of affiliative behaviour: one hypothesis is that affiliative behaviour is due to generalisation of positive responses towards the mother (Mason, 1965a); the other is that affiliative responses are partly innate but develop through experience with the peer group (Harlow and Harlow, op. cit.). Studies of primates reared in total isolation, both from mother and peers, demonstrate the importance of early experience but do not show whether the mother or the peers are most important. A number of such studies show that after 6 months of total isolation for rhesus monkeys, or after 21 months for chimpanzees, no affiliative attachment ever develops and there is no clinging. Infants reared with other infants but without a mother cling together, and patterns of play are retarded, but eventually their social behaviour becomes normal (Sackett, 1967). Infants reared with their mother but without peers are more cautious and aggressive with peers later; Harlow and Harlow (op. cit.) suggest that this is because they have failed to form positive attachments with peers which would act as restraints for aggression. In the present state of research it appears that experiences both with peers and with the mother play a role in the development of affiliative behaviour.

Affiliative behaviour takes several forms. We shall consider greeting, play, grooming, cooperation and sympathy. When two animals meet, they often engage in lip-smacking and touch each other; one may present and the other mount, regardless of their sex; a chimpanzee may hold out a hand and touch the other on the top of the head, the shoulder, groin, thigh or genital area; baboons smell one another's genitals and nose; a friendly pair may embrace each other enthusiastically. Lorenz (1963) describes the ritualised greeting ceremonies observed in geese and other species, and considers that their purpose is the prevention of aggression. It will be shown below that lip-smacking is the usual way of

inviting grooming, and that it reassures a subordinate animal and appeases a dominant one.

Young primates spend most of their time playing, and chimpanzees are the most playful. Their play consists mainly of approach and withdrawal in mock attack, wrestling and tumbling in mock fighting. They also engage in presenting and mounting. An invitation to play is made by various playful postures and gestures, and by the playface. The tempo of a play-chase or play fighting is different from the real thing – it is gentler and more relaxed, and is accompanied by the playface. Play begins in the early months of life, and is the main activity of the young. As they get older the play becomes rougher, and eventually leads to the formation of a dominance hierarchy. Play is thought to serve the functions of providing practice for adult life, of developing social skills, establishing positive bonds and enabling young animals to find their niche in society. Adult females also play with their young; adults play with each other to some extent, though they spend more time grooming (Loizos, 1967). It may be suggested that play is an expression of various kinds of positive social motivation.

Non-human primates spend a great deal of time grooming themselves and each other, sometimes alternately or simultaneously. One animal explores another's fur with its fingers, extracts small pieces of dried skin or foreign matter, conveys them to the mouth, and eats or tastes them. It is accompanied by rhythmic lip-smacking and the lip-smacking face. The groomee may invite grooming by lip-smacking, rolling on its side, or sitting sideways in front of the other animal, looking away from it and displaying part of its body. The groomer may initiate grooming by lip-smacking. Grooming occurs under several conditions. (1) Parents, especially mothers, groom their young; childless females may try to groom the young of other females. (2) Oestrous females and males may groom each other in the intervals between copulating. (3) Adults may groom each other; subordinate members of the hierarchy tend to groom more dominant members, young animals groom older, females groom males. This is interesting since being groomed means adopting a submissive posture. It has been suggested that a dominant animal will offer himself for grooming in order to reassure another – to prevent him from being frightened or running away. Similarly a subordinate animal may offer itself for grooming as an appeasement gesture. Grooming tends to be more prevalent in species with a steep dominance hierarchy. It looks as if grooming, and its lip-smacking signal, is a means of establishing an affiliative bond (Sparks, 1967). While play takes place under conditions of high arousal, such as when there is a tense relation between two

animals, grooming appeases the aggression. Under intense fear animals will cling together in close bodily contact.

A further manifestation of affiliative motivation is cooperation. Threat from predators or other groups leads to a fierce, and coordinated defence of the group and its territory (Ardrey, 1967). There is also cooperation over food-gathering. Studies in the laboratory have shown that two chimpanzees will cooperate to manipulate laboratory apparatus to gain a food reward (Hebb and Thompson, 1954). There is evidence that chimpanzees are concerned for each other's welfare – what is called 'sympathy' in the case of humans. Nissen and Crawford (1936) studied the behaviour of pairs of chimpanzees in adjacent cages where only one of them had food. The animal without food begged for food and was given it, or the other would pass food without being asked. When two animals were in the same cage, the food was divided up fairly. In the wild, group cooperation is brought about by a form of group structure and leadership that varies for different species; it is described in the next section.

Group behaviour

Innate tendencies towards affiliation do more than create positive social bonds, they prescribe the form of group life for each species. The basic social unit of monkeys or apes is not the family but the group, or troop. The size of group varies from species to species: for gorillas 15–20, chimpanzees 30–60, baboons 5–750. For most species these groups are very stable in composition; it is very rare for an animal to change groups, and once it has left a group it is very hard to be readmitted (Jay, 1965a). The main exception to this is the chimpanzee – chimpanzee bands may change by the hour (Goodall, 1965). Groups contain a number of sub-groups of adult males, groups of children, of adult and adolescent females and infants, and pairs of males and oestrous females. These sub-groups are held together by the affiliative, familial and sexual bonds described above. In addition to these positive social forces another major motivation is operative – the struggle for dominance.

The phenomenon of the 'pecking order' was first observed in chickens; it is also found in primates and most other species. It is in the biological interests of an individual male animal to be dominant since it takes precedence over access to food and to females. Dominance may be of advantage to the group because it prevents internal aggression, provides leadership by the strongest males, and ensures that the strongest members will survive during a food shortage. The dominance hierarchy

is strongest in ground-dwelling species, that are most liable to be attacked. The relative status of two males may be settled by fighting, but in the great majority of cases it is settled by a ritualised threat display, after which one submits. It is probably advantageous for the survival of the species for members of the group not to fight. Once the dominance order of two animals has been decided it remains fixed for ever afterwards. Dominance conveys a greater degree of satisfaction of bodily needs, in particular hunger and sex; dominance also entails control of territory, which is 'chiefly a licence to feed and mate' (Brown, 1965, p. 19). Since dominant males have preferential access to females, and are indeed sought out by them, they are the fathers of most of the children; presumably successive generations should evolve in the direction of whatever properties convey dominance. It is not known what these qualities are, but it is likely that size, strength and fighting ability are involved (Jay, 1965a).

The leadership and control of primate groups take a variety of forms.

1. Baboons and macaques live on the ground in open country in large troops; there is an oligarchy of dominant males, with a sharp pecking order between them, who share a harem of females and keep authoritarian control of the troop.

2. Gorillas, langurs and others live in thick forests in troops with a very relaxed hierarchy; one male assumes leadership but there is no monopolising of females by high-status males, and no fiercely established pecking order.

3. Hamadryas baboons and some other kinds of monkey live in smaller troops consisting of one male, his harem, and the children.

4. Gibbons and others live in families consisting of one male, one female and children.

5. Chimpanzees also live in the forests, in smaller groups of rapidly changing membership and with no dominance hierarchy (cf. DeVore, 1968; Morris and Morris, 1966).

The most common arrangement is for a number of dominant males to share degrees of social influence. A dominant male in the first four cases will direct the movements of the group, will decide whether food or water is satisfactory, and will stop quarrels within the group. His relations with the other males, once their social standing has been settled, is that others present while he mounts, and others groom him. It is interesting that the others are strongly attracted to him (Chance, 1955); this is more likely with a dominant male who only threatens without actually aggressing. Adult females when oestrous seek out dominant males and present for them. This results in a temporary rise

in status for a female. Dominant males protect children, both from outside predators, and from larger children in the group.

The dominance and leadership hierarchy is often associated with a particular spatial arrangement. Where attacks from predators are frequent, the adult males arrange themselves on the periphery of the group. In baboons, sentinels are placed at the periphery of the group, but inside there are a series of concentric circles with the most dominant animals at the middle. This pattern has been observed in langurs and macaques also (Chance, 1967). In this kind of group an animal will approach only to a certain distance from a more dominant male, depending on the social distance. His posture and gait reflect this – he will not put his tail up until he is a suitable distance away. The most dominant animals in a group have the most erect posture. Chance (op. cit.) observes that the lesser animals focus their attention on more dominant ones, in a chain. This enables them to follow the lead of more dominant animals and is, he suggests, the reason for the concentric spatial arrangement.

Interaction between parents and children

We have seen that there are elaborate patterns of primate social behaviour which appear to be the result of evolutionary processes. A most important evolutionary development has been the opening of innate tendencies so that environmental experiences are needed to supplement and complete them. The period of dependence on the family has lengthened, as has the learning capacity of organisms. It is now necessary for there to be a series of behaviour patterns, partly innate, which produce appropriate behaviour of infants to parents, and parents to infants. As we shall see, this too is partly learnt.

It is biologically necessary for parents to provide food, shelter and protection from predators for their young. In the absence of a permanent nest it is necessary for the young to be carried – infant chimpanzees are carried for $2\frac{1}{2}$–3 years; in the absence of any permanent family the larger group helps with these tasks. The infant shortly after birth has a number of innate reflexes which enable it to respond to the mother – finding and sucking the nipple, upward climbing, clinging and grasping the mother so that it can be carried. There is evidence that infants are very interested in the mother's face. They become conditioned to the mother and can discriminate her from other animals. Infants then go through a period (10 weeks for rhesus) in which they derive comfort from physical contact and feeding from the mother. External stress produces intense clinging to the mother; clinging is pro-

duced by arousal and is able to reduce arousal (Mason, 1965b). During a further period the presence of the mother provides security in the presence of unfamiliar and frightening objects. Finally there is a degree of separation from the mother, although the bond is extremely long-lasting (Harlow and Harlow, 1962). In his well-known experiments on cloth and wire mothers, Harlow (1959) has thrown considerable light on the development of the infant–mother bond. The most important finding is that infants spent much longer clinging to the cloth mother than to the wire mother (15 hours per day *v.* $2\frac{1}{2}$), and that it made little difference whether milk was supplied by the cloth or the wire mother. The cloth mother also provided more security: infants clung to her when frightened, and were then able to explore frightening objects. The usual interpretation of these experiments is that there is an innate response to fur, and that this is more important than food reinforcement in the development of the infant–mother bond. It may be pointed out however that there was a second difference between the cloth and the wire mothers – the face of the wire mother was less like a monkey face than that of the cloth mother. The role of the mother's face and eyes in socialisation remains to be studied, for the non-human primates.

It is also biologically necessary for there to be a bond from parents to infants, if the latter are to be properly cared for rather than neglected or attacked. Shortly after birth the mother produces the maternal responses of cradling, feeding and grooming the infant, and retrieving it if it escapes. As the infant gets older, increasing freedom of movement is allowed, but the mother continues to protect the infant. Similar behaviour is extended to other infants; female primates all show a great interest in infants. When the child is older the mother becomes ambivalent and starts to punish the child; finally there is a degree of separation and rejection of the child, especially when the next baby is born. Maternal behaviour is thought to be stimulated by the infant's clinging and sucking; monkeys reared without mothers themselves show no affection for infants and treat them very harshly. The behaviour of fathers is rather different: 'Male monkeys in the wild should be regarded as generalised fathers: they show affectional responses to members of their social group but do not show them differentially to their own or other children' (Harlow and Harlow, op. cit., p. 330). Adult males protect children as described above.

We have seen that experiences in the family affect the development of later affiliative, sexual and maternal behaviour. In other words family experiences are necessary for the normal development of these basic patterns of primate behaviour. In addition animals learn the particular

behaviour pattern of their troop. Studies with Japanese monkeys have found that new elements of behaviour may be acquired by the whole troop and persist over a 10-year period. Examples are eating caramels, washing sweet potatoes, and separating grains of wheat from sand by washing in the sea. New habits were picked up most readily by younger, adolescent monkeys, and by males (Tsumori, 1967).

The elements of social interaction

We shall anticipate the next chapter of this book, on the elements of human social interaction, by considering the elements used or responded to by apes and monkeys.

Olfactory. Apes and monkeys make little use of taste and smell compared with most other mammals, though it probably plays some role in sexual arousal. Many species use olfactory markers to mark out territory; dogs for example use urine in this way; apes and monkeys however are very mobile and do not need to do this (Marler, 1965).

Tactile. The main form of tactile behaviour is grooming, which is done mainly by use of the hands, helped by the teeth, tongue and nose; it may be reciprocal. Aggressive bodily contacts are biting, striking and pulling the fur. Presentation, mounting and embracing occur not only between sexual partners, but in connection with dominance and appeasement. Clinging takes place when an animal is frightened. Greetings involve a wide variety of bodily contacts – genital and stomach nuzzling, kissing, embracing and grooming. These bodily contacts may take a variety of forms depending on the social relationship between two animals; biting may be aggressive or playful, grooming may last for a longer or shorter time (Hall, 1962).

Visible

(1) Bodily changes. Females in oestrus are marked by bright blue or red areas of skin and swellings, in baboons and other species; when presenting, the female turns the coloured area to the male, and it acts as a releaser for sexual activity (Wickler, 1967). Sexual arousal in the male is shown by erection; aggressive arousal is accompanied by the hair on the neck bristling.

(2) Posture. A threatening posture consists of an arched back and lowered head; submission is shown by crouching, curling up, or by presenting. The tail is raised by a dominant animal, in proportion to its status in the immediate group. Gorillas adopt a strutting walk when in a

dominant position. Other postures are used to invite grooming; the presenting position is the prelude to copulation. A gorilla leader may signal departure by standing motionless and facing in the direction to be taken.

(3) Gestures. Aggression is signalled by various threatening gestures such as fist-shaking and stamping, waving things about and banging them. A friendly approach may be indicated by holding out a hand, or putting hands on the head.

(4) Proximity. Following another primate can be a friendly overture, or an aggressive chase; the difference is seen from the way it is done. A dominant male allows other males to approach only up to a certain distance. A langur will force another to move by going close to him, a gesture of dominance (Jay, 1965b).

(5) Facial expression. Unlike most lower animals, apes and monkeys have a series of facial expressions, corresponding to their emotional state. There are about 13 different facial expressions, and these are similar in different species. The playface is an open-mouthed smile with teeth covered; it occurs during play. The lip-smacking face has lips together and protruded; it indicates desire to approach and goes with grooming. The pout face is rather similar and is shown by children who want to be with their mother. When an animal wants to attack it bares its teeth, and frowns. When about to flee the eyebrows are raised, the forehead wrinkles, the mouth corners are pulled back, baring the teeth (Van Hooff, 1967; Morris, 1967).

(6) Eye-movements. The direct gaze is widely used as a threat signal. Chance (1962) observed that if there is a 'cut-off' of mutual gaze by one animal, the other will not attack. It is postulated that mutual gaze is highly arousing, and aggression can be averted by cutting it off. A number of forms of cut-off have been observed in different species, including averting the gaze, shielding the face with a hand, lowering the eyes, and turning the head (Vine, 1969). Looking away can be regarded as an act of submission or appeasement. There may also be lowering or fluttering of the eyelids for the same purpose. Lesser animals watch the more dominant ones and are thus able to follow their leadership. Apart from this, not much is yet known about gaze-direction or eye-contact in non-human primates. It is interesting that some moths have evolved wing patterns that look like giant eyes, which are used as threat displays.

Auditory. Different kinds of monkeys and apes can make between 7 and 25 different vocal sounds. The most common are as follows: bark and growl (when attacking), scream and shriek (being attacked and giving alarm), soft grunt (when grooming, and for keeping in touch in the

jungle), clicking and chittering (by young animals). These sounds cannot be regarded as intended to communicate – they are emotional reactions which are audible to others. The sounds are furthermore continuous noises rather than words – similar to human groans rather than grammatical sequences. Motivational information however is conveyed with some precision, by small variations in the intensity, speed and pitch of the noises emitted (Marler, 1965). Attempts have been made to teach chimpanzees to speak. Hayes (1952) taught a female chimpanzee to use the words 'papa', 'cup' and 'mamma' by rewarding her with milk. It was thought that the word 'cup' came to mean 'I want a drink', but normally animal sounds are highly stereotyped responses conditioned to the original learning situation; they are not intended to communicate. When apes and other animals respond to human speech they are responding to the physical sounds, not to their meaning (de Haan, 1929).

Combinations of signals. The elements of social behaviour, olfactory, tactile, visual and auditory, which act as signals, do not occur alone. There are a number of regular combinations. Threat, for example, includes the bared teeth, staring eyes, lowered eyebrows, a tense posture with head lowered and forelegs bent, hair bristling, and is accompanied by barking or grunting. There are several basic patterns like this, associated with attack, withdrawal, appeasement, grooming, copulation, group coordination and care of young. The signals are therefore highly redundant, but are very efficient for communicating motivational states. Visual signals are far more effective than auditory, and appear to be designed to convey information at short range. 'By far the greatest part of the whole system of communication seems to be devoted to the organisation of social behaviour of the group, to dominance and subordination, the maintenance of peace and cohesion of the group, reproduction and care of the young' (Marler, op. cit., p. 584).

THE DEVELOPMENT OF HUMAN SOCIAL DRIVES

The psychology of motivation

Behaviour does not consist just of learned responses to stimuli; it is energised through the physiological arousal of the autonomic system. It is goal-directed in that instinctively defined or environmentally acquired goals are pursued with varied patterns of response. The same individual will be differently aroused on different occasions, and there are individual differences both in levels of arousal and in the goals which are sought.

The commonsense alternative to the postulation of drives is to explain behaviour in terms of conscious desires and intentions. The objection to this is that conscious experiences are now known to be partial and sometimes inaccurate representations of what is probably happening; psychoanalysis and experiments with post-hypnotic suggestion have shown that the reasons people give themselves for their actions are sometimes rationalisations, i.e. cognitive constructions that are more acceptable than the true motivation – for example a religious young man may be very concerned about the beliefs or spiritual state of an attractive young woman.

We have just discussed the social behaviour of non-human primates in terms of basic drives. These are clearly related to basic biological processes, and it is easy to see how they have evolved to preserve the species. Hunger and thirst provide for basic bodily needs; sex continues the species; aggression defends the group against predators and rivals for food; parent–child forces ensure that infants are looked after while dependent; the affiliative drive acts as a social bond to restrain aggression, and forms the basis for cooperation over defence and food-gathering; dominance creates social order and leadership inside the group, and is in the direct biological interests of the most dominant. This set of partly innate drives brings about a pattern of behaviour, including social behaviour, that enables individuals and groups to survive. All of these drives appear in humans too. The differences are that there is greater scope for environmental learning, assisted by the larger brain, the longer period of dependence in the family, and the existence of elaborate cultural patterns.

When we speak of a drive, we refer to a pattern of goal-directed behaviour, energised by autonomic arousal, and released by certain internal and external conditions. The drives found in non-human primates are all partly innate, partly learnt. Some of them can be regarded as needs, others not. Hunger and thirst are needs in the sense that they are aroused by deprivation, and satiated by eating and drinking. We shall show that sex, in the case of humans, is not a need in this sense; it is certainly a drive since sexual activity is energised by autonomic arousal. We shall not distinguish between 'primary' and 'secondary' drives, corresponding to innate versus learnt, or biological versus social drives. There are however certain other 'cultural' drives found in humans which are less directly associated with biological processes, and more associated with cultural products and social structures. Achievement motivation, the need for money, and commitment to ethical or ideological values and to organisational goals, are examples of this.

Probably they are made possible by language and associated symbolic processes. Is it correct to speak of these as 'drives' at all? They are similar to more basic drives in that goal-directed activity is released, and that autonomic arousal is produced; they are dissimilar in that there is no instinctive basis for them. It is also impossible to satiate cultural drives – when a person has made some money he wants to make more money; indeed these drives appear to follow a reinforcement rather than a satiation model.

The physiological basis of motivation is the activity of the autonomic nervous system, as controlled by the hypothalamus. Neural messages from the hypothalamus set off sympathetic or parasympathetic arousal. Sympathetic arousal consists of a discharge of adrenalin from the adrenal glands; this in turn produces an increase in heart-rate, of blood-pressure and of perspiration, thus preparing the organism for action. There are individual differences in the physiological pattern of response. Parasympathetic activity is related to the digestive processes, and to hunger and thirst. Sympathetic arousal results in greater effective effort, but only up to a point, after which over-arousal produces anxiety and disorganisation of response. Arousal can be produced directly by injecting adrenalin into the bloodstream, or by other physiological conditions such as hunger; arousal depends also on external stimuli, both innate releasing stimuli and other stimuli which become sources of arousal as a result of learning. Environmental stimuli have a dual effect when motivation is aroused: they lead to particular responses, and they lead to diffuse autonomic activity, which has an energising role.

For lower animals motivation is largely instinctive. That is to say there are innate sequences of motor response which are released by particular stimuli when there is an internal state of physiological readiness. In man and higher animals the state of arousal is much the same, but it is aroused under new conditions, and new patterns of associated behaviour are acquired. The releasing stimuli are not only such things as the blue bottoms of baboons, but clothes of fashionable design; more abstract drives are aroused by such stimuli as the national flag and religious symbols. The form of sympathetic arousal is probably very similar, even though different action patterns are being set off, as Schachter (1964) showed in an interesting experiment. Some subjects were given an injection of adrenalin, while others had neutral injections of salt solution. Some of each group of subjects were placed in the company of a confederate of the experimenter, who generally behaved in a wild and crazy manner. Further subjects were subjected to an insulting interview, in the company of a confederate, who became very angry

with the interviewer. The main finding was that the adrenalin-injected subjects became very euphoric in the first situation, and aggressive in the second – more so than those injected with salt solution. Thus the form of arousal, the emotions and drives experienced, and the goals sought, depend on the nature of the arousing situation.

The patterns of behaviour which are set off in an aroused organism may be innate, as in the food-seeking behaviour of insects. There are similar innate patterns in humans, for example some of the responses of infants to mothers (p. 47 ff), and some features of sexual behaviour (Morris, 1967). More important however are the general innate tendencies towards dependent, sexual and affiliative behaviour, which require environmental experience for them to develop. In animals special forms of learning, during critical periods, are involved (Thorpe, 1962). As in other areas of behaviour, genetics and environment play complementary roles, and neither can operate without the other. Twin studies have shown that broad dimensions of personality depend upon both, and that their relative weight varies between different traits – schizophrenia being more dependent on inheritance than neurosis for example (Shields and Slater, 1960).

Some of these drives are commonly restrained either by other drives, or by anxiety. In the non-human primates we saw that aggression within the group is restrained by affiliation. In human society aggression and sex are associated with internalised restraints, often leading to the suppression of the normal goal responses or to their replacement by substitute or 'displaced' alternatives. Miller's theory of approach-avoidance conflict (1944) predicts that there will be an equilibrium degree of approach to the original goal, and that this will be nearer to the goal if the avoidance forces are weakened, for example by alcohol.

Hunger and thirst

Hunger and thirst have a direct effect on many aspects of primate social behaviour and group life – the collective gathering and eating of food, the feeding of young, the occupation and defence of food-bearing territory. The same is true to a considerable extent of human primitive societies, but in more advanced societies the links are less direct. In addition, when people are rarely hungry, and meals are eaten out of habit, hunger ceases to operate as a major drive. It may still affect social behaviour however: Schachter (1959) found that the majority of subjects who had been without food for 20 hours chose to take part in experiments where they would be together with other subjects, while the

reverse was the case for non-hungry subjects. It is possible that the universal human trait of eating in the company of others is due to this link with affiliative behaviour. Experience suggests that eating together has the result of increasing the social bonds between people. The hunger and thirst drives themselves we shall not discuss here. They are different from most other drives in that arousal depends on the contents of the bloodstream; they are unlike all other drives in that they are aroused by deficit, and operate in a homeostatic manner. The needs themselves are innate, together with the elementary feeding responses of the infant; apart from this, what is eaten, and how it is eaten depends on the culture; this is to some extent true of monkeys too (p. 38).

Sex

Sexual motivation is biologically necessary for the preservation of the species, though not for the survival of the individual, and it has widespread effects on social behaviour. Compared with monkeys and apes, humans are much less promiscuous, and family arrangements are longer lasting – though in some societies adolescents are allowed to be promiscuous, and the one man–one woman family is not the only arrangement, though it is the commonest. The more permanent family enables children to have a longer period under parental care, and they have a father as well as a mother. In many societies there are restraints on sexuality, in order to prevent premarital or extramarital copulation, and such restraints become internalised during socialisation. Sears, Maccoby and Levin (1957) found that American mothers usually punish small children for early sexual behaviour, such as playing with the genitals.

Sexual motivation is aroused in lower animals by the concentration of sex hormones in the bloodstream, and by releasing stimuli from members of the opposite sex. Sexual behaviour proper begins at puberty, when sex hormones are produced. Unlike hunger there is no physiological deficit, and deprivation does not increase the strength of drive. In lower animals female sexual behaviour can only occur during oestrus, while hormonal injections have a great effect on sexual activity. In apes this is less true, and with humans scarcely true at all: castration and ovary removal do not produce much loss of sexual drive, and hormone injections have little effect (Ford and Beach, 1952). On the other hand removal of large areas of the cortex, even in rats, but especially in males, has the effect of eliminating sexual activity entirely. This evidence suggests that sexual motivation in higher mammals becomes controlled

by cortical structures rather than by hormones, and that this is particularly true of males. Thus learning can have a greater effect, and cultural factors may be very influential (Cofer and Appley, 1964).

There are however clear innate response patterns – erection in infants, and the intromission-ejaculation sequence; indeed the whole interaction sequence making up copulation takes a very similar form in most human societies (Morris, 1967). On the other hand sexual behaviour does not develop in monkeys reared in isolation, and it has been suggested that for human infants bodily contact with the mother is a source of later sexual behaviour (Walters and Parke, 1965). Chimpanzees need to observe others in the act before they can perform properly (p. 30); humans appear to need books of instruction. In addition elaborate cultural patterns of etiquette and social skills for handling the opposite sex are acquired. Among the non-human primates sexual motivation mainly results in copulation; among humans there is frequent sexual arousal, but internal and external restraints prevent copulation occurring, except under very restricted conditions. The result is that sexual motivation has a widespread impact on social behaviour, where the end-product is conversation, proximity and eye-contact, and more rarely bodily contact, rather than copulation. Such intermediate levels of intimacy can be regarded as equilibria brought about by conflict between sexual motivation and restraining forces. The intermediate steps are far more widely attained than is copulation, and become sub-goals which are sources of gratification for the sexual drive. This interpretation is supported by an experiment by Clark and Sensibar (1955) in which it was found that stories told to TAT cards following sexual arousal contained overt sexual themes if subjects were drunk, but contained only covert, symbolic themes if the subjects were sober. The result of the greater dependence of sex on cortical and learnt processes in man, combined with internalised restraints on copulation, has been to convert sex into a generalised drive of social approach.

Aggression

We have seen that aggression in animals is biologically useful for the group – in defending territory, resisting predators, and spreading the group out over the territory; it is useful to the individual in giving priority over food and access to females. Aggression inside the group is restrained by affiliative forces. Humans are far more aggressive than the other primates. We differ in eating meat, as lions and tigers do; we use weapons, which now kill people at a distance, so that the appeasement

signals of victims are inoperative; and we are becoming very overcrowded (Lorenz, 1963). Aggression within the group is most often of a new, and relatively harmless kind however – verbal aggression. This does not inflict direct biological damage, but it affects self-esteem (which can have somatic consequences). We may distinguish different types of aggression, according to the conditions that arouse it. (a) Aggression often results when an individual is attacked by another, or when self-esteem is attacked. Frustration may also result in aggression, but only if the frustration is seen as arbitrary or unnecessary – and we can regard this as a kind of attack. (b) Aggression can be instrumental to other needs, such as food or sex; much animal aggression is due to competition for biological satisfactions. Aggression of this kind in humans is not 'angry', as the first kind is. Struggles for dominance can also lead to aggression (see p. 28 f). (c) There may be spontaneous aggression which is not caused either by attack or by biological needs; this has been observed in male mice reared in isolation, and it is possible that fighting is instinctively related to competition for females. On the whole the evidence does not support the idea that there is an aggressive need in higher mammals that can act as a source of spontaneous aggression (Berkowitz, 1962; Buss, 1961).

Aggression is however a drive in that certain stimuli (e.g. attack) release patterns of response (e.g. fighting), which are accompanied by autonomic arousal. The vigour of response is furthermore affected by the internal physiological state of the organism: it is stronger in the presence of male hormones, in people of muscular physique, and in those with a high level of noradrenalin (Funkenstein *et al.*, 1957). The aggressive response to frustration or attack appears to be innate in lower animals and partly innate in man. Infants use such forms of aggression as screaming, and kicking, though these become modified by experience (Goodenough, 1931).

Learning is also important, and even animals have to learn the appropriate targets for attack. Socialisation studies of humans have shown that aggression is strongest when children have been (1) frustrated, by rejection or in other ways, (2) frequently punished, especially by physical punishment, (3) exposed to aggressive models, including the mere presence of a male parent in the family. Sears (1961) found that anti-social aggression was stronger at age 5 in children who had received punitive discipline; however, at age 12 such aggression correlated with earlier permissiveness and *low* punishment, though pro-social aggression correlated with punishment. Sears suggests that early punishment has the effect of displacing aggression into socially acceptable channels.

Aggression is frequently aroused, in animals and men, but rarely occurs. In non-human primates it is thought that affiliative feelings towards the group restrain aggression. Physiological studies show that parts of the cortex act as suppressors of aggression in monkeys. Socialisation studies of humans show how these restraints are acquired in childhood. Aggression is lowest in those who have had warm relations with parents, and where parents have discouraged the use of aggression, and used love-oriented methods of discipline and reasoning; cognitive processes can also restrain aggression, when it is thought to be morally wrong (Berkowitz, op. cit.).

When aggression is aroused, the restraining processes are activated too. The conflict thus created results in the suppression of the immediate response, and its replacement by a substitute or displaced form of aggression, in exactly the same way as sex. A number of experiments have shown that the degree of displacement, to different objects or less direct forms of aggression, is related to the strength of restraints (Buss, op. cit.). As a result, aggression of an indirect, verbal kind is a common feature of social behaviour, though physical violence is not.

The relation between aggression and dominance is far from clear. Our view is that dominance is both a need in itself and instrumental to biological needs, and in man to self-esteem; a dominant position is established by actual or threatened fighting, i.e. aggression of a competitive, instrumental kind; attacks are not made on stronger people through fear of the consequences, while attacks on weaker individuals are restrained by their giving way or appeasing.

Dependency

It is biologically necessary for infants to have dependent responses towards their mothers while in need of food and protection. As the period of family care and childhood learning has lengthened, these dependent reactions have become even more necessary. We saw that young monkeys and apes have instinctive responses to seize the mother's hair and to seek the nipple; attachment to the mother is increased during the period of childhood play and early family life; the child then becomes increasingly independent and is eventually rejected by the mother (p. 37). Dependent behaviour in human children includes such behaviour as touching and holding a parent, being near, seeking attention or reassurance, and seeking affection or need satisfaction, though the correlation between these elements is low, especially for boys (Sears, 1963). Such behaviour continues during later childhood, and is often punished

or discouraged by parents (Sears, Maccoby and Levin, 1957). Children break out of this dependent relationship during adolescence, and boys try to do so earlier, since it is not an approved pattern of behaviour for boys (Kagan and Moss, 1962). There is a correlation of about ·30 between dependency or passivity before the age of 3, and dependency on a love object in adulthood, or dependency on parents, for girls only. This was not true of later dependence on friends (Kagan and Moss, op. cit.). Children and adults who are strong in dependency are more susceptible to social influence (Walters and Parke, 1964). Gewirtz (1961) regards it as a learnt drive, and reports experiments in which 20 minutes of isolation made children more susceptible to social influence. Walters and Parke (1965) argue that these results could be due to anxiety aroused rather than isolation; Walters and Ray (1960) manipulated both arousal and isolation and found that arousal was the crucial variable affecting social learning. The effects of isolation are more marked for younger children, for whom it might be expected to create more anxiety. It is unfortunately difficult to create arousal with anxiety, or arousal without social rejection. The outcome is unclear, and it seems likely that both isolation and anxiety can arouse dependent behaviour. The dependent activity also serves to reduce the arousal – as when a human or monkey infant clings to its mother.

Dependence has certain innate motor components that appear immediately after birth in monkeys; there is sucking in human infants, but reaching and grasping appear later – the 5th to 6th month. Infants show a preference for the human face, or for masks resembling it by the 4th week of life; smiling in response to the face reaches a peak at 11th–14th week, after which infants can discriminate the mother from strangers (Spitz, 1946; Ambrose, 1961). Infants prefer a female face, a female voice, and like the sound of heart-beats. It is not known how far these phenomena are due to innate neural patterns, and how far they are due to early learning. Coss (1965) found that pairs of circular stimuli placed side by side (i.e. resembling two eyes) produced more arousal in subjects than one or three such stimuli or when one circle was above the other, and that there was more arousal if solid black circles were placed inside the circles (i.e. like pupils); this suggests but does not prove that response to eyes may be innate. Walters and Parke (1965) suggest that the innate orienting and following response leads to exploration, and attending to the mother. Schaffer and Emerson (1964a) conclude from their longitudinal study of 60 infants that infants seek proximity with people during the first 6 months of life, but that this is a non-specific attachment to certain stimuli; during the period 6–9 months

attachment to particular individuals develops. Children reared in institutions shortly after birth are apathetic towards adults and do not show a dependent response (Yarrow, 1964).

Recent research has caused older ideas on the learning of dependency to be revised. It was previously believed that feeding by the mother reinforced dependency, which then became a secondary drive. Harlow's experiments showed that this was not true for monkeys (p. 37); human studies found similarly that early dependent attachments are formed to people who had taken no part in feeding (Schaffer and Emerson, 1964a), and that dependence has no correlation with maternal feeding methods (Sears, Maccoby and Levin, op. cit.). Harlow's work suggested a second variable – innate attraction to the mother's skin, which is a source of anxiety-reduction. However, Schaffer and Emerson (1964b) found that some infants resist physical contact involving restraint ('non-cuddlers'), and obtain comfort from looking at the mother, or holding her skirt. Walters and Parke (1965) suggest a third source of early dependence – the stimulation of the distance receptors of vision and sound but not by specific stimuli. Ambrose (1961) and others found that a face elicited a smile more readily if it was moving, but also if there was eye-contact. Walters and Parke (op. cit.) suggest that while sexual motivation is partly based on bodily contact with the mother, 'the formation of psychological attachment is primarily fostered by distance-receptor experiences'.

Robson (1967) and others have suggested that the amount of eye-contact between infant and mother may be a crucial determinant of dependence. Eye-contact of a sort takes place at 4 weeks; this means nothing to the infant but is highly rewarding to the mother who then becomes more attached to the child and plays with it more (Wolff, 1963). It is suggested by Robson that this an instinctive response for the *mother* with the biological value of appeasing hostility due to the frustrations of child-rearing. By 4 months the child may seek out eye-contact, though this varies with the extent to which the mother has sought or avoided eye-contact, and possibly with the extent to which eye-contact occurred during feeding or was followed by other rewarding reactions.

A further factor in the growth of dependence is the social interaction between mother and infant. Schaffer and Emerson (1964a) found that dependence was strongest when the mother had been most responsive to the child's crying, and when there had been a lot of interaction between them. The use of crying and smiling to elicit a maternal response could be regarded as the earliest form of social behaviour. Infant and

mother are able to remain in social contact at a distance by the means of such visual and vocal messages. Interaction between them during the pre-verbal period takes a number of forms, such as making imitative noises and play. Appell and David (1965) report that at 13 months the infant–mother relation may take various forms, from mutual satisfaction to mutual frustration.

While an infant has a great deal of maternal attention during the first two years of life, this attention is liable to decline, especially if another child is born. The change is greatest for a first-born child, who previously had its mother's undivided attention. Thus there are grounds for supposing that first-born children would be high in dependence, but also high in independence, since they are expected to take a dominant role in the family. Sampson (1965) suggests that first-born children suffer from a resultant dependency conflict. The style of maternal behaviour during childhood affects the development of dependence, though the results of different studies are rather inconsistent. One agreed result is that dependence is not valued for males in Western society; it is regarded as a failure to develop normally (Sears, op. cit.; Kagan and Moss, op. cit.).

Affiliation

We saw that in groups of primates there is affiliative behaviour in the form of playing and grooming, and that affiliative forces appear to restrain aggression to other members of the group. In humans there is similar affiliative behaviour, which takes the form of joint activities at work, play, or conversation, and consists of such elements as physical proximity, eye-contact, and friendly styles of verbal and non-verbal behaviour. There are considerable individual differences in the strength of affiliative tendencies; for example some members of groups are found to be more concerned with being accepted by other members, and with establishing friendly relations in the group, as opposed to getting on with the task. Some psychologists conceptualise this behaviour in terms of a need for affiliation (Atkinson, 1958), others in terms of learnt habits, or traits such as extraversion. Sex, dependency and affiliation are all approach tendencies directed towards social objects, though with somewhat different goal responses; sex and affiliation are indeed sometimes difficult to distinguish. We saw that animals cannot survive alone, and that these drives have survival value for the group, and thus for its members.