Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (First year) Subject: Zoology Paper Code: ZOG 102 Paper Title: Animal behaviour Unit: 1 Introduction to animal behaviour Module Name: Proximate and ultimate causes of behaviour Name of the Presenter: Ms Golda Dcosta

Notes

PROXIMATE AND ULTIMATE CAUSES OF BEHAVIOUR

Proximate causes (Immediate and sudden causes)- of behaviour explains the biological action in terms of the immediate mechanical influences on a trait, basically **how** the reaction occurs. It focuses on the mechanics of behaviour.

Ultimate causes (evolutionary causes) of behaviour are historical explanations and evolutionary terms or **why** the action occurs and are often linked to evolutionary fitness. It focuses on the advantages of the behaviour.

Both, Proximate and ultimate causes of behaviour follow fixed action pattern (FAP). Fixed action pattern is an instinctive behavioural sequence is unlearned, unchangeable and once initiated, is usually carried to completion. In other words, a fixed action pattern is a series of behaviour elicited by a stimulus such that even when the stimulus is removed, the pattern goes on to completion.

Examples of Fixed action pattern (FAP)

 Niko Tinbergen himself studied the behaviour of the three spined stickleback, a small freshwater fish. The males of this species are very territorial and aggressive. During the mating season they develop a red spot on their underside. Tinbergen observed that at this time male sticklebacks will attack another male stickleback that enters their territory. He theorised that the red spot on their underside was acting as an innate releasing mechanism and when one stickleback observed another with this red spot they would initiate the aggressive attack which is an example of a fixed action pattern. To test this out Tinbergen presented the male sticklebacks with a wooden model; if the wooden model had a red spot, then the stickleback would attack it. However, without a red spot there would be no reaction from the sticklebacks.

In this example the red underbelly of the other male sticklebacks is the sign stimulus that triggers an aggressive behaviour from the territorial male stickleback and this is the proximate cause. The ultimate cause is that by chasing away other male sticklebacks the original male will decrease the chance that the egg laid in his territory will be fertilised by other male. This explains both the questions of behaviour as how and why it was caused. This also explains the fixed action pattern. In this case the male stickleback attacks whatever has a red underside and is essentially unchangeable and usually carried to completion

- 2. Whenever a greylag goose sees an egg outside her nest she will methodically roll the egg back into the nest using her beak. The sign stimulus or external stimulus in this case is anything that resembles her egg. But researchers also found that even if the egg is removed, she completes the FAP by returning an "imaginary" egg. An egg outside her nest proximate cause and the ultimate cause is protecting her egg. It is a parenting instinct.
- 3. The young geese are well known to follow and imprint on their mother. The proximate cause here is that during an early, critical developmental stage, the young geese observe their mother moving away from them and calling. The ultimate cause of this behaviour is that by following their mother, the young geese receive more care and learn necessary skills and thus have a greater chance of survival than those that do not follow their mother.
- 4. In Belding's ground squirrels, when males reach about two months of age, they leave the burrow where they were born. The sign stimulus in this case is physiological. It is

an increase in testosterone that triggers this behaviour and becomes the proximate cause. The ultimate cause of this natal dispersal is debated to avoid fitness costs associated with life in the natal area and might allow them to obtain benefits elsewhere.

- 5. Herring gull chick feeding behaviour- The adult lowers its head and moves its beak. The chick pecks the red spot on the beak causing the adult to regurgitate. When the young gulls are presented with a vertical object having a red spot swung horizontally at its end, they still complete the behaviour of pecking on the red spot. Here the red spot is the sign stimulus and is the proximate cause. The ultimate causation is the anticipation of food.
- 6. The "sweet" tooth in humans. Human often like to eat sweet food. The proximate cause of this behaviour is the presence of taste buds for sweetness that increases the chances of eating high energy foods. The increased fitness associated with consuming high energy sweet foods is the ultimate reason for the natural selection of the so called "sweet tooth".