

A Review of Pacing in Captive Tigers

Stereotypies are a coping mechanism for innumerable animals in captivity (Lyons et al., 1997, Szokalski et al., 2012). Restrictions on natural behaviors such as hunting, territorial roaming, and mating induce the stereotypy of pacing in tigers (*Panthera tigris*) (Bashaw et al., 2007, Szokalski et al., 2012). Pacing is categorized as a stereotypy if the tiger walks between the same two points, either in a straight line or figure eight pattern for at least two consecutive repetitions (Bashaw et al., 2007, Nevill & Friend, 2003). Pacing is not observed in the wild and is a result of a lack of mental and physical stimulation in captivity (Szokalski et al., 2012). Pacing serves the function of spending energy that would normally be allocated to appetitive behaviors such as hunting, cleaning prey, and searching for mates (Mohapatra et al., 2014).

Traditionally, observational studies are used to track the percentage of the tiger's day spent pacing (Mohapatra et al., 2014, Szokalski et al., 2012, White et al., 2003). Many studies indicate that captive tigers spend as much as 25% of their day engaged in pacing (Mohapatra et al., 2014, Nevill & Friend, 2003); this number remains fixed regardless of enclosure size which contradicts the common hypothesis that extra space should decrease pacing rates (Lyons et al., 1997, White et al., 2003). Moving tigers into larger enclosures after being in relatively smaller ones also does not have a significant effect on decreasing pacing rates (Lyons et al., 1997, Mohapatra et al., 2014), and if perpetuated overtime, it is believed that pacing can become a fixed element of a tiger's behavioral repertoire (White et al., 2003).

Pacing in zoos is caused by several factors. This includes the stress of seeing/smelling the presence of conspecifics and zoo guests (Bashaw et al., 2007, White et al., 2003). The presence of other tigers or humans is stress inducing as tigers are solitary for most of their lives in the wild (Szokalski et al., 2012). When in captivity, due to financial limitations, zoos often need to place tigers in groups of two or more, and this increases stress levels in the felids (Mohapatra et al., 2014, Nevill & Friend, 2003.). Studies indicate that when tigers are unable to control access to conspecifics, either by claiming their own territory or isolating themselves totally, pacing levels increase (Bashaw et al., 2007, White et al., 2003). This was supported when results from an experiment involving placing a visual barrier in order to separate conspecifics saw a significant increase in pacing as the tigers were still receiving olfactory and auditory cues from conspecifics without being able to visually locate the source of the cues (Bashaw et al. 2007).

Experimental studies can look at various enrichment efforts to see if there is a positive reduction in the time spent pacing (Bashaw at al., 2003, Damasceno et al., 2017, Ruskell et al., 2017). Researchers interested in studying the effects of enrichment use either variations of the same enrichment method (Damasceno et al., 2017) or a rotation of different kinds of enrichment (Skibieli et al., 2017) to quantify changes in pacing behavior. Using different novel food methods,

such as bones, fish, and spices causing pacing to decrease at different rates and significance levels in tigers; introduction of fish has demonstrated prolonged decreases in pacing rates one week after enrichment (Bashaw et al., 2003, Skibieli et al., 2017). The most common enrichment efforts involve novel food items and enclosure rotation (Bashaw et al., 2003, Ruskell et al., 2015, Skibieli et al., 2017). Enrichment aimed at enclosure rotation shows that tigers use urine spraying to mark their territory when another felid has just been in their enclosure; this chemical communication is used by the tiger to avoid physical conflict and was considered a positive reaction as the rotation promoted this natural behavior (White et al., 2003).

Future research should aim to study enrichment efforts that not only reduce pacing during trials, but also can change behavior in the long term (Bashaw et al., 2003, Skibieli et al., 2007). This may include focusing on efforts not centered on feeding enrichment, but rather looking more towards strategic social pairing, or beneficial keeper-felid interactions (Szokalski et al., 2012).

Citations

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