Detecting Preference and Motivation for Environmental Resources: An Animal Welfare Approach

Caroline Marques Maia*

Laboratory of Animal Physiology and Behavior, IBB, UNESP, Botucatu, SP, Brazil

*Corresponding author: Caroline Marques Maia, Laboratory of Animal Physiology and Behavior, IBB, UNESP, Botucatu, SP, Brazil **E-mail:** carolmm_luzi@hotmail.com

Animal Welfare Science began to gradually develop in the 60´s, probably as a consequence of the publication of the book "Animal Machines" by Ruth Harrison [1], which denounced several practices that were done without regard for animal suffering. Since then, much research has been conducted aiming to identify the welfare states of animals. Firstly, an animal was considered to have good welfare when it was physically healthy, feeding, and producing well. Everyone can easily understand the importance of these characteristics and believe they may be part of animal welfare considerations, but welfare may not be restricted to this. How the animal behaves may also indicate if it is in a better or a worse condition. Thus, a healthy and productive animal or even an animal that is feeding well may be in a poor welfare condition if it is, for example, expressing some stereotypic behaviour. Stereotypies are defined as a series of movements regularly repeated with no apparent purpose or goal [2], probably induced by frustration, repeated attempts to cope and/or brain dysfunction [3].

However, we should consider that even an animal behaving "naturally" does not necessarily have good welfare, and that the opposite may also be true [4]. For example, an animal fleeing from a predator is behaving naturally, but it should not be considered to have good welfare in that moment. Moreover, how can we be sure that some behaviours are natural and others are unnatural, stereotypic or otherwise abnormal? How can we be sure that an animal expressing some abnormal behaviour is in a worse situation than an animal not expressing it? If we consider that the expression of an abnormal behaviour could be a coping strategy used to deal with the restrictions of the captivity [5], and that an animal not expressing it could be in such an intense state of frustration or depression that it is simply unable to do so, we will not likely be sure of our answers. Similarly, according to Hill & Broom [6], natural behaviours should not necessarily be expected in environments that are more restricted than natural ones as captivity. Moreover, some studies contested stereotypies as unequivocal indicators of poor welfare conditions (e.g. De Passillé et al. [7]).

Furthermore, some aspects of animal welfare are difficult to measure: emotional states, including positive internal states such as pleasure and negative internal states such as fear or pain. There are many papers demonstrating that different animal species are able to feel pain, including fish species (for a review about pain in fish, see Braithwaite & Huntingford, [8]), and other papers indicating that animals are often afraid of handling and human beings [9,10]. Such negative emotional states are detrimental to animal welfare, but, as I mentioned above, the emotional component of animal welfare is not restricted to unpleasant feelings. The absence of pain and any another kind of suffering is not an indicator per se that the animal is in a good welfare state. The animal may not be suffering in any way, but it might not be experiencing any pleasure either. Does this mean that the animal is in a good welfare condition? Moreover, what do we know about the pleasure animals feel, for example, when interacting with a resource they are highly motivated to reach? Much more research is necessary to identify positive emotions in animals.

Thus, identifying animal welfare indicators that are unequivocal has not been an easy task. Considering these issues, Marian Dawkins [11,12] has proposed that we should turn our attention to what the animal wants instead of looking for such welfare indicators. In this context, Volpato et al. [13] has defined good welfare as the internal state of an animal when it is in a situation that it freely chose. Dawkins [12] has extended this idea, by defining good animal welfare as a condition in which the animal is healthy and has what it wants. Thus, many papers have focused on evaluating the animal's preferences through choice tests, where two (binary tests) or more (multiple-choice tests) options are available for the animal to choose. Considering this approach, much progress has been made. The researchers have identified the preferences of many animal species for different environmental resources, such as sucrose [14], habitats [15], sexual partners [16-19], temperature [20] and many other resources.

In addition to this idea, Duncan [21] recommended identifying not only preferred and non-preferred conditions, but also the intensity of the responses. Thus, many papers have evaluated the intensity of the animals' motivation to access environmental resources, and some progress has also been made towards this goal. The studies have evaluated the animal motivation for different resources, such as contact with conspecifics [22]; additional space [23]; dust-baths [24]; motivation to reach many different items [25] and even to express a stereotypic behaviour [26]. These studies are based

on the idea that the more the animal is motivated to reach the item, the more important that specific item is to this animal. In this way, the motivation of the animal is usually inferred from the physical effort spent to access a given resource. Such effort is generally measured by gradually increasing the amount of weight on a push door that blocks a given resource (e.g. Duncan and Kite, 1987 [27]) or the number of times that a pre-conditioned behaviour (such as push a switch; e.g. Sherwin, [23]) needs to be repeated to access a specific resource. In these tests, food is usually used as a benchmark to compare the motivation of the animals to reach other resources, since it is considered the resource the animal is most motivated to access.

Although these approaches seem to be promising, some caution is necessary to apply and interpret preference and motivation tests. For instance, an animal may choose an available option because of a bias of the test apparatus or of the surrounding environment, or even because it was distracted by something (for review, see Volpato et al. [13]). In addition, the animals may choose what is good at the moment, but not necessarily what will be good for welfare in the long-term. Considering the motivation tests, Hovland et al. [28] has demonstrated that the food resource, usually used as a benchmark, may even elicit an aversion response if it is made available in excess. Thus, using food as a parameter to compare the animal motivation to reach other resources is an approach that also needs caution. Furthermore, basically most preference and motivation studies are concentrated on farm and lab animals. Considering that zoo and other captive animals may also suffer from poor welfare conditions, it is also relevant to evaluate their preferences and motivation for the resources. When applying environmental enrichment, which is a technique widely used to improve the welfare conditions of zoo animals, why not give the animals what they prefer or are very motivated to have? Thus, although preference and motivation tests are promising in improving the welfare conditions of the animals, some caution is needed and we still have a long way to go.

Acknowledgments

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