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Coping

Every individual human or other animal is exposed to impacts of their environment that require action. Some of these environmental effects are physical, such as changes in temperature or painful blows, whilst others are mental, like frightening threats or the loss of a social companion. For most effects, the animal has a system which, when activated, tends to reduce any damage which might result from the environmental impact. For example there are physiological and behavioral responses to increased temperature or the sight of an approaching aggressor. The maintenance of steady state in the body by such means is referred to as homeostasis which may be brought about by a response to displacement of the body state from the tolerable range, i.e. negative feedback control, or by an action taken before any displacement so as to prevent that displacement from occurring, i.e. feedforward control. Examples from human body temperature regulation are running in order to warm up after you have got cold or putting on a coat to prevent yourself from getting cold.

To cope is to have control of mental and bodily stability. This means that all of the various control systems are functioning effectively. The term 'coping' refers to the process of controlling the environmental effects. Sometimes this is achieved very easily because the environmental impact is slight in relation to the adaptive ability of the individual. In such cases there is only a minor effect on the welfare of the animal. If, on the other hand, coping is very difficult then the welfare is considerably poorer. In some circumstances the environmental effects on the individual may be such that there is only a brief period when coping is not possible but prolonged failure to be in control of mental and bodily stability leads to reduced fitness. The individual is then said to be stressed (see Stress, p. ) and this is a further situation where welfare is poor (see Welfare definitions, p. ).

The scientific use of the word 'coping' which is described above reflects the popular use of the word but is more precise and refers to the full range of environmental impacts on the individual. When people say that they can not cope they are not always thinking about all of the problems besetting them but tend to concentrate on one problem. However, it is often combinations of difficulties which make coping difficult. This is true for all species of animals. The methods of coping which are used may help with several problems at once. For example, many emergency responses require more energy than normal to allow the animal to utilise skeletal muscle more efficiently, make the heart pump faster and reduce response time. The action of the adrenal glands, in producing adrenaline (= epinephrine) and glucocorticoids such as cortisol, has these energy providing consequences. Such general physiological methods of trying to cope are usually combined with one or more of a variety of physiological responses which are specific to the effect which the environment is having upon the animal. Hence if it is too cold the animal may raise its hair, shiver and reduce blood supply to peripheral parts of the body but in extreme circumstances adrenal responses are involved as well.

Coping methods may be behavioral and mental as well as physiological. In the example given above of exposure to cold conditions the individual may adopt a posture in which heat loss is minimised, huddle together with conspecific animals and move to a warmer place. If normal regulatory responses are not effective, other changes may be brought about which affect the mental state of the individual. For example, a pig subjected to repeated unavoidable contact with a frightening conspecific or human may show a severely reduced range of behavior and abnormal lack of responsiveness. Close confinement of pigs, with consequent reduction in ability to show various regulatory responses, often results in the animals showing high levels of stereotypies (see p. ) such as bar-biting or sham-chewing. Such abnormal behavior is likely to be an attempt at coping but may continue, despite being ineffectual, as a behavior pathology.

Some behavioral coping methods may be closely associated with physiological changes and biochemical actions in the brain such as those of the naturally occurring opioids: ß-endorphin and the enkephalins. Another important coping system which has links with other systems is the immune system since T-lymphocyte activity is modified by both adrenal hormones and opioids. Hence the efficacy of the body's fight against disease may be changed by environmental effects on the individual which are quite unconnected with the pathogens involved.

Failure to cope ultimately results in death but many changes occur before this extreme is reached and some of these are detectable. Injury and disease can be recognised as can extreme modifications of behavior. However, it may be difficult to recognise depression in some individuals who are not coping with their environment. Responses to problems involving reduced activity and failure to act appropriately will eventually be reflected in obvious signs but are less conspicuous to an observer than active responses. We now know that both active and passive coping responses may be used in a given situation. Some individuals tend to use mainly active or mainly passive responses but others use both at different times. We still have much to learn about coping mechanisms in humans and in other species.

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