

# Stereotypy is Not Irrelephant!

Ivy Hellickson, Christina Barrett & Emily Agan

Reed College, Bio342

## Why would captive elephants exhibit stereotypic behaviors?

- In the wild, Asian elephants (*Elephas maximus*) roam a **huge** feeding range and are a part of a **large family network**.
- By contrast, captive elephants live in a **small environment** in **small groups**. The Oregon Zoo herd is made up of only 7 individuals!
- This leads to **stereotypic behaviors**—repetitive behaviors that serve no obvious purpose [1].
- In elephants, this looks like **rhythmic head movements, swaying or repetitive pacing** [2].

## What factors affect stereotypy?

- Previous studies show that **stereotypy varies** with food and time [2].
- We set out to confirm this relationship and identify other variables!



The Oregon Zoo herd from oldest to youngest—Packy, Tusko, Shine, Rama, Chendra, Rose-tu and Samudra.

Photo Credit: The Oregon Zoo.

## Experimental Design:

**Hypotheses: Stereotypy increases as...**

- 1.) age increases
- 2.) social behavior decreases
- 3.) food accessibility decreases
- 4.) the day goes on



Rose-Tu and Shine exhibiting social behavior.  
Photo credit: Benjamin Brink, The Oregonian.

Behavior was recorded...

- Four times in November between 9 o' clock a.m. and 4 o' clock p.m..
- Using **10 minute intervals of focal sampling.**

**Our Ethogram can be condensed into two portions...**

### **1.) Stereotypy**

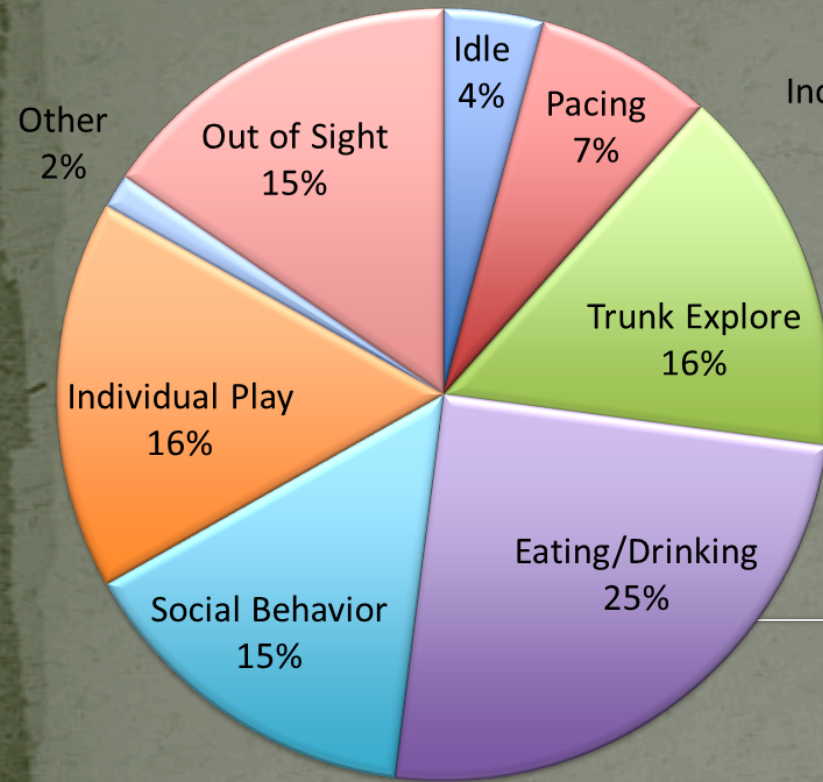
- Pacing—taking three or more steps toward no obvious destination, often in circles
- Weaving—any combination of head and trunk swaying.

### **2.) Social Behavior**

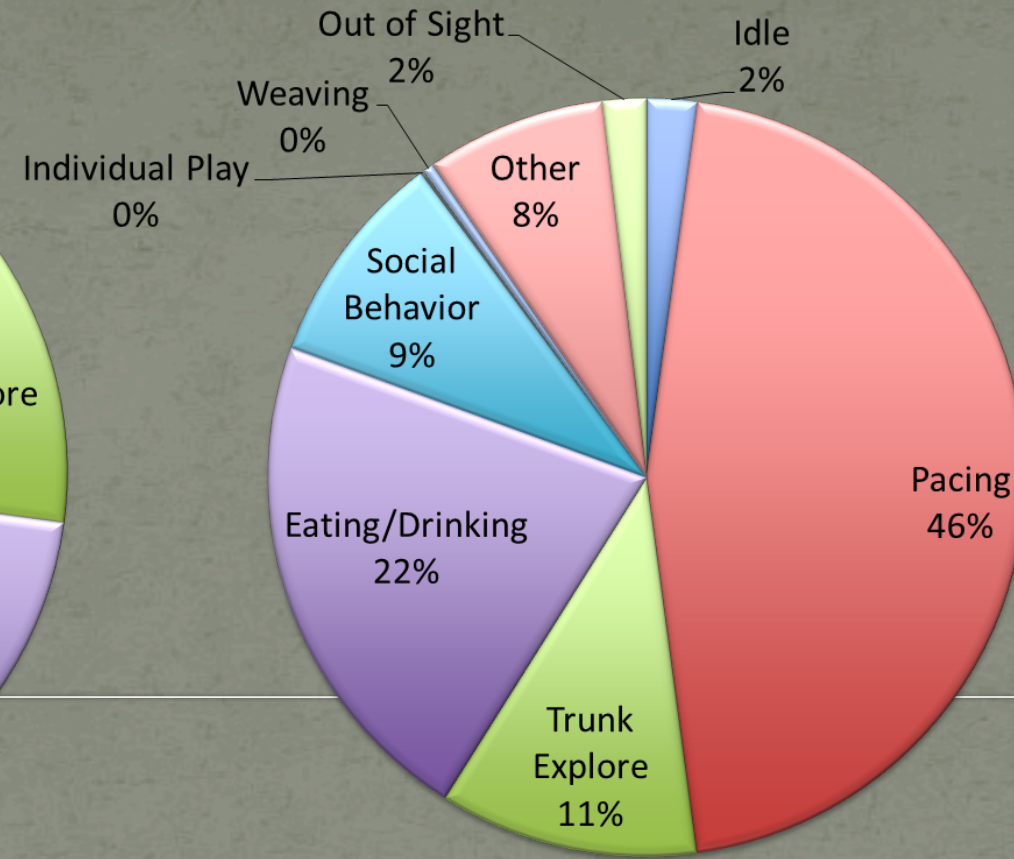
- Proximity—coming within 5 feet of one or more elephants
- Physical contact—body rubs or bumps, trunk touching or wrapping, genital exploration and head butting

# Results:

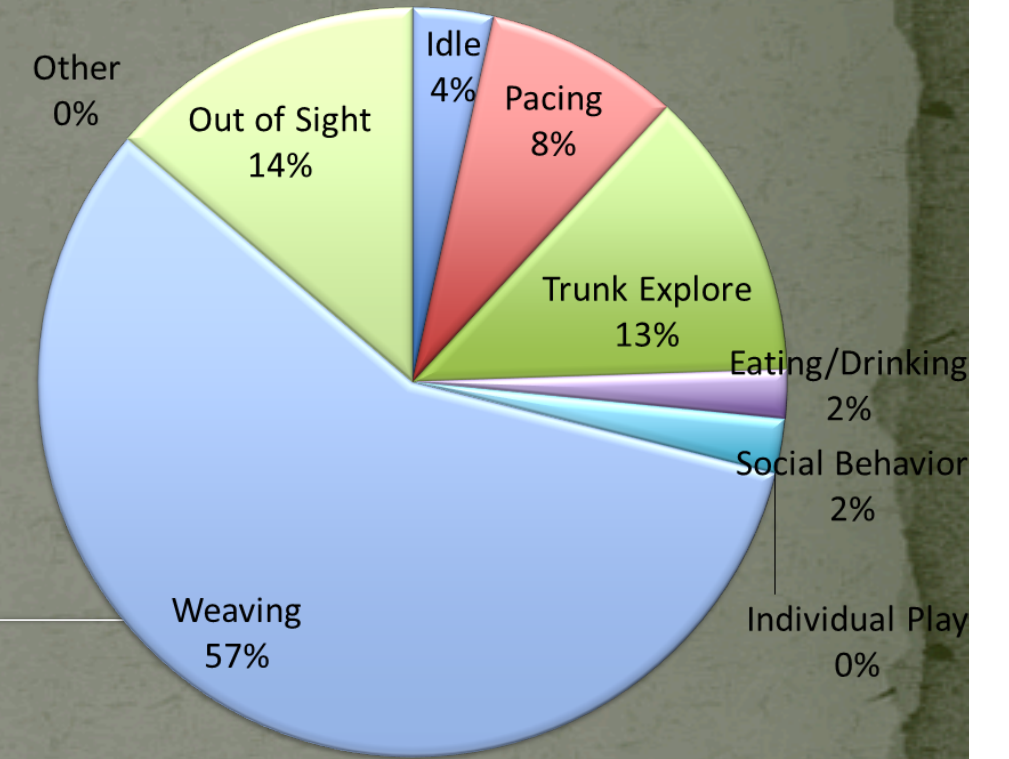
**Average behavior for Sam, a four-year-old male calf**



**Average behavior for Chendra, a 19-year-old cow**



**Average behavior for Rama, a 29-year-old bull**



Sam

Photo credit: pdxpipeline.com



Chendra

Photo credit: The Oregon zoo



Rama

Photo credit: The Oregon Zoo

# Results:

## Stereotypy vs. Proximity

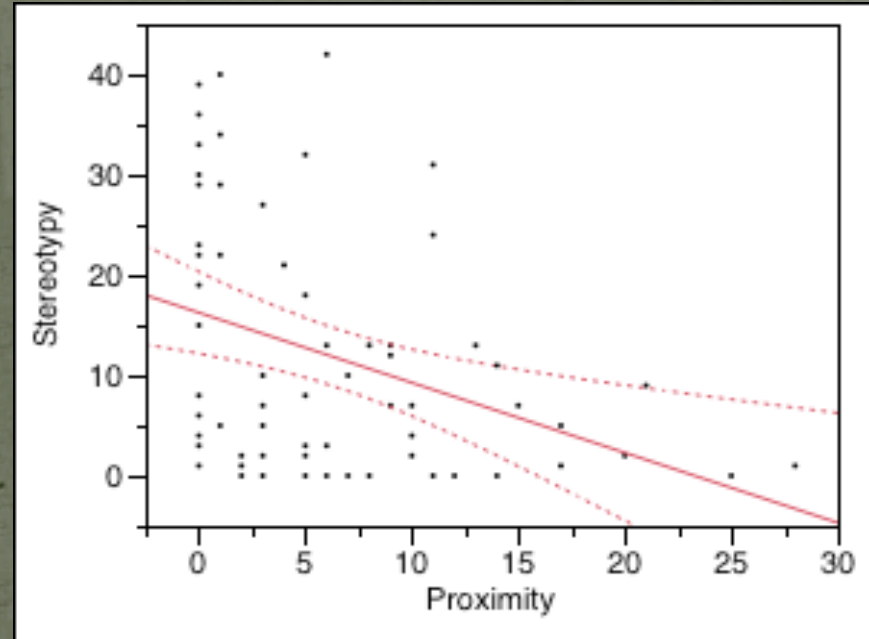


Fig 1. There is a statistically significant **negative correlation** between stereotypy frequency and time spent in **proximity** to other elephants ( $p = 0.0028$ ).

## Stereotypy vs. Feeding

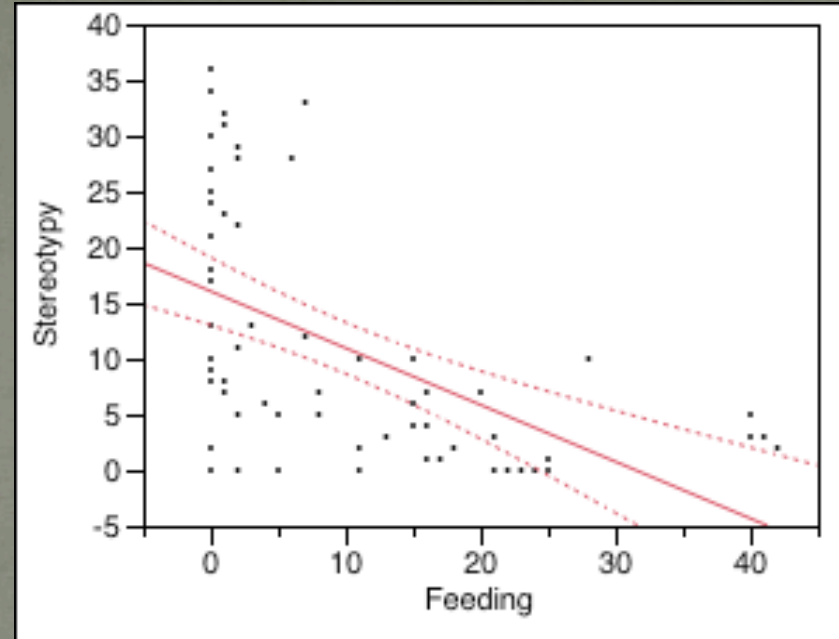
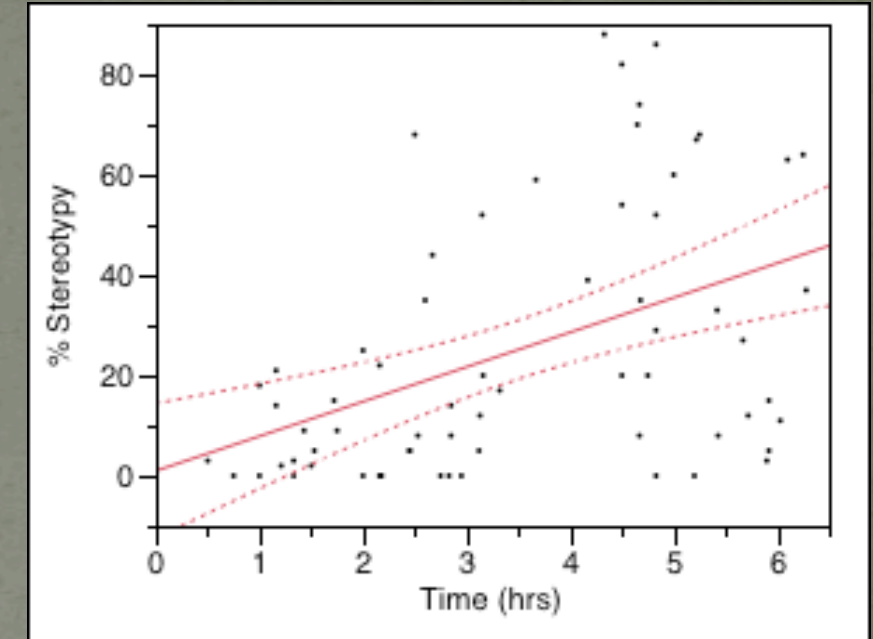


Fig 2. There is a statistically significant **negative correlation** between stereotypy frequency in the elephants and time spent **feeding** ( $p < 0.0001$ ).

## Stereotypy vs. Time



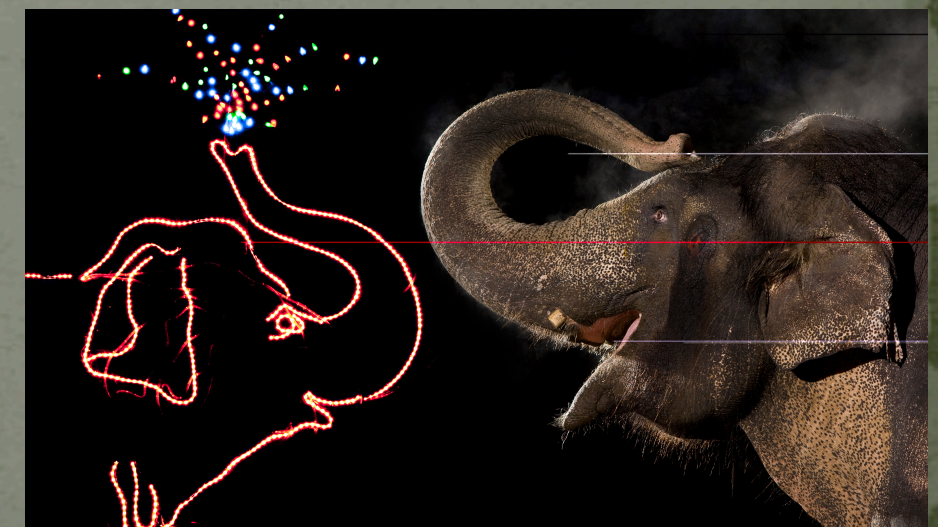
There is a statistically significant **positive correlation** between percent stereotypy and the passage of time with 9:00 a.m. as time zero ( $p = 0.0002$ ).



Shine, Sam and Rose in close proximity.  
Photo credit: Benjamin Brink, The Oregonian



Chendra taking advantage of meal time.  
Photo credit: The Oregon Zoo



Rama experiencing zoo lights at night.  
Photo credit: The Oregon Zoo

## We Conclude that:

Elephants stereotypy increases as...

- 1.) age increases
- 2.) social behavior decreases
- 3.) food accessibility decreases
- 4.) the day goes on

This all suggests that the factors that most deviate from the Asian Elephants' natural environment (which would normally include constant access to food, traveling long distances in family groups, and no noisy visitors throughout the day) increases the frequency of stereotypy.

## Future Directions:

The next step to understanding and improving life at the zoo would be testing different enrichment strategies. This might include...

- more **edible greenery in habitats** to encourage foraging behavior
- making **food acquisition a challenge**, such as suspension in raised nets
- more **“toys”** or sources of stimulus
- encouraging **social interaction** whenever possible
- more **habitat rotation** or **increased habitat size**
- continued prioritization of breeding programs above acquisition of elephants from the wild

## References:

- 1.) Swaisgood, R. R. and D. J. Shepherdson (2005). “Scientific approaches to enrichment and animals: What’s been done and where should we go next?” *Zoo Biology* 24(6): 499-518
- 2.) Rees, Paul A. “Activity Budgets and the Relationship Between Feeding and Stereotypic Behaviors in Asian Elephants (*Elephas maximus*) in a Zoo.” *Zoo Biology* 28:79-97 (2009).

## Acknowledgements:

We would like to thank the Oregon Zoo staff, our TAs, the Asian Elephant herd at the Oregon Zoo and, of course, Suzy Renn, for making this project possible.



Chendra and Sam.  
Photo credit:  
The Oregon  
Zoo