Behavior of the hand-raised white-faced capuchin *(Cebus capuchin)* male Mally at the Serengeti-Park Hodenhagen

Internship report by

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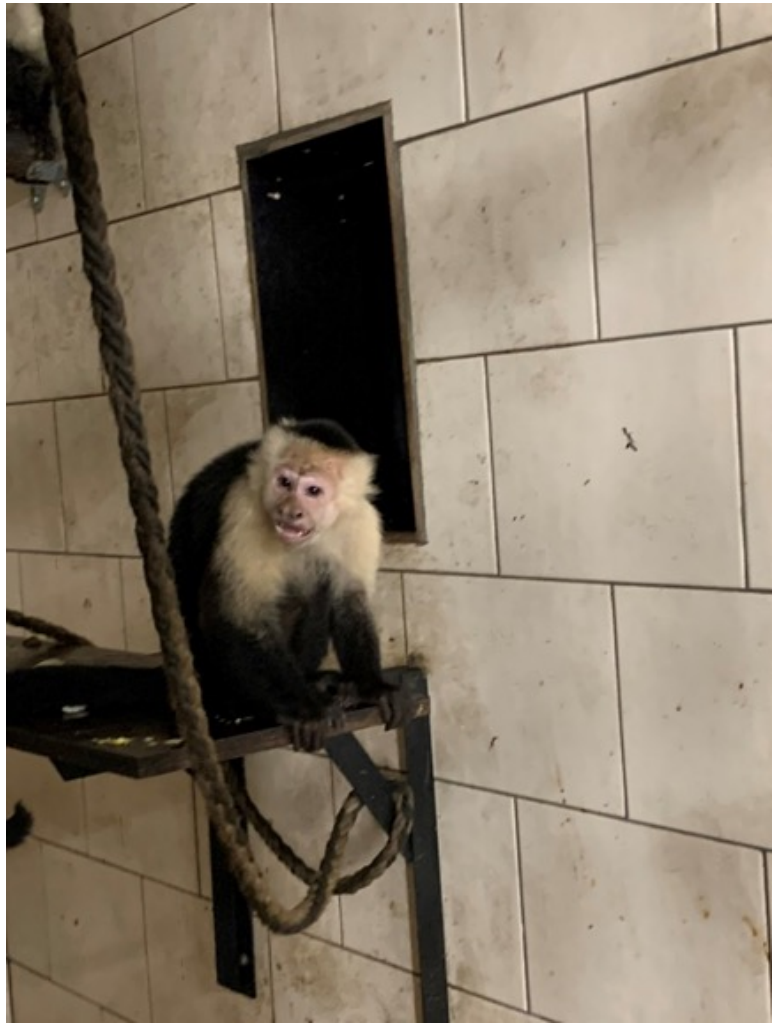
Introduction

White-faced capuchins in the wild

- Are social and live in multi- male / -female groups.
- Young animals live with their mother and are raised by her.
- 3 Month: start to forage playfully, increase their social play, social learning from the adults.
- Wild male capuchins leave their natal group at about 4.5 years of age (Jack et al. 2012)

Mally

- Was born in America.
- Confiscated by German customs at Munich airport, due to missing documents
- Placed in an animal sanctuary in Munich.
- He was only a few weeks old and was already living separately from his mother.
- Since May 2013 in the Serengti-Park



This project

- evaluate the activity budget (Genus normative behaviours (GNB) and behaviours potentially indicative of stress (BPIS))
- Was he young enough to experience and adapt to normal capuchin behavior?
- What is the degree of normal species behavior compared to the other capuchins in the group?
- Does he have the tendency to show a typical capuchin behavior?

Ethogram

Table 1: Genus normative behavior. Adapted from (Da Silva 2015).

Macrocategory	Behaviour	Definition
Energy Gain (EG)	Foraging	The individual moves around searching for food, but witho ingestion at the moment of registration.
	Eating	The animal is stationary and takes food into his mouth, chews and ingests.
	Drinking	Animal is stationary next to a water source taking water int his mouth followed by ingestion.
Exploratory (EX)	Food manipulation	Food is manipulated with apparent aim to ease the ingestio (soften, crack), but without necessary ingestion afterwards
	Manipulation of environment	The individual touches, moves, licks, rubs or bites objects o part of the environment.
	Play alone	The individual interacts with objects (manipulation of the surrounding environment with no apparent motive). Pushe and pulls ropes, branches, twigs and wires. Swings itself with inferior or superior limbs.
Vigilance (VI)	Alert	The individual turns the eyes and head slowly, looking at least at two different directions. The animal alternates between looking at inside and out of the enclosure, withou performing any other behaviour.
	Threat to the observer	The animal threats the observer. (e.g.: shows the teeth, aggressive vocalization)
Locomotion (LO)	Locomotion	Vertical or horizontal locomotion on the enclosure, withou manipulation or search for food.
Social positive activities (SP)	Grooming	The act of manipulate hair from others with hands or mout
	Social play	Two or more animals interact physically and/or chase each other without aggression involved. There may occur manipulation of the environment
	Sexual behaviours	The individual opens the eyes widely and repeatedly, together with contortion body movements (his behaviour occurs directed to another individual), body rocking from side to side. This usually happens during female oestrous.
	Scrounge	The animal approaches another and feed on scraps that fal from this one`s mouth.
	Mount	Individual mount each other and it may occur contact between genitalia. This usually happens during female oestrous.
External social interaction	Reacting to visitors	Interact with visitors Begging for food Vocalization
	Reacting to keeper	Interact with keepers Running Following keeper`s direction
Inactivity	Inactivity	The individual stays in rest and static. The eyes may be ope or closed.

Table 2: Behaviours potentially indicative of stress. Adapted from Da Silva (2015).

Macro-category	Behaviour	Definition
Active I (AC I)	Head Twirl	Turns the head looking up and side to side.
	Pirouette	Turns on itself without leaving the same spot.
Self- directed (SD)	Scratching	The animal scratches a body part, with his hands or feet, during a brief moment
	Self-grooming	Grooming with hands or mouth, compulsively.
	Self-biting	Bites itself in any body part.
Pacing (PA)	Pacing	Walks or runs repeatedly, without aim, around the same path.
Ingestion (IG)	Manipulation/ ingestion of feces, urine or sperm	Licks or touches urine or sperm. Eating of own or other`s feces, urine or sperm.

Predictions:

1. Mally's activity budget will be less than budgets for wild capuchins.
2. He will show less BPIS compared to other capuchin groups in captivity, due to size and enrichment of the enclosure.
3. Higher frequency of grooming from the females to Mally as the receiver rather than the giver.
4. He will be more reactive than his conspecifics to visitors and keepers.

Methods

Animals

- Six white-faced capuchins living in the park.
- All the capuchins, except Mally, were born in the safari park and were raised by their parents .

Name	Sex	Age	Age group	Date of birth	Country of birth/ Birthplace	Raising status	Relationship
Jenny	Female	16	adult	25.01.2006	DE, Hodenhagen	Mother-raised	
Vanessa	Female	14	adult	18.08.2007	DE, Hodenhagen	Mother-raised	Mother of Milo
Mally	Male	9	subordinate adult	01.01.2013	USA, unknown	Hand-raised	Father of Milo
Molly	Female	9	subordinate adult	07.02.2013	DE, Hodenhagen	Mother-raised	
Paul	Male	6	subadult	07.02.2015	DE, Hodenhagen	Mother-raised	
Milo	Male	4	late juvenile	21.04.2018	DE, Hodenhagen	Mother-raised	Son of Mally and Vanessa

Figure 1: White-faced capuchins (Cebus capucinus) in their indoor enclosure at the Serengeti-Park Hodenhagen. **A:** Jenny; **B:** Vanessa; **C:** Mally; **D:** Paul; **E:** Milo; **F:** Molly

Location

- The animals spend their day between 9/10 AM to 6 PM.
- outdoor enclosure: 550 m^2
- Most of the area is visible, except for the back part of the island
- During the day: animals are free to roam outside and have no possibility to enter the indoor enclosure.
- During the night, they in their indoor enclosure.

Data collection

- Investigation period: 19 July 2022 - 29 July 2022.
- Observation period: Monday to Friday, 09:00 AM - 05:00 PM.
- Total observation time: 36 hours.

Monday - Friday				
AM	Observation times (10-minutes intervals)		PM	Observation times (10-minutes intervals)
09:00 AM - 10:00 AM	09:00 AM - 09:10 AM		01:00 PM -02:00 PM	01:00 PM - 01:10 PM
	09:15 AM - 09:25 AM			01:15 PM - 01:25 PM
	09:30 AM - 09:40 AM	B		01:30 PM - 01:40 PM
	09:45 AM - 09:55 AM	R		01:45 PM - 01:55 PM
10:00 AM - 11:00 AM	10:00 AM - 10:10 AM	E	02:00 PM - 03:00 PM	02:00 PM - 02:10 PM
	10:15 AM - 10:25 AM	A		02:15 PM - 02:25 PM
	10:30 AM - 10:40 AM	K		02:30 PM - 02:40 PM
	10:45 AM - 10:55 AM			02:45 PM - 02:55 PM
11:00 AM - 12:00 PM	11:00 AM - 11:10 AM		03:00 PM - 04:00 PM	03:00 PM - 03:10 PM
	11:15 AM - 11:25 AM			03:15 PM - 03:25 PM
	11:30 AM - 11:40 AM			03:30 PM - 03:40 PM
	11:45 AM - 11:55 AM			03:45 PM - 03:55 PM

Results

Activity budget

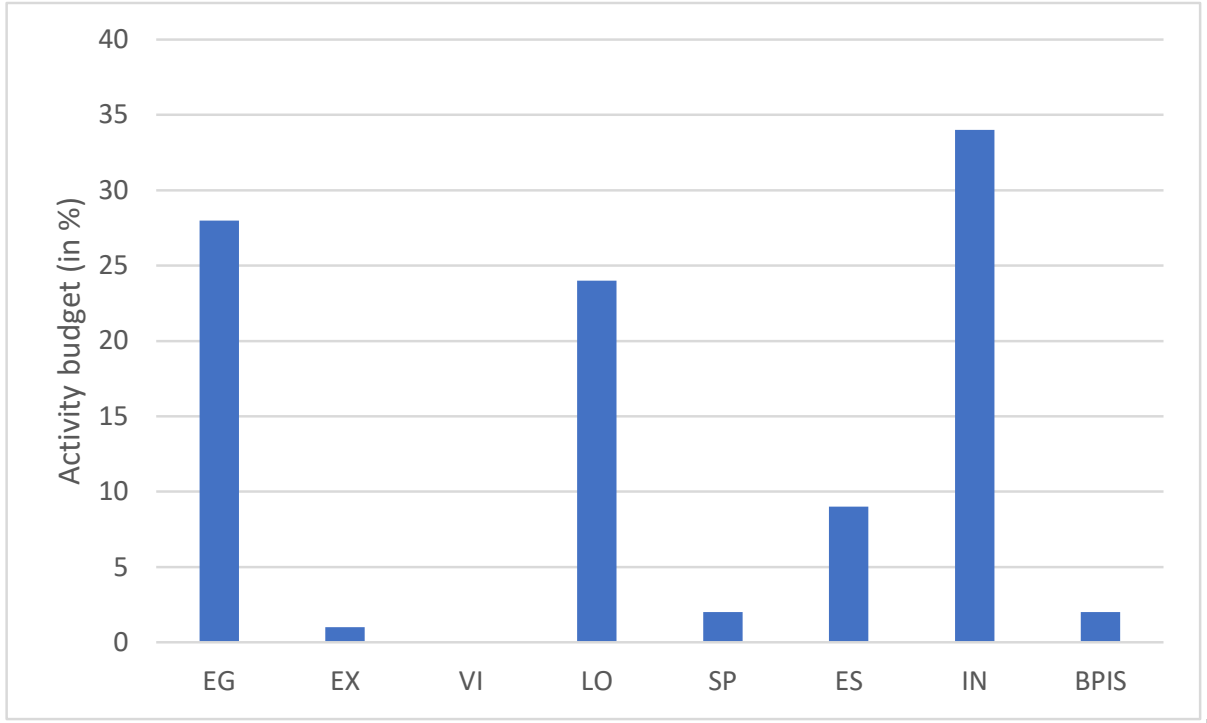
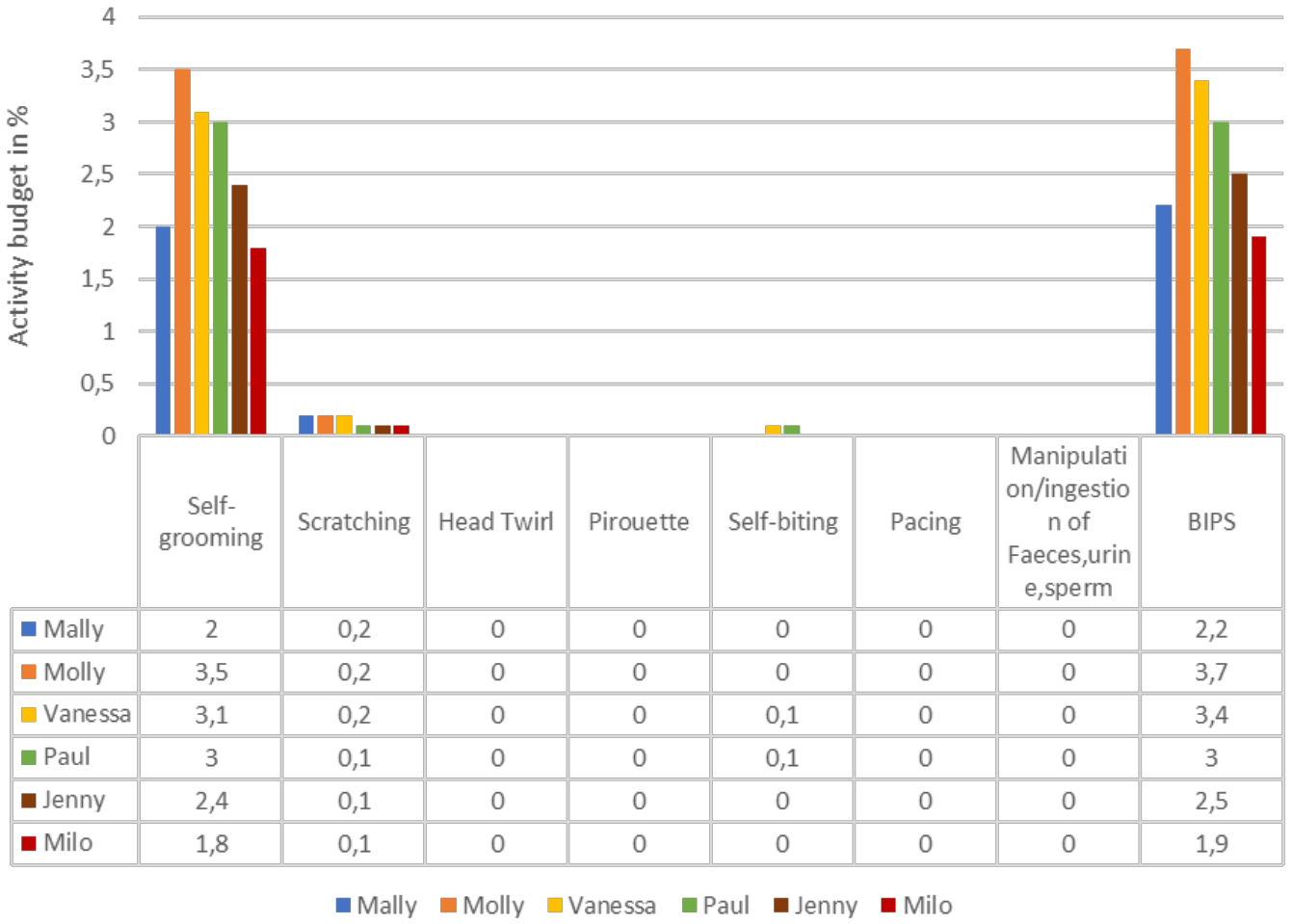


Figure 3: General activity budget of Mally with the macro-categories of GNB and BPIS in percentage. **EG:** Energy gain; **EX:** Exploratory; **VI:** Vigilance; **LO:** Locomotion; **SP:** Social positive activities; **ES:** External social interaction; **IN:** Inactivity; **BPIS:** Behaviours potentially indicative of stress.

BPIS (Behaviour Potentially Indicative of Stress)



	Self-grooming	Scratching	Head Twirl	Pirouette	Self-biting	Pacing	Manipulation/ingestion of Faeces,urine,sperm	BIPS
Mally	2	0,2	0	0	0	0	0	2,2
Molly	3,5	0,2	0	0	0	0	0	3,7
Vanessa	3,1	0,2	0	0	0,1	0	0	3,4
Paul	3	0,1	0	0	0,1	0	0	3
Jenny	2,4	0,1	0	0	0	0	0	2,5
Milo	1,8	0,1	0	0	0	0	0	1,9

Figure 4: Activity budget (in percent) of the capuchins in the macro-category BPIS. Blue bar: Mally. Orange bar: Molly. Yellow bar: Vanessa. Green bar: Paul. Brown bar: Jenny. Red bar: Milo.

Frequency of grooming

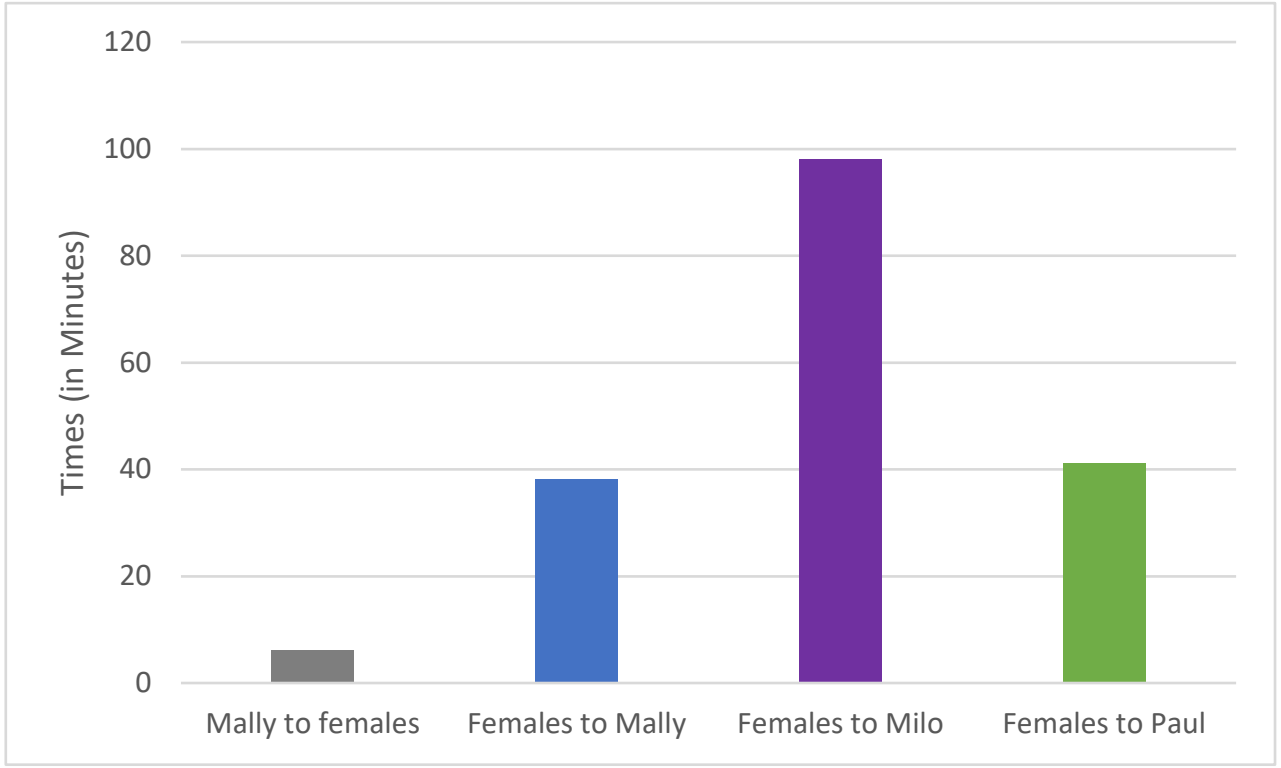


Figure 5: Time spent grooming by the females towards Mally and the other males (Milo and Paul) relative to how long Mally groomed the females. Total time spent by Mally in grooming the females is represented by the grey bar. Total time the females spent in grooming Mally (Blue bar), Milo (Purple bar) and Paul (Green bar) are represented.

Reaction to keeper and visitor

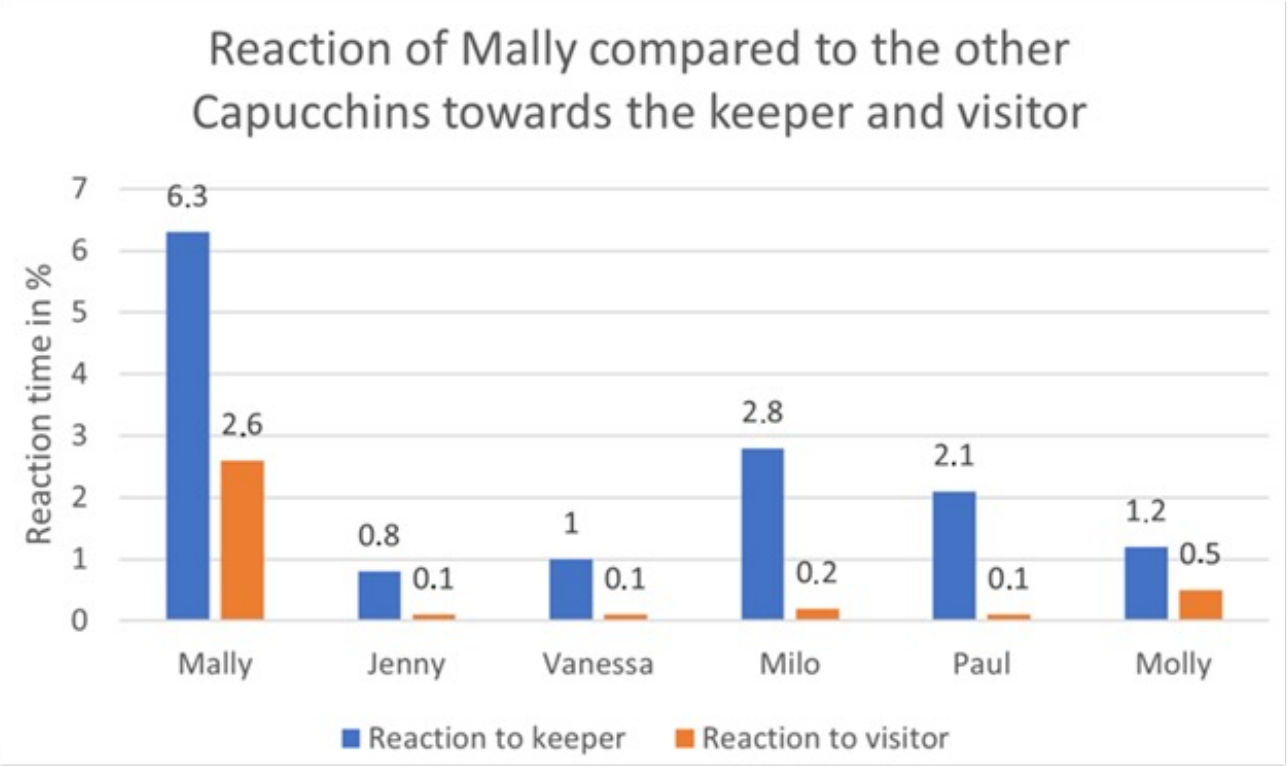


Figure 6: Percent reaction time of capuchins to the keepers (blue bars) and visitors (orange bars).

Inactivity

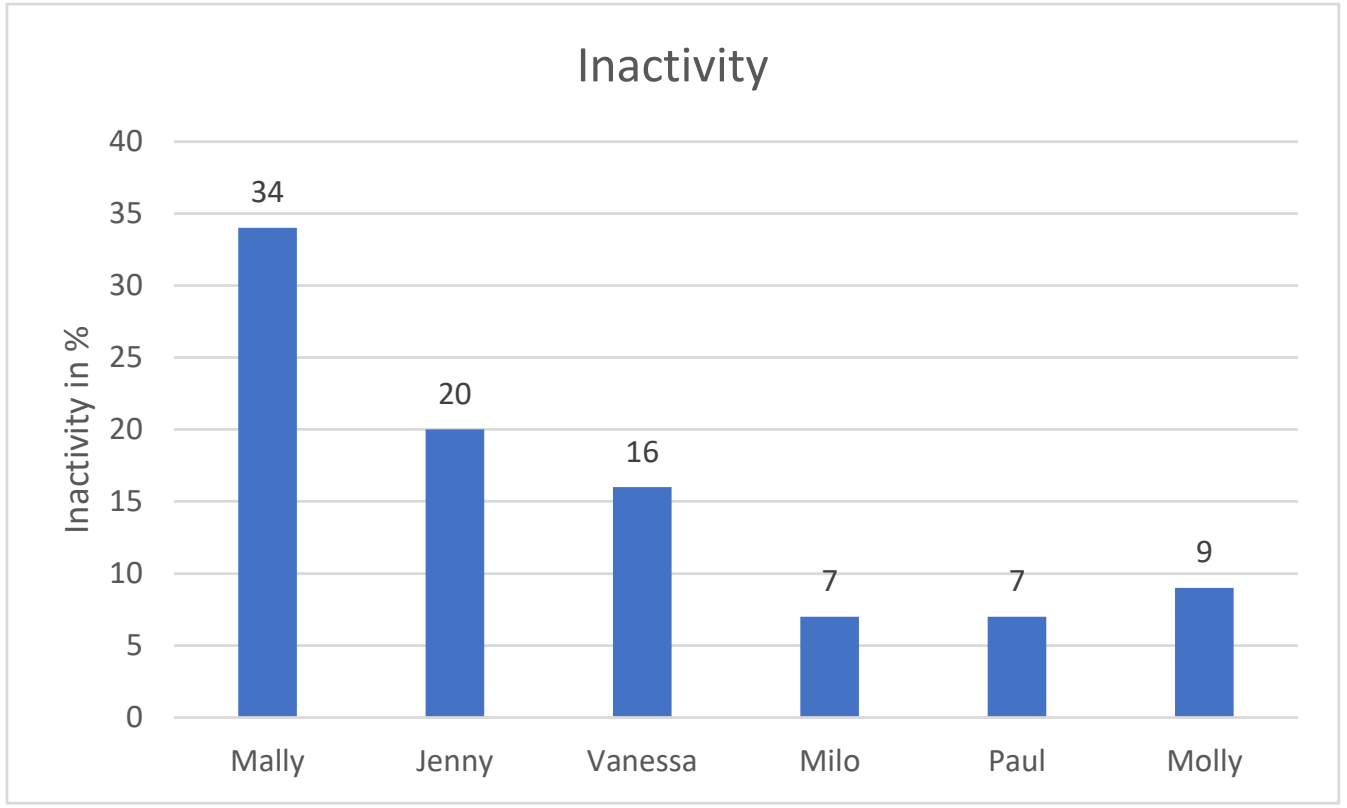


Figure 7: Inactivity of the capuchins in %.

Discussion

First hypothesis:

Mally's activity budget will be lower than that of capuchins in the wild

Wild capuchins (Back et al. 2019):

Energy gain: up to 46%

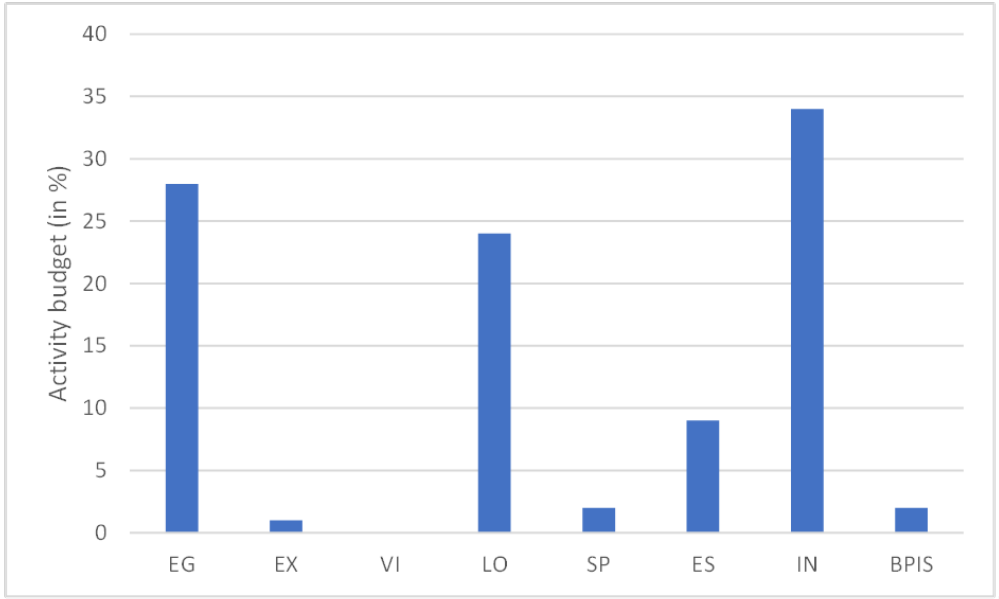
Foraging: 20-30%

Eating: 20-30%

Locomotion: 20-30%

Social interactions: less than 10%

- Mally's activity budget showed similarities and were within these ranges
- capuchins living in captivity invest less time in independent foraging than capuchins living in the wild.



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Second hypothesis:

Mally will show less BPIS, compared to other capuchin groups in captivity, due to the size and enrichment of the enclosure.

- BPIS (Mally): 2.2%
- BPIS (capuchins in captivity): 11% (Da Silva, 2015)

Serengeti Park:

- 550m^2 (Outdoor enclosure)
- Six white shoulder capuchins *(C.capuchinus)*

Rio Grande do Norte:

- closed enclosure size: 23m^3

➡ six Black-striped capuchins (*S. libidinosus*)

Zoo in Salvador (Bahia)

1. 248m^3 (two enclosures)

➡ seven Blond capuchins (*S. flavius*)

2. enclosure size of 124m^3

➡ for five adults of Golden-bellied capuchins (*S. xanthosternos*)

3. 100m^2

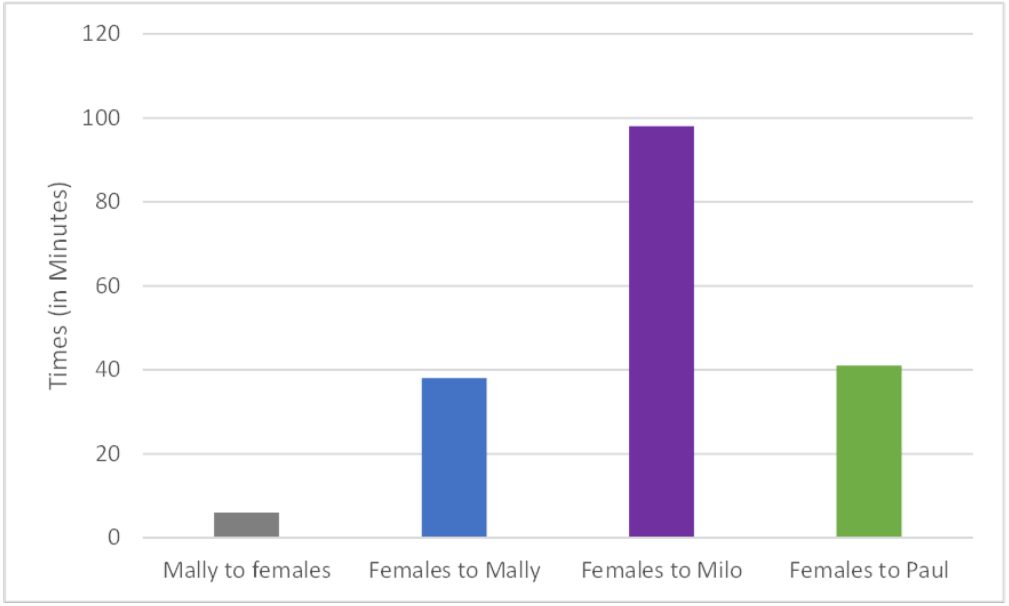
➡ for eight adults.

- less stress-induced behaviour (BPIS) was observed in Mally than in other captive capuchin groups
- may be due to the size and facilities of the enclosure

Third hypothesis:

There will be a higher frequency of grooming from the females to Mally as the receiver rather than the giver.

- Studies have shown that the females frequently groom the males of the group while the males almost never groom the females (Perry 1997).
- All females groomed Mally for a total of 38 minutes, while Mally groomed the females for 6 minutes.



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Fourth hypothesis:

Mally would be more reactive than the other capuchins to the visitors and the keepers, because he is hand-raised.

<u>External social interactions with visitors and keepers:</u>

9% of the activity budget.

- Reaction time to the keepers: (6.3%)
- Visitors: (2.6%)

This can be seen as a positive social interaction.

➡ Males reacted more to the keepers whereas the females, on the other hand, rarely responded

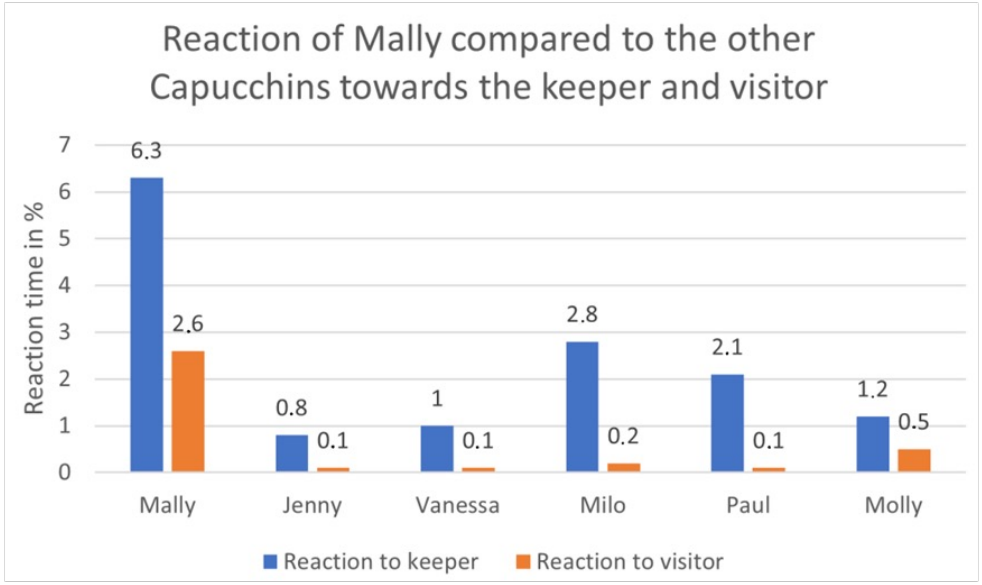

Figure 6: Percent reaction time of capuchins to the keepers (blue bars) and visitors (orange bars).

Conclusion

Findings show that Mally..

- has integrated well into the group.
- showed positive social interactions with his conspecifics.
- was able to learn the typical behaviour of capuchins.

- Mally does show atypical behaviour, such as his high level of interaction with humans compared to other group members.
- He spends less time on food foraging or generally in the energy gain category.
- The proportion of inactivity is higher than in other studies

➡ may be due to the captivity aspect and the food supplementation by humans.

Outlook

- Mally spent most of his time alone and often kept his distance from his conspecifics.
- Was often inactive.

To reduce inactivity, employment opportunities may be expanded:

1. adding more dynamic branching to expand range of play
2. making access to their food more complicated

➡ animals spend more time for searching.

- Visitors spent more time in front of the capuchins island when they were more active vs. when they were inactive.
- By increasing the activity of the capuchins, visitors to the park could have a better view.

➡ Increase the time visitors spend in front of the enclosure and increase their interest in the animals.

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