

An investigation into the cognitive abilities of Harris's Hawks (*Parabuteo unicinctus*) and the potential impact on the species enrichment in captivity

Introduction

Animal cognition has been shown across the animal kingdom in captivity and in the wild. Cognitive ability can be seen in areas such as tool use and problem solving (Heinrich, 1995; Weir *et al*, 2002). The emergence of animal cognition research has been taken into consideration for animal husbandry and welfare for many animals, thus enrichment was developed to help reduce stress and stereotypical behaviour in many animals. However, birds of prey such as Harris's Hawks are often forgotten about when it comes to enrichment. The aim of this study is to investigate whether Harris's Hawks can use their cognitive ability to solve a string pull test and improve time taken to solve these tests with increased number of attempts, thus suggesting Harris's Hawk have higher functioning cognition. Therefore, showing their need for enrichment in captivity.

Method

- Before testing Harris Hawks will have two one-hour periods of habituation to equipment.
- The Harris's Hawk will not be fed 20 hours before testing.
- Equipment is placed into aviary
- String is baited and shown to Harris's Hawk.
- Time taken to solve the string pull is recorded.
- If unsolved after 30 minutes equipment would be removed.
- The Harris's Hawks were tested on four variations of the string pull test; vertical string pull, vertical string pull (extended sheath), vertical string pull (extended sheath after two-week break), and horizontal string pull.



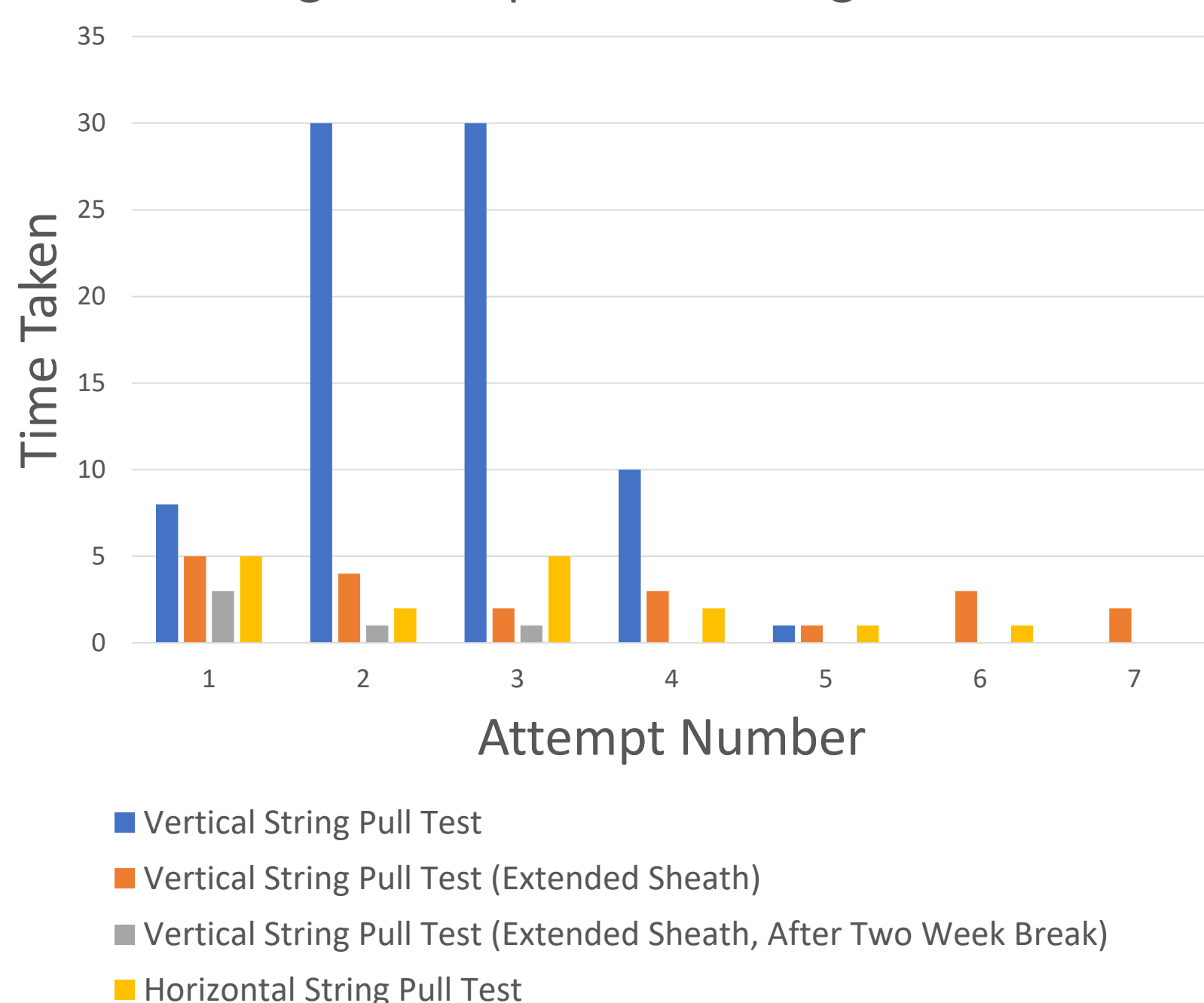
Subjects & Materials

- Three Harris's Hawks
- 2 females & 1 male
- Threaded string (0.5cm diameter)
- Weighed down round plastic sheath (Height of 58cm and diameter of 8cm)
- Day old chick (as food reward)

Results

Only one of the Harris's Hawks was successfully able to solve the string pull tests. As can be seen in the graph a steady decrease in solving time indicates the ability to learn from past attempts. A Spearman's rank correlation coefficient has been used on these test showing a negative correlation; vertical string pull test $r = -0.4$, vertical string pull test (extended sheath) $r = -0.54$, vertical string pull test (extended sheath, after two week break) $r = -0.5$, and horizontal string pull $r = -0.66$.

Angel's Attempts At All String Pull Tests



Discussion

Evidence from the results can be shown to suggest Harris's Hawks have trial and error learning, with clear significance shown by the time taken to solve the horizontal string pull test in comparison to attempts taken, shown by the -0.66 spearman's rank correlation coefficient. This evidence is supported in Colbert-White *et al* (2013) study with another Harris's Hawk solving the vertical string pull test which solving time went from 380 seconds to 8.5 seconds. Thus suggesting evidence of higher functioning cognitive ability. However, this study as well as Colbert-White *et al* (2013) only have data from one Harris's Hawk so it is recommended that further research is taken into this area to provide more in-depth knowledge into Harris's Hawk cognition and in turn giving evidence on whether enrichment is required.