



# Golden Lion Tamarins: Parent-rearing vs. Hand-rearing



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## Objectives

- compare parent-reared vs. hand-reared litter's interactions with its parents
- compare current social interactions of the two litters with each other
- investigate the overall behavior of the individuals in both litters to monitor if they are developing in a typical manner

## Methods

### Subjects

The subjects are six (n=6) golden lion tamarins.

- a breeding male and female, 7 and 5 years old respectively.
- a hand-reared litter consists of a male and female born 4 June, 2004
- a litter born on 28 February, 2005 and have not yet had any human contact.

### Housing and Maintenance

Enclosure:

- located in the tropical rain forest building at the Woodland Park Zoo
- exhibit for viewing (9 1/2' by 9')
- a platform in the upper left-hand corner out of sight from visitors
- two holding areas out of the sight of visitors
- a soft substrate covers the ground of the enclosure to cushion any falls as the infants become more independent. (Husbandry Protocol, 1996). This substrate was removed on 13 May, 2005.

Diet:

- two times per day, once at 8am and then at 3pm
- 150-g of marmoset diet, fruit, vegetables and insects sprinkled with human infant probiotic
- insects offered up to five times a day for enrichment

### Data Collection Procedure

- Continuous sampling of infant 1 and infant 2 was used to record the social interactions between the infants and the other group members. The initiator and behavior will be recorded on a grid followed by the recipient and their reaction to the behavior. The data found on the 2005 litter in this study will be compared to the raw data of a previous study on the 2004 litter to compare hand versus parent rearing.

- The second form of sampling was a scan sampling with 30-second intervals focusing on one of the four offspring during each session. Sessions will last 15 minutes.

Approximately 30-hours of observations will be made between 18 April, 2005 and 18 May, 2005. (Ethogram shown below.)

### Equipment and Materials

- Pencil
- Paper
- Clipboard
- A Freestyle® Shark series watch

## References

- Golden Lion Tamarin Management Committee. (1996) *Husbandry Protocol for Golden Lion Tamarins*. 1-43
- Keuroghlian & Passos. (2001) Prey Foraging Behavior, Seasonality and Time-Budgets in Black Lion Tamarins. *Brazilian Journal of Biology*, 61(3). 455-459
- Kleiman, D. (1979) Parent-Offspring conflict and sibling competition in the monogamous primate. *The American Naturalist*, 114(5), 753-760
- Kleiman & Mallinson. (1998) *Lion Tamarin Conservation: Structure and Process*. *Conservation Biology*, 12(1), 29-30
- Massicot, P. (2005). Golden Lion Tamarin. *Animal Info*. Retrieved [4-9-2005] from [http://www.animalinfo.org/gloss.htm#taxonomic]

## Ethogram

### Inactive

- Lie - Li
- Sit - St
- Hang - Hg
- Stand - Sd
- Huddling - Hd
- Locomotion - Lo
- Fall - Fl
- Feeding - Fd
- Foraging - Fg
- Autogroom - Aut
- Allogroom - All
- Other - O
- Out of View - OV
- Cries - VCr
- Nga - VN
- Chirps - VCh

### Active

- Play - Py
- Contact - Ct
- Stare - Sr
- Tongue Flick - TF
- Share - Sh
- Steal - Sl
- Accept - Acc
- Approach - App
- Withdrawal - WtD
- No Reaction - NR
- Aggressive - Ag
- Cling - Cg
- Carry - CgC
- Hold - CgH
- Hover - Hv
- Rub Off - RO

### Active Continued

- Play - Py
- Contact - Ct
- Stare - Sr
- Tongue Flick - TF
- Share - Sh
- Steal - Sl
- Accept - Acc
- Approach - App
- Withdrawal - WtD
- No Reaction - NR
- Aggressive - Ag
- Cling - Cg
- Carry - CgC
- Hold - CgH
- Hover - Hv
- Rub Off - RO

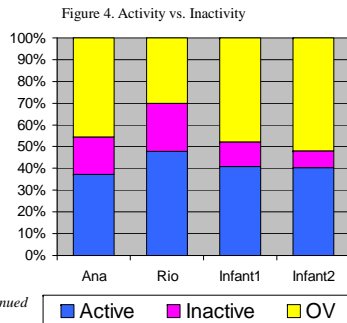


Table I. Infant Interaction

	# Initiated	# Recipient	Infant1	Infant2
	489	310		
Ana			27	28
Rio			43	41

Table II. Juvenile Initiation of Social Behavior with Infants

Name	Active	Social	Feeding	Foraging	Inactive
Ana	37.2	31.2	3.5	31.2	17.4
Rio	47.7	24.8	11.3	50.5	22.2
Infant1	40.9	21.1	3.7	51.1	11.4
Infant2	40.4	22.3	5.3	41.5	7.5
L. rosalia*	73.3	---	---	12.4	26.7

Table III. Activity Budget

## Activity Budget (Discussion & Results):

(Figure 4, Table III)

- Rio overall is the most active while in view
- Infants are out of view more often than Rio or Ana
- Ana spent the least amount of time foraging
- Rio spent the most time feeding
- Infant 2 was the least inactive while in view
- All are similar in social behavior

The activity patterns do not coincide with the activity patterns found in previous studies. The reason for this could be from the lack of an out of view category from the previous study. The actual amount of time spent foraging may be closer than perceived between the two studies. The higher percentage of activity (73.3%) in the previous study can offset the foraging percentage. The possible time spent foraging when out of site can also influence the results.

## Introduction

The golden lion tamarin is a small arboreal primate belonging to the family Leontopithecus. Years of overpopulation and deforestation in Brazil has fragmented the golden lion tamarin habitat creating small, disconnected areas capable of supporting golden lion tamarins. They are highly endangered being found only in a small area northeast of Rio De Janeiro in Brazil. There are approximately 1600 golden lion tamarins in the world, 485 of which are found in 143 zoos worldwide (Kleiman & Mallinson, 1998). Concerns towards the welfare of golden lion tamarins made it one of the first animals to be chosen as part of the American Zoo and Aquarium Association's Species Survival Plan and in 2003 was removed from the critically endangered list to the endangered list with an increasing population trend (Massicot, 2005).

Golden lion tamarin births are usually twins with the whole family group helping with the care of the infants. After 2-14 days of the infants being solely carried by the mother the task is then passed on to all the members of the group starting with the father (Husbandry Protocol). In captivity, infants should be left to be raised by their parents and left with their parents for the birth and rearing of one or two sets of siblings to allow them to develop parental care skills. However, behavioral conflicts of being in captivity can affect the rearing of infants. The Husbandry Protocol compiled by the Golden Lion Tamarin Management Committee (1996) states that infants are not to be hand-reared unless given permission by the Studbook Keeper. If infants need to be hand-reared, exposure to its family group should occur at an early age, exposing the infant to the smells and sounds of its family group to ensure proper socialization after reintroduction.

Last June two golden lion tamarin babies were born at the Woodland Park Zoo who eventually had to be taken away from their mother and moved to the Animal Health Complex to be raised and eventually reintroduced back to their parents. Chloe and her breeding partner, Papa, have proven themselves to be good parents, however, with their most recent litter born 28 February, 2005 receiving help from their successfully reintroduced June 2004 litter. This litter hasn't had any need for human contact.

A student in the summer 2004 psych 419 class at the University of Washington observed the June 2004 infants while they were being held in an incubator within their parent's enclosure during the reintroduction period. The purpose of this study is to compare the current, parent-reared litter's interactions with its parents to the June 2004, hand-reared litter's interactions with its parents as well as the current social interactions of the two litters with each other and investigate the overall behavior of the individuals in both litters to monitor if they are developing in a typical manner.

## Results and Discussion

Parent-reared vs. Hand-reared litter's interactions with its parents: (Figure 1 & 2)

- Papa and Chloe attended to the infants the same amount for both the parent-reared and hand-reared litters.
- Papa attended to the infants significantly more than Chloe.
- The parent-reared litter responded less frequently to the parent's (59%) than the hand-reared litter (76%).

Chloe helped raise multiple litters so keepers were surprised at her change in maternal behavior after the June litter wondering if something happened to initiate the change since inadequate experience most likely wasn't the cause for the lack of maternal behavior.

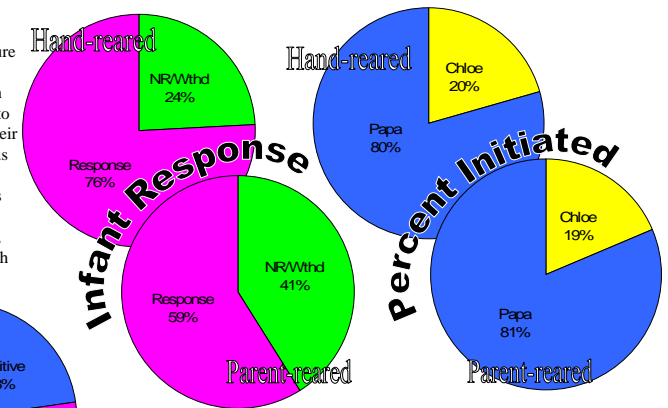


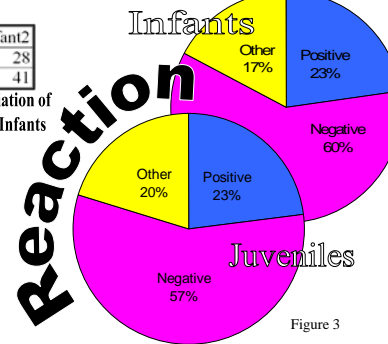
Figure 1

Figure 2

Current social interactions of the two litters (Discussion & Results): (Figure 3, Table I & II)

- The infants and juveniles respond with more negative reactions (i.e. aggression, withdrawal, no reaction etc.) one to the other than positive reactions (i.e. allogrooming, carrying, playing, etc.)
- Of overall infant related familial social interactions infants initiate interactions more than were the recipient of interactions.
- Rio initiated more social interaction with the infants than Ana by 29 interactions. Aggression tends to occur between members of the same sex, especially females, in the form of sibling competition or "twin fights" (Kleiman, 1979).

Figure 3



## Conclusion

- The main difference between the hand-reared vs. parent-reared offspring was found in the response of the infants to parental interaction suggesting parent-reared infants may become more independent at a younger age.
- The infants and juveniles interact with each other in a typical manner, the infants interacting with the juveniles in a similar way as the juveniles to the infants.
- The keepers believe that the infants are developing more rapidly than expected starting sharing behaviors, eating solid food, playing and exploring ahead of schedule.
- The June litter was successfully reintroduced and, as juveniles, seem to be developing normally. One difference, however, is Rio and Ana interact with the visitors more than the others with Rio being the only one to show an unknown tongue flicking behavior which is directed exclusively towards observers.