



ANIMAL BEHAVIOUR

Captive animal husbandry and welfare practice related to animal behaviour.

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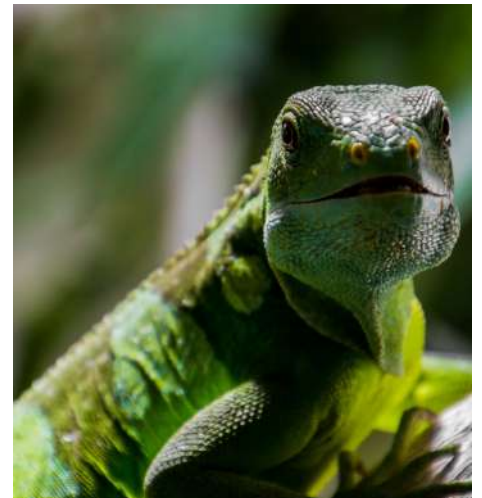
AIMS

To gain knowledge and understanding of:

- What natural, normal and rewarding behaviours are for animals.
- How the expression of normal, natural and rewarding behaviours supports good animal welfare and how this can be encouraged through the provision of species-appropriate enrichment.
- How a lack of appropriate environmental and behavioural choices can lead to poor welfare.
- What an abnormal behaviour is, how it can lead to stereotypical behaviours and poor animal welfare.

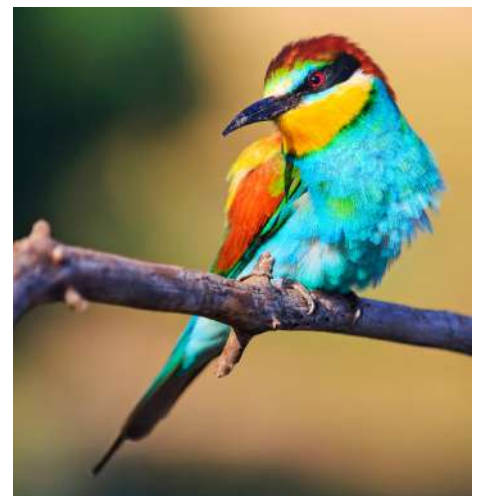
OBJECTIVES

- Apply behavioural knowledge to encourage natural species-appropriate behaviours and good welfare in the animals that you manage.
- Identify how a range of internal and external mechanisms help to shape how an animal responds and behaves.
- Recognise stereotypical and other abnormal behaviours and understand their causes.



REASONING

- To truly provide for good animal welfare, we must understand species-specific behavioural needs, why they exist and how to meet them.
- Understanding that behaviour is linked to a species' biology can help us to recognise normal and abnormal behaviours which can indicate the welfare state of an individual.
- Knowing how to provide for behavioural needs through simple environmental infrastructure and management can help to encourage behaviours that a species feels motivated to express.



ANIMAL BEHAVIOUR AND MANAGEMENT

How an animal behaves is how it acts or interacts with itself, its environment and others around it. Managing an animal's behaviour and encouraging it to behave in a natural and normal way is vital for both good physical and mental health. Good behavioural management is providing an animal with the space, environment and resources that allow appropriate movement and stimulation to express behaviours as well as giving animals choice so that they can feel in control of their own environment.

Behaviours can be species-specific such as brachiation in gibbons to help them move around easily in the trees. Some behaviours are more generalist such as digging or climbing which can be seen across a wide range of species. A behaviour is often the result of strong internal motivation and the animal will find the behaviour rewarding to express. If the animal is unable to perform that behaviour it can often lead to frustration and stress. Animals should be able to perform their entire natural behavioural repertoire to prevent poor mental well-being.



More complex social behaviours must also be provided for by housing social species in appropriate groupings. Elephants have a highly complex social hierarchy, and thrive from social interaction with other elephants. Elephants housed alone in zoos will undergo boredom, stress and depression. Highly intelligent species such as primates also need a high degree of social interaction and mental stimulation that will encourage natural and rewarding behaviours.



An animal's behaviour can be a good indicator of its mental state (how it is feeling). Abnormal behaviours usually indicate that an animal is not happy or is unhealthy.

"Behaviour is how animals express their internal motivations and emotional states, and how they react and respond to their environment. It is always meaningful."

Heather Bacon

WHAT SHAPES BEHAVIOUR?

Behaviour is influenced by a variety of different factors. These factors may be within the animal (internal) or outside the animal (external).

Internal Factors Influencing Behaviour	External Factors Influencing Behaviour
Genetics and breeding	Natural history
Anatomy and physiology	Current environment
Health status and biology function	Perinatal environment (the time during gestation and after birth)
Emotional state	Social structure
Personality	Previous environment
Previous learning experiences	
Motivational state	

Genes influence animal morphology, physiology, and personality, therefore they will influence how an animal behaves. Health status will influence behaviour because animals that are not physically fit may be unable to express all of their behavioural repertoire. Similarly, if animals are experiencing health problems which are painful, they would be more irritable or aggressive. Genes will also influence how an animal learns, which will then have an impact on their behaviour in terms of being able to cope with new challenges.

How an animal feels (the emotional state) will also affect how the animal reacts and behaves in any situation. Animals that are experiencing feelings of depression or frustration will react and respond differently to those experiencing feelings of contentment or pleasure. Motivational state also impacts animal behaviour and this can then influence how the animal feels. For example an animal that is highly motivated to perform food-finding behaviour or exploratory behaviour will try to do these things, but if the environment does not allow these behaviours to be expressed, the animal may feel frustrated. This shows that behaviours and emotions are linked. How the animal behaves and how it feels, and thus its welfare, is dependent upon the interaction of different internal and external factors.



THE NATURAL BEHAVIOURAL REPERTOIRE

A natural behavioural repertoire is a comprehensive compilation of all the behaviours that can normally be seen (and described) for a particular species of animal in the wild. These behaviours will encompass every aspect of the animal's life from breeding behaviours, to food acquisition and social interactions. Repertoires can be useful tools to assess welfare in captivity. The more behavioural activities that can be seen means that more motivational needs are being met in that animal or species. In general, the percentage of the natural behavioural repertoire being expressed will reflect on the standards of animal welfare being experienced.

WHAT SHAPES BEHAVIOUR?

The environment, and especially the perinatal environment, can influence animal development, physiology and health and have long-term impacts on animal behaviour. Different species will be genetically motivated to behave in a certain way, depending on the environment they have evolved to survive in. These behaviours will persist, even in a captive setting. An animal will behave differently in a static, limited enclosure that lacks opportunities to express meaningful behaviours than in an environment that allows these highly motivated and evolved behaviours to be expressed. Social situations will also impact animal behaviour, for example, in situations where there is social conflict, animals may show more aggressive or fearful behaviours, whereas in compatible social groups we may see behaviours such as social grooming or co-sleeping.



The immediate environment (i.e. the surrounding environment) will affect how an animal feels and reacts. For example, loud noises during peak visitor time can cause stress. How the animal reacts and responds to that environment is also dependent on its genetics and mental state.

When we consider an animal's behaviour, we should always focus on the interaction between both the internal and external mechanisms, and how they influence how an animal behaves and reacts.

Q: What external environmental factors do you think might be shaping an animal's behaviour within your facility?



EXAMPLES OF ADAPTIVE BEHAVIOURS

Just like humans, animals have evolved to perform certain behaviours that help them cope and thrive in specific environments. This is called behavioural adaptation.

Cuttlefish have the ability to change their colour and pattern in order to blend into their surroundings. They can detect the light and colour within their surroundings then use that information to mimic it with their own pigments. They have 3 skin layers which can be stretched in different ways to make unique colours and patterns. Together, these features allow cuttlefish to escape predators, as well as sneak up on unsuspecting prey.



Chimpanzees evolved in complex environments that require cooperation and the evolution of large brains to avoid predators and find food. As a result, they live in complex communities with intricate communication techniques that allow them to live both a ground and tree dwelling lifestyle in large groups.

Kangaroo rats have adapted to survive in the desert by getting all the water they need from the seeds that they eat. With few places to hide in the desert, they also have incredible hearing and can jump up to nine feet, which helps them avoid predators.



Photo by
Alan Hill



Crocodylians are semi-aquatic and exhibit a range of behaviours, including investing large amounts of energy in parental care. They create a nest from soil and vegetation and guard the eggs during the incubation period. Mothers then move babies from the nest to the water when they hatch and guard them in the water for weeks and sometimes months.

DEFINING BEHAVIOURS

Natural behaviour has been defined as a behaviour that is:

“Typically observed in the wild; it is adaptive in the evolutionary sense...(i.e.) has evolved by natural selection which allows an individual to survive more easily in its particular environment and so gives it a better chance of leaving offspring than an animal not so adapted.”



Unnatural behaviour is defined as a behaviour that is:

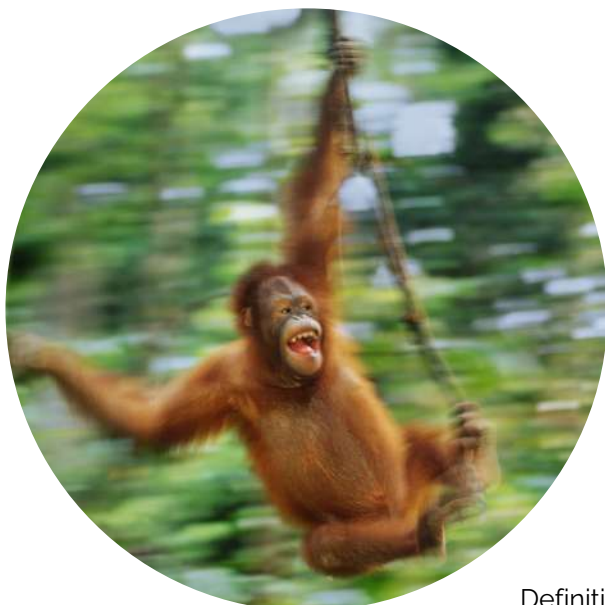
“Not seen in the wild. Not all unnatural behaviours are regarded as abnormal, however, as they may promote success within the captive environment.”

Normal behaviour will:

“Promote the success and survival of the individual and its genetic contribution to the population” and is “clearly appropriate to the particular situation.” It may also “be either natural or unnatural.”

Abnormal behaviour is defined as a behaviour that is:

“Rarely seen in wild populations and does not promote the success and the survival of the individual or its close relatives (i.e. it does not increase fitness). It appears not to be goal oriented, so that its function is not apparent.” It “may include elements of normal activities, but they are performed in an inappropriate fashion.”



ANIMAL BEHAVIOURS AND THE CAPTIVE ENVIRONMENT

FRUSTRATION

Animals evolve specific skills and behaviours to survive in the wild. If the zoo environment does not allow these natural behaviours to be expressed, an animal may become frustrated.



STRESS

Animals are kept in zoos where the environment is different to the environment the animal has evolved and adapted to. This different environment can be stressful for the animal because it does not have the necessary behaviour or physiology to cope with a new environment.



THRIVING

If the zoo environment offers environmental choices that allow the animal to express its natural and normal evolutionary behaviours in an environment designed for species-specific needs, an animal can thrive.



GOOD BEHAVIOURS TO ENCOURAGE

Strongly motivated behaviours should **always** be encouraged. These can be encouraged through appropriate enclosure design, food presentation, diet, social interactions, environmental and behavioural enrichment. Some examples of behaviours that should be encouraged include relaxation, exploration, care-seeking and giving, grooming, foraging, nesting, digging, climbing and play.

Q: Can you recognise natural behaviours in the animals you care for? Which behaviours do you think are the most important to the animal?



If an animal is maintained in an unsuitable environment it will be frustrated and stressed. This can often lead to behaviours called STEREOTYPIES

ABNORMAL BEHAVIOURS

Abnormal behaviours usually evolve from normal behavioural patterns, becoming abnormal. A stereotypical behaviour is an example of an abnormal behaviour and described as a repetitive or ritualistic movement, posture or even vocalisation.

A stereotype is usually recognised as being less flexible than a normal behavioural pattern, more rigid and carried out even when there is no stimulus for it. A stereotype is a symptom. It demonstrates that the animal is not coping with its environment. To improve conditions, an animal carer must address the underlying cause.

Rays and sharks in aquaria can be seen to demonstrate abnormal behaviours, the most common of which is surface breaking behaviour (see photo). The individual will repeatedly lift the front of its body out of the water. This behaviour is not seen in the wild. In some fish species, abnormal behaviours can be symptomatic of diseases being present.



As an animal carer you need to be able to recognise abnormal behaviours by first understanding what natural and normal behaviours are for that species. Using this knowledge and assessing what the motivations of that animal are, you can understand if a particular behaviour is not normal for that species or individual and is possibly a stereotypical behaviour.

Examples of abnormal behaviours

- Repetitive hair pulling.
- Repetitive body scratching.
- Repetitive bar licking.
- Frantic activity levels (may be indicative of stress as well).
- Lethargy (for unusually long periods of time).
- Fence pacing (with no end goal).
- Head weaving.
- Body rocking.



Tigers have a large territory in the wild. In captivity they will naturally spend a large part of their day walking around their enclosure to mark their territory. However, if this behaviour is repetitive and without a purpose, it can be considered a stereotype. Animals perform abnormal repetitive behaviours due to changes in their brains that occur as a response to chronic stress, frustration or pain. These experiences lead to the release of chemicals in the brain to help the animal cope. In an attempt to generate more of the chemical, the animal will perform the behaviour more. Because of this, it is important to prioritise prevention of abnormal behaviours instead of cures.

Q: Can you recognise stereotypical behaviours in the animals you care for?

Why do you think this abnormal behaviour is occurring?



HOW CAN WE ENCOURAGE NATURAL AND REWARDING BEHAVIOURS IN CAPTIVITY?

In captivity, a happy animal will exhibit a range of normal, natural and rewarding behaviours. An unhappy animal will consistently exhibit abnormal and stereotypical behaviours. Knowing what is normal and natural for the species you care for is very important. Many species, including humans, have the same basic needs. Eating, sleeping, locomotion, appropriate socialisation and appropriate environments are all basic behavioural needs. Ensuring these, and the more species-specific needs are consistently being met will help promote good welfare.

Remember!

Different species can have different behavioural needs based on their internal and external mechanisms. For example, different species of snakes will interact with their environments differently depending on their morphology, where they evolved and their current mental state (how they're feeling). Some species of snake are arboreal whereas some live in sand. Both behave differently due to their environment.

We must consistently provide opportunities for the animals to be able to carry out natural and rewarding behaviours whilst ensuring they remain free from injury and in good physical health.



EXAMPLES OF BEHAVIOURS TO ENCOURAGE IN DIFFERENT SPECIES



- Group socialising.
- Trunk manipulation.
- Dust and water bathing.
- Foraging.
- Cognitive use.



- Foraging/investigating.
- Nesting.
- Climbing.
- Olfactory use (smelling and marking).
- Grooming/rubbing.



- Partner socialising.
- Flight and bipedal movement.
- Foraging.
- Cognitive Use.

COMFORT, CHOICE & CONTROL

We should provide environments that promote positive feelings, including contentment and satisfaction, that are derived from opportunities to express behaviours. A good environment is not an environment that looks natural but one that promotes natural and rewarding animal behaviours.



COMFORT

Ensuring an environment is comfortable means you are creating a satisfying social and physical environment. This includes:

- Rewarding social interactions.
- Providing secure places for the animals to hide.
- Appropriate temperatures and humidity.
- Comfortable spaces using soft substrates.
- Rewarding eating and drinking opportunities.

By providing a comfortable environment, you will be able to meet an animal's basic behavioural needs. However it is also important to allow the animal to have choice and control over its environment.



THE IMPORTANCE OF CHOICE

Imagine only ever having one choice of food to eat, or one room to live in, or only one friend to interact with. Just like us, animals enjoy having choices and the ability to choose what they eat, when they eat, where to live and who to interact with. Traditionally, humans control all of these aspects of an animal's life in captivity. Removing the ability to choose how to behave can be detrimental to an animal's well-being and it is up to animal carers to ensure as many choices as possible are available to each individual.

WHAT CAN REDUCE CHOICE IN CAPTIVITY?

- A lack of enriching and species-appropriate environments (social and physical).
- An unvaried diet fed at the same time.
- Animal restraint such as tethering or public handling.
- Animal shows.
- Lack of appropriate social interactions.



Example: fennec foxes are from the Sahara. They are nocturnal and live in burrows or dens during the day. An environment that lacks good denning choices during the day (such as in the photo), can result in chronic stress for the animals.

Research has shown that giving animals choice is more important than them using it.

There have been studies that show chimpanzees, gorillas and bears responding positively to being given the choice to be inside or outside. Even if they decide to stay in one place, having the option to choose where they want to be is important to ensure good welfare standards.

Other studies found panda stress levels were reduced when they were given the choice to use an indoor space away from public view, even when they did not use that space.



Q: How can you offer the animals in your care more choice, comfort and control over their environment?



HOW CAN WE PROVIDE ANIMALS WITH CHOICE?

Below are just a few factors you might want to consider when thinking about how you can provide an animal with more behavioural choices:

Consider what you feed them and how. Do you provide different food options regularly and note which ones they prefer? Do you offer the food in a manner that encourages rewarding feeding behaviours?

Consider whether your animals can move freely around their enclosure (both indoors and outdoors) at all times. Do you provide access to indoor areas (if they exist) all the time? Do you provide opportunities for the animals to hide from each other or the public?

Consider the enclosure complexity. Does the enclosure environment encourage a range of behaviours that the animals can choose from? For example, digging in a range of substrates or climbing in different spaces - can they do this at all times?

Consider whether your animals have a range of of temperatures/humidity to choose from. Is there a temperature gradient offered to the animals, i.e. do you provide cool or hot areas which they can choose from, depending on how they feel?

Consider if they can appropriately socialise with others? Can the animals choose who to interact with? Do they have a choice who to make friends with and does the environment allow for positive interactions?

CHOICE AND CONTROL

Choice lets an animal react to its environment, whilst control allows the animal to proactively change its environment.

It is very important for an animal to be able to react to its environment in a manner that feels comfortable. Having control over their environment helps to ensure this.

We can provide control by ensuring there are plenty of species-appropriate choices.

We can also provide control by creating environments that can be manipulated by animals - for example automated water sprinklers that only turn on if the animal chooses to walk under it.



Remember, from an octopus to an elephant, all species will benefit from having choice and control over how they can act and react to the environment.

SUMMARY

Encouraging natural behaviours that animals feel motivated to express is extremely important for good animal welfare. Behaviour is how animals express their internal motivations and emotional states and how they react and respond to their environment – it is always meaningful. An animal will thrive in captivity if the zoo environment offers environmental choices that allow the animal to express normal behaviours that the animal feels motivated to undertake. Abnormal and stereotypical behaviours are a result of poor management and care, and can lead to very poor welfare, as well as frustration and suffering.

Species-appropriate stimuli, enclosure design and infrastructure helps animals express their behavioural needs. A lack of appropriately stimulating environments can result in frustration and stress which can result in abnormal or stereotypical behaviours.

IMPORTANT POINTS TO REMEMBER

- Natural, highly motivated behaviours are species-specific and are important for a happy and healthy animal.
- Behaviour is always meaningful and continual assessment of behaviour is essential to ensure a good standard of welfare is being experienced by each and every animal.
- Providing an animal with choice, comfort and control of an environment is very important to ensure a good standard of welfare is being experienced.
- Social interaction for social species is not only enriching but necessary to ensure good welfare.
- Behaviours are shaped by internal and external mechanisms. They have often evolved to help the animal adapt to a specific environment.

QUICK QUESTIONS

Behaviour Basics

- **What is animal behaviour?** Create a short statement you would use to describe animal behaviour to your colleagues or team.
- **Define natural, unnatural, normal and abnormal animal behaviours.**
- **Do you understand what natural behaviours should be being expressed in the different animals you care for?** Consider two different species in your zoo and list at least 5 different natural behaviours you would expect to observe in these species.
- **What are the internal and external mechanisms that shape an animal's behaviour?** Choose one species and consider what behaviours evolved as a result of the natural environment.
- **Choose an animal you care for and list possible natural behaviours that you should observe in that individual.** Consider whether they have opportunities to express these natural behaviours in their current environment at ALL times?
- **Do you work with any animals with very specific behavioural adaptations to cope with specific environments?** Are those adaptive behaviours being stimulated in the animals current environment?

Abnormal or Stereotypical Behaviours

- **Can you recognise unnatural or abnormal behaviours in any of the animals you care for?** Name the species and list the possible reasons why those behaviours are being expressed. Does the current enclosure restrict these behaviours and how?
- **What can abnormal behaviours in animals indicate?** Consider what different abnormal behaviours observed in the animals might be telling us.
- **What is a stereotypical behaviour and what can it tell us about the animal?** Choose one example of a stereotypical behaviour in a species and describe why you think this behaviour arose.
- **How would you go about addressing the expression of an abnormal or stereotypical behaviour in an animal?** What would you change or keep the same? Do you have records which you could use to investigate whether this behaviour is new?

ACTIVITIES



CHOOSE AN ANIMAL (OR GO TO AN ENCLOSURE) AND WRITE A LIST OF BOTH THE NORMAL BEHAVIOURS AND ABNORMAL BEHAVIOURS YOU OBSERVE. WRITE DOWN 5 SHORT-TERM CHANGES AND 5 LONG-TERM CHANGES YOU WOULD MAKE TO THE ENCLOSURE TO ENCOURAGE MORE NATURAL BEHAVIOURS. THINGS TO CONSIDER:

- **WHAT SPECIFIC BEHAVIOURAL NEEDS DOES THIS SPECIES OR INDIVIDUAL REQUIRE? HOW DO YOU KNOW? CONSIDER WHAT YOU WOULD OBSERVE IN THE WILD.**
- **ARE THE ABNORMAL BEHAVIOURS DUE TO ENCLOSURE DESIGN/FOOD/INFRASTRUCTURE OR ALL THREE?**
- **HOW WOULD YOU ENSURE THE SAFETY OF THE ANIMALS AND STAFF WHEN MAKING THE CHANGES?**
- **REMEMBER BOTH INDOOR AND OUTDOOR AREAS SHOULD BE CONSIDERED.**
- **WHAT MAINTENANCE WOULD BE REQUIRED TO THE CHANGES MADE?**
- **HOW DO YOU THINK YOU COULD PRESENT THESE IDEAS TO YOUR SUPERVISOR?**



CHOOSE ONE SPECIES IN YOUR ZOO AND CONSIDER BOTH THE INTERNAL AND EXTERNAL MECHANISMS THAT SHAPE THE ANIMALS' BEHAVIOURS. LIST 1) SOCIAL NEEDS, 2) FEEDING NEEDS, 3) SLEEPING/RESTING NEEDS, 4) HOW NEEDS DIFFER DEPENDING ON AGE AND SEX OF THE SPECIES. DISCUSS WITH YOUR TEAM IF THESE NEEDS ARE BEING MET WITHIN YOUR ZOO AND WHAT IMPROVEMENTS COULD BE MADE?

- **WHAT ENVIRONMENT DID THIS SPECIES EVOLVE IN? CONSIDER FACTORS SUCH AS THE TEMPERATURE, HUMIDITY, COMPETITION, PREY/PREDATOR INTERACTIONS, STABILITY OF THE ECOSYSTEM.**
- **AS A RESULT OF THE ENVIRONMENT, WHAT, IF ANY, ARE THE SPECIES' SOCIAL NEEDS?**
- **HOW LONG DOES THE SPECIES SPEND FINDING FOOD IN THE WILD?**
- **WHAT DOES THE ANIMAL USE TO LOCATE AND CONSUME FOOD IN THE WILD?**
- **IS THE SPECIES PREY, PREDATOR OR BOTH? HOW DOES THIS IMPACT ITS BEHAVIOURS?**
- **WHAT COGNITIVE ABILITIES DOES THIS SPECIES HAVE? HOW CAN YOU APPROPRIATELY CHALLENGE THESE IN CAPTIVITY?**