

AN ABSTRACT OF THE THESIS OF

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Social behavior such as play, affiliation, and some vocalizations of captive animals can be indicators of good welfare. Cheetahs (*Acinonyx jubatus*) at the Cheetah Conservation Fund (CCF) near Otjiwarongo, Namibia are often housed in social groups with various backgrounds. Observations of social and active behaviors were recorded for a group of four hand-raised (HR) cheetahs and of five wild-caught (WC) cheetahs (≥ 5 months old when caught) to determine if there were differences between the groups. The social behaviors for cheetahs may include physical contact, allogrooming, social play, and vocalizations within groups. Comparisons of the frequency of counts engaged in all social behaviors for the two groups showed no statistical significance, but specific social behaviors varied. Allogrooming and physical contact were more frequent for the hand-raised cheetahs. Vocalizations and active behaviors occurred more with the wild-caught group of cheetahs. These results may be related to the cheetah group's background, enclosure size, or in some cases individual differences within a group. To assess the animal welfare of these groups based on social behavior, further research is needed to understand the cause of these differences.

Key Words: Cheetahs, Social Behavior, Hand-Raised, *Acinonyx jubatus*, Allogrooming

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A Social Behavior Comparison between a Hand-Raised and Wild-Caught Group
of Male Cheetahs (*Acinonyx jubatus*)

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Shanna J. Rose

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A Social Behavior Comparison between a Hand-Raised and Wild-Caught Group of Male Cheetahs (*Acinonyx jubatus*)

INTRODUCTION

Animal welfare has been of considerable interest to researchers and the public for a long time. Welfare is typically referring to the animal's well-being, which includes psychological and physical aspects (Masiga & Munyua, 2005). Psychological well-being measures include the animal's stress levels and perceived feelings, and physical well-being includes environmental conditions, behavioral and health related measures. Animal welfare is of great concern in particular with the care and husbandry of wild animals.

Globally, the care and husbandry of captive wild animals varies and often specific standards of care are not defined (Masiga & Munyua, 2005). In many parts of the world where wildlife is harvested for food, fur and entertainment purposes, the animals are frequently kept in very poor conditions (Rahman et al., 2005). In Africa there is often a conflict between humans and wildlife as these animals can interfere with much of the agricultural production, which in turn leads to cruel methods of animal control and capture (Masiga & Munyua, 2005). Cheetahs in Africa are often blamed for killing farm animals, leading farmers to kill or capture them as a means of decreasing loss of livestock (Marker et al., 2003). These issues are typically characterized by a lack of understanding of the needs for wild animals that are removed and placed in reserves. To assure adequate care and welfare, it is essential that research addressing animal behavior and its implications be pursued as this knowledge would be beneficial to animal facilities and reserves around the world.

Wild captive animal welfare for conservation purposes can be affected by a variety of factors. The capture of an animal is often very stressful, and in some situations a harmful process for the animal (Jordan, 2005; Rahman et al., 2005). Most often, captive animal welfare is affected by environmental concerns such as the available space and resources, similarity to a natural habitat, proximity to humans, and social environment (Morgan & Tromborg, 2007). Housing the animals in artificial lighting, with unusual noises, abnormal social groups and other factors that are unlike an animal's natural habitat have been shown to be potential sources of stress for various animal species (Morgan & Tromborg, 2007). Social grouping has been demonstrated as a beneficial factor to captive elephant welfare where less abnormal elephant behavior was observed when the animals were managed in larger groups (Vanitha et al., 2011). To improve animal welfare for captive animals, zoos and other animal facilities attempt to mimic the animal's natural environment which for many species includes placing them in social groups. Cheetahs, typically males, are often found in coalitions, or social groups, in the wild, which has led to facilities such as the Cheetah Conservation Fund (CCF) in Otjiwarongo, Namibia to house them in groups (Marker et al., 2008).

Analyzing social animal behavior such as play, affiliative behaviors and some vocalizations can be a good indicator of captive animal welfare within social groups (Boissy et al., 2007). There are a variety of observable behaviors that can be recorded to demonstrate this social behavior. Physical contact and interaction can be seen in a variety of species. Elephants in the wild are in social groups and demonstrate physical contact with one another (Vanitha et al., 2011). A type of affiliative behavior is social grooming, also called allogrooming. This has been observed and studied in many primates including

Assamese macaques (Cooper & Bernstein, 2000). Allogrooming is defined as the oral or manual manipulation of the skin or hair of another conspecific (Cooper & Bernstein, 2000). Although much of allogrooming has been studied with primates, meerkats have been shown to groom each other and may have a role in the social hierarchy with dominant and subordinate individuals (Kutsukake & Clutton-Brock, 2010). Sex differences and seasonal variation of social grooming has also been described with adult white-tailed deer (Forand & Marchinton, 1989). The role of social grooming is not well defined, but it is easily observed and considered a good example of affiliative behavior between individual animals.

Animal play has also been shown to be an indicator of good welfare and can possibly assist in improving the well-being of an animal (Held & Spinka, 2011). Play varies between species and within species. Held and Spinka define it as a behavior not directly contributing to survival that is rewarding to the animal, occurs when the animal is in a relaxed state, and is often directed at a conspecific (2011). These behaviors are often repeated, exaggerated, and appear to be pleasurable to those involved (Bekoff, 1974). Play behavior is typically manifested by animals that are healthy, well-fed, and not under stressful conditions, which makes it a good indicator of good animal welfare conditions (Oliveira et al., 2010; Boissy et al., 2007).

Research in zebra finches has demonstrated that vocal-communication behavior can be an important factor of social behavior (Sturdy, 2004). The finches use vocal communication to help recognize their mate's call and respond differently according to their social situation (Sturdy, 2004). Specific vocalizations may also reflect positive emotions of the caller (Boissy et al., 2007). A study on the vocalizations in cheetah

coalitions during separations and reunions showed vocal calls and walking rates increased during separation (Ruiz-Miranda et al., 1998). The most common calls emitted during separations were chirps, followed by meows (meows) and stutters (Ruiz-Miranda et al., 1998). The chirp call may communicate individual identity, location, or desire to reunite with coalition members (Ruiz-Miranda et al., 1998). Specific roles of vocalizations are not well defined in cheetahs and many other animals, but certain vocal calls likely have a social purpose.

Cheetah social behavior includes physical contact with others, allogrooming, social play, and vocalizations within groups. In the wild male cheetahs are typically in coalitions with related individuals (Marker et al., 2008). These coalitions are found to have a higher survival rate when there are many other coalitions (Durant et al., 2004). A good husbandry technique for captive cheetahs is to keep them in gender separate groups, which are often non-related (Ruiz-Miranda et al., 1998). This allows the cheetahs to have social interaction which could improve welfare by providing an environment similar to what is found in the wild.

The Cheetah Conservation Fund near Otjiwarongo, Namibia is an internationally recognized centre that focuses on the conservation of cheetahs and their ecosystems. CCF's conservation programs have resulted in many farmers bringing young, injured, or "pest" cheetahs to CCF (Marker et al., 2003). CCF houses 40-50 cheetahs kept in large enclosures built in their natural habitat. Many of these cheetahs are housed in various-sized groups based on age, gender, and background (HR or WC). Some cheetahs are brought to CCF at a very young age and are hand-raised by CCF staff. Human handling causes them to lose much of their fear and aggression towards humans, and with the lack

of crucial hunting skills from mothers, they cannot be released into the wild. However, these cheetahs provide valuable education opportunities for tourists to assist in the preservation and conservation of cheetahs.

Aside from social interaction with humans, little is known about the differences in social behavior between hand-raised and wild-caught cheetah groups. Previous research addresses hand-reared or captive-born animals, however the cheetahs at CCF are not born on site due to Namibian laws that prevent captive breeding of the animals. Additionally, the wild-caught cheetah groups in the present study are animals that arrived at CCF at least 5 months old, and although not all history is known, are assumed to have been primarily raised by their mother. Wild animals in other conservation facilities often have similar backgrounds, which emphasizes the importance of understanding the differences between these groups in relation to social behavior.

The objectives of this study were to assess possible differences in social behaviors between hand-raised and wild-caught cheetah groups. Methods were modified from a cheetah temperament study that recorded social and other behaviors. For this study, two male cheetah groups composed of mainly non-related individuals of different age groups with a hand-raised and wild-caught group (brought to CCF \geq 5 months old) were observed and compared for behavioral differences.

As social behavior can be an indicator of welfare it is beneficial to gather information about these two groups of cheetahs and be able to measure appropriate social behaviors according to their background. This information can assist in gaining a greater understanding of cheetah social behavior and their needs, but may also assist in defining social parameters for assessing animal welfare. Additionally, captive animal locations

housing cheetahs can use this research in order to consider social behavior as a reason for grouping captive animals to improve animal welfare.

METHODS

Study Animals

Nine adult male cheetahs were the subjects of this study (Table 1). A group of four males (HR) were housed in a large 2.5 hectare (6.1 acres) enclosure near the center of CCF. Ron was brought to CCF in September of 2005 by the farmer who had captured him with two sisters when they were two months old. Little C had been orphaned and given to CCF at two months of age in August 2007 by a farmer that had found him. Smart Man (N'Dunge) and his brother Blonde Man (Shunga) were brought to CCF at two months of age in June 2008 by a farmer who found them around his livestock. All four cheetahs had been hand-raised by CCF staff. Their cheetah enclosure is adjacent to a pen with four young cheetahs, and another pen with Ron's sisters. On occasion during particular tourist attractions, the four males would be placed in a smaller cheetah pen adjacent to it. Both pens were frequented by tourists.

The other five adult males (WC) were also studied individually at a 4 hectare (9.9 acres) pen which is farther out from the main center. This pen is not adjacent to any other cheetah pens and is not visited by tourists. Omdillo was brought to CCF when he was three years old in January 2008 after being held on a farm for an unknown amount of time. Chester was one year old when he was brought to CCF in January 2008 with a leg injury that needed surgery. Anakin arrived at CCF at five months old with his mother in April 2008. His mother had a severe knee injury and had to be euthanized. In September 2008 a seven month old cheetah had been trapped by a farmer and given to CCF and was named Obe-Wan. Cruise arrived at CCF in September 1998 when he was 18 months old

and had been poorly treated by a farmer. Cruise had been in a neighboring pen to the other four males until the month before this study took place when the pens were combined, allowing all five males to socialize in the large pen. All of these cheetahs are not related and were not hand-raised. For the purposes of this study these five males are categorized as wild-caught.

Table 1. Cheetah ages when brought to CCF and at the time of observation (May 2010).

Group	Individual Cheetah	Age Brought to CCF	Age at Observation
Hand-Raised	Little C	2 mths	3 yrs
	Smart Man (N'Dunge)	2 mths	2 yrs
	Blonde Man (Shunga)	2 mths	2 yrs
	Ron	2 mths	4 yrs
Wild-Caught	Omdillo	3 yrs	5 yrs
	Chester	1 yr	3 yrs
	Anakin	5 mths	2 yrs
	Obe-wan	7 mths	2 yrs
	Cruise	1.5 yrs	13 yrs

Behavioral Observations

All cheetah observations were conducted during the month of May, 2010 in the morning hours prior to feeding between 8 a.m. and 10 a.m. for a total of 42.5 hours (4-5 hours for each cheetah). Days of observations were performed at convenience around other CCF activities, particularly those that may have conflicted with doing observations. Focal sampling was used with each cheetah being observed individually. The observations were recorded onto datasheets scoring behavior states as they were observed at 1 minute intervals during the 30 minutes of observation, called instantaneous sampling, as well as all-occurrence sampling of behavioral events (Martin & Bateson, 2007). A

sample datasheet is included in the appendix. Definitions for behaviors were modified from an ethogram presented in a prior cheetah temperament study as shown in Table 2 (Wielebnowski, 1999). The data was then recorded into a database in Microsoft Excel counting the number of states and events that occurred during the observation to be used for analysis. Some behaviors that were recorded were removed from analysis for the purpose of analyzing primarily the social behaviors, and any other possible related behaviors between the two groups.

Table 2. Ethogram of behaviors observed in the study including if it was a state (S) or event (E).

Allogroom	E	Licking/nibbling fur or body of other cat. [noted if initiator/recipient]
Social Play	E	Loping play chases, minor swatting, gentle mouthing. [noted if initiator/recipient]
Chirp	E	More high-pitched than meows and very short.
Meow	E	A soft call, low-pitched, similar to domestic cat.
Purr	E	Low, grumbling sound.
Sniff Other	E	Cat examining another cat with nose. [noted if initiator/recipient]
Contact	S	In contact with conspecific (not coded if performing active behavior simultaneously – but noted in comments).
Explore/Investigate	S	Sniffing object or environment. [noted what was being sniffed]
Locomotion	S	Locomotor activity consisting of running or walking
Object nudge	E	Touch/move object with nose
Object rub	E	Rubs face, head, neck or flanks on object (e.g. on fence, tree, ground). [note the object]
Object sniff	E	Olfactory examination of ground (e.g. urine or feces) or structures. [note the object]
Rest	S	Lying, sitting or standing.
Pace	S	Repetitive walking or trotting along same route. [must perform one trip there and back – keep in the bout/state even if turning around]

Data Analysis

To determine if social behaviors varied between the two groups a nested analysis of variance (ANOVA) was used with the behavior frequencies for each group and individual. This allowed testing for statistical significance between the groups while also testing if there was significant individual variation within each group. Statistical significance between the groups and not between individuals eliminates the possibility that any effect is due to an individual within a group. The analysis was considered statistically significant if the probability value (p value) was ≤ 0.05 . Each specific social behavior and other relevant behaviors were also analyzed for statistical significance (Table 3). All statistical tests were completed with the Statistical Analysis Software Program (SAS).

RESULTS

Analysis of the data for the two groups of cheetahs revealed that there was no statistical significance for all combined social behavior frequencies between the two groups, $F(1,75) = 2.34$, $p = 0.131$; but between the individuals in each group, the results were significant, $F(7,75) = 2.43$, $p = 0.028$. Social behaviors included data on allogrooming, vocalizations, physical contact, social play, and sniffing other conspecifics.

Specific social behaviors that were not grouped produced varied results (Figure 1). Allogrooming behaviors were statistically significant between groups, $F(1,75) = 6.38$, $p = 0.014$ and not significant between individuals, $F(7, 75) = 1.48$, $p = 0.189$. Group means show HR cheetahs to express more allogrooming behavior ($M = 0.639$, $SD = 1.417$) than WC cheetahs ($M = 0.075$, $SD = 0.267$). Allogrooming that was specifically scored as initiated was significant between groups, $F(1,75) = 5.18$, $p = 0.026$; and not significant between individuals, $F(7,75) = 0.68$, $p = 0.689$. Allogrooming that was measured as received approached significance between groups, $F(1,75) = 3.89$, $p = 0.053$; and was significant between individuals, $F(7,75) = 2.8$, $p = 0.013$. Vocalization frequencies, including chirp, meow, and purr, was statistically significant between groups, $F(1,75) = 4.53$, $p = 0.037$; and not significant between individuals, $F(7,75) = 2.12$, $p = 0.053$. Group means show WC cheetahs to vocalize more ($M = 1.6$, $SD = 3.869$) than HR cheetahs ($M = 0.278$, $SD = 0.659$). Additionally, meow vocalization frequencies were statistically significant between individual cheetahs, $F(7,75) = 3.09$, $p = 0.007$. The frequency of physical contact with other group members showed statistical significance between groups, $F(1,75) = 10.11$, $p = 0.002$; and approached statistical significance

between individuals, $F(7,75) = 2.15, p = 0.05$. Group means show HR cheetahs to be in contact with conspecifics more ($M = 2.611, SD = 5.073$) than WC cheetahs ($M = 0.175, SD = 0.55$). Other social behaviors such as social play and sniff other were not statistically significant between groups or individuals.

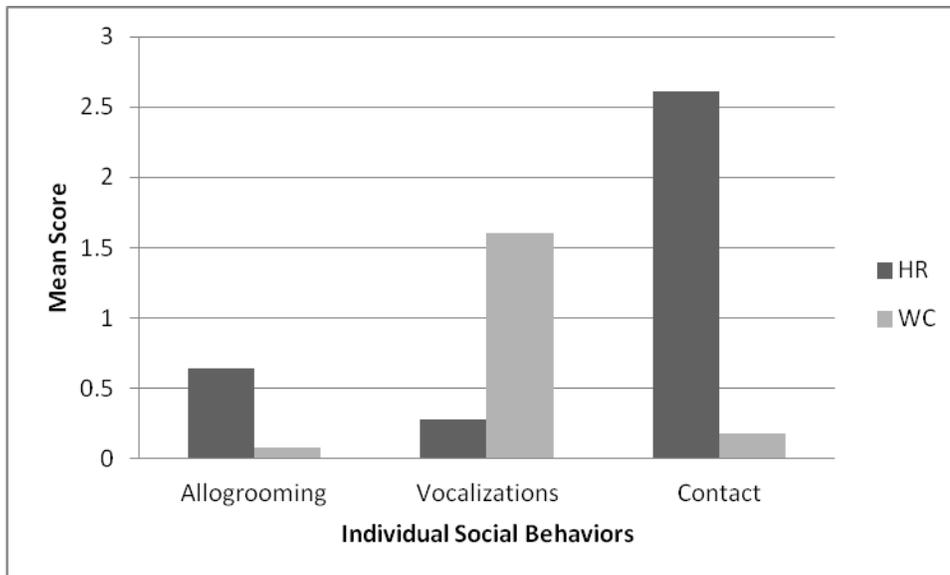


Figure 1: Individual social behavior mean scores for hand-raised and wild-caught cheetah groups.

Active behaviors including exploring or investigating, locomotion, and object nudge, rub or sniff were also analyzed. These behaviors frequencies were statistically significant between groups, $F(1,75) = 4.58, p = 0.036$ and not significant between individuals, $F(7, 75) = 0.94, p = 0.482$. Group means show WC to be greater as 5.425 ($SD = 5.625$) and HR with 3 ($SD = 3.986$). Locomotion frequency was very significant between groups, $F(1,75) = 11.24, p = 0.001$ and not significant between individuals, $F(7, 75) = 1.61, p = 0.149$. Group means show WC to be greater as 4.125 ($SD = 3.603$) and HR

with 1.917 ($SD = 0.333$) (Figure 2). All other specific active behaviors were not statistically significant.

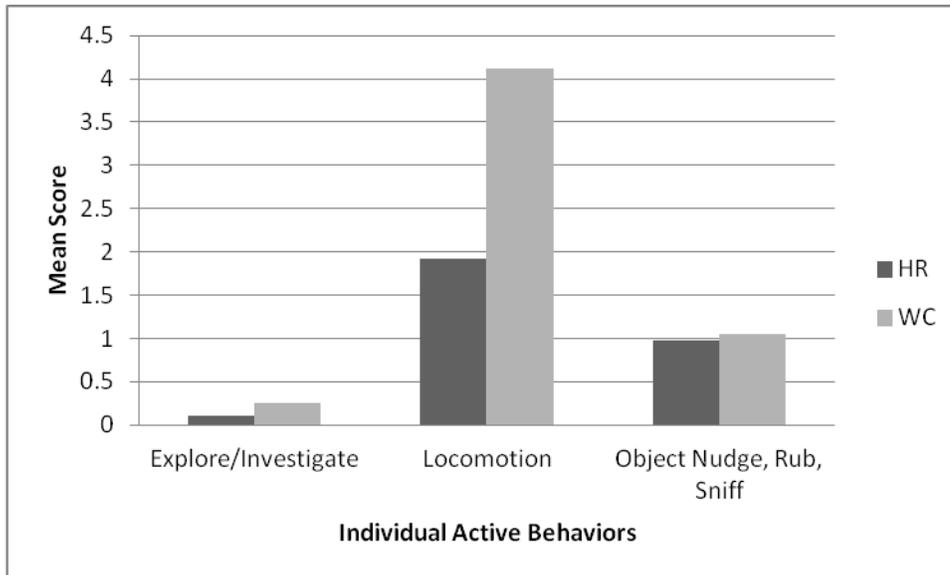


Figure 2: Individual active behavior mean scores for hand-raised and wild-caught cheetah groups.

Additionally, pacing behavior frequency was analyzed showing a highly significant difference between groups, $F(1,75) = 13.44$, $p < 0.001$; and not significant between individuals, $F(7,75) = 0.18$, $p = 0.989$. Group means show HR cheetahs paced more ($M = 4.833$, $SD = 7.377$) than WC cheetahs ($M = 0.35$, $SD = 0.864$) (Figure 3). Resting behavior did not show to be significant between groups or individuals (Figure 4).

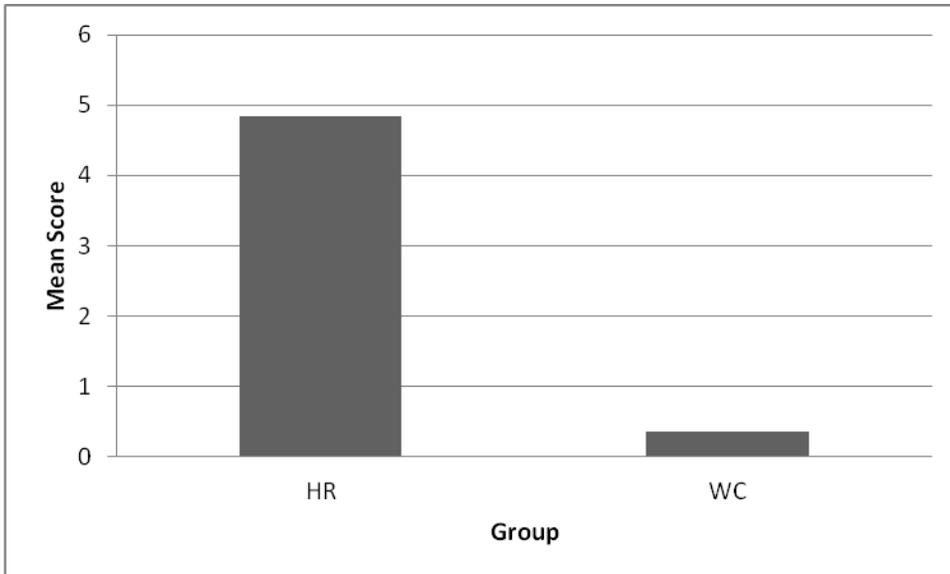


Figure 3: Pacing behavior mean scores for hand-raised and wild-caught cheetah groups.

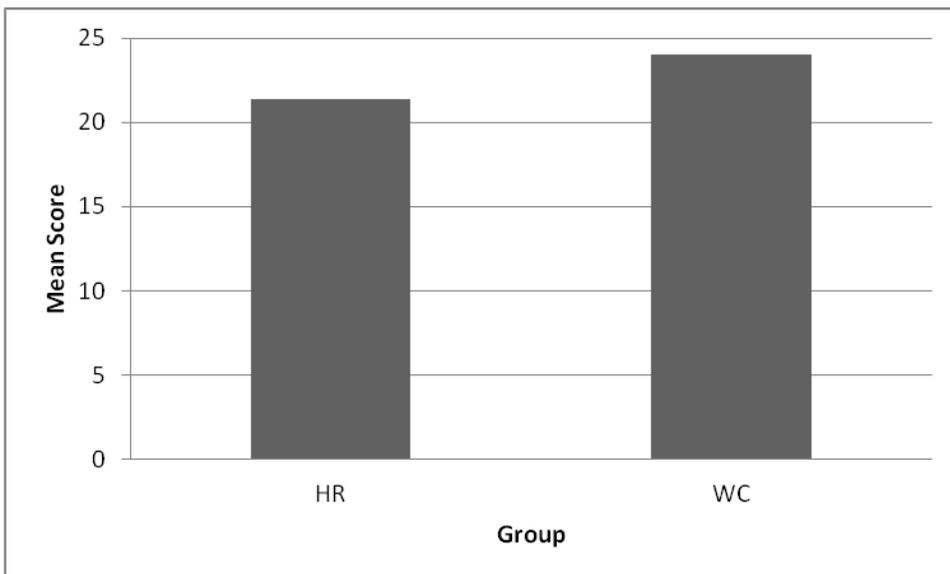


Figure 4: Resting behavior mean scores for hand-raise and wild-caught cheetah groups. The results were not statistically significant between the two groups.

Table 3. Nested ANOVA results of behaviors for group and individual values.

Behavior	F/p	Group	Individuals
Social Behaviors	<i>F</i>	2.34	2.43
	<i>p</i>	0.1311	0.0282*
Allogrooming	<i>F</i>	6.38	1.48
	<i>p</i>	0.0139*	0.1893
Allogrooming initiated	<i>F</i>	5.18	0.68
	<i>p</i>	0.0261*	0.6887
Allogrooming received	<i>F</i>	3.89	2.8
	<i>p</i>	0.0527	0.0128*
Vocalizations	<i>F</i>	4.53	2.12
	<i>p</i>	0.037*	0.0529
Chirp	<i>F</i>	2.61	0.91
	<i>p</i>	0.1108	0.5058
Meow	<i>F</i>	2.78	3.09
	<i>p</i>	0.1002	0.007**
Purr	<i>F</i>	0.11	1.34
	<i>p</i>	0.7397	0.2474
Contact	<i>F</i>	10.11	2.15
	<i>p</i>	0.0022**	0.0502
Social Play	<i>F</i>	0.22	1.04
	<i>p</i>	0.6403	0.4118
Sniff Other	<i>F</i>	0.81	0.73
	<i>p</i>	0.3707	0.6474
Active Behaviors	<i>F</i>	4.58	0.94
	<i>p</i>	0.036*	0.4819
Explore/Investigate	<i>F</i>	0.9	0.3451
	<i>p</i>	0.7	0.6743
Locomotion	<i>F</i>	11.24	1.61
	<i>p</i>	0.0013**	0.1492
Object Nudge	<i>F</i>	0.91	1.09
	<i>p</i>	0.3444	0.3772
Object Rub	<i>F</i>	1.1	0.9
	<i>p</i>	0.2976	0.5139
Object Sniff	<i>F</i>	0.05	1.06
	<i>p</i>	0.8294	0.3965
Rest	<i>F</i>	2.8	0.98
	<i>p</i>	0.0991	0.4504
Pace	<i>F</i>	13.44	0.18
	<i>p</i>	0.0005***	0.9891

* $p < .05$, ** $p < .01$, *** $p < .001$.

DISCUSSION

The results did not demonstrate social behaviors frequencies, grouped as allogrooming, vocalizations, contact, social play, and sniffing others, to be different between the hand-raised and wild-caught groups. However, frequency differences in particular social behaviors such as in allogrooming, vocalizations, and contact were seen. The hand-raised group participated in more allogrooming and contact behaviors, whereas the wild-caught group was much more vocal. In particular, certain individuals displayed more behaviors than others within their group, which was the likely cause of the significant differences between individuals for received allogrooming and meow vocalizations. These results suggest that the groups may have different common social behaviors due to their backgrounds.

The wild-caught group demonstrated significantly more active behaviors, in particular, locomotion. Since this result was not due to individual variations, the locomotor behaviors may also be considered a social behavior for this group as the difference was not driven by one individual. However, locomotor behavior could also vary due to the wild-caught group having a larger enclosure size, and therefore more room to move around. Active behaviors may also be an indication of a healthy individual related to good welfare.

Pacing behavior frequencies showed a significant difference between hand-raised and wild-caught groups. This occurred more frequently with hand-raised cheetahs. Pacing behavior can be an indicator of stress, but may also be a type of normal active behavior (Dembiec et al., 2004). The behavior frequency could be due to the hand-raised enclosure

being adjacent to other cheetah pens, in tourist viewing areas, and other CCF activities occurring nearby. The higher levels of pacing may also be more related to the smaller enclosure making it more difficult for the cheetahs to move around for large distances.

These findings demonstrate clear differences in particular social and active behavior frequencies between the hand-raised and wild-caught cheetah groups. The importance of these differences is of particular interest as all of these animals have spent the majority of their lives in captivity, but are housed in different enclosures and arrived at CCF at different times. These may be major factors for the differences between the two groups. Research on the behavioral development of foxes showed that handled animals had less fear responses and more exploration compared with those without handling (Pedersen, 1993). The human handling and development differences of the two cheetah groups are a likely factor in the social behavior differences. Similar studies have shown differences between hand-reared and mother-reared animals. In a captive cheetah study looking at behavioral differences as predictors of breeding status, differences between hand-reared and mother-reared individuals were found (Wielebnowski, 1999). Although the differences were not significant due to the small sample size, scores for tense-fearful and aggressive temperament were lower for hand-reared individuals in general (Wielebnowski, 1999). A study on human-reared infant gorillas demonstrated nonsocial behavior, less environmental exploration, and more self-directed behavior with human-reared individuals than mother-reared individuals (Gold, 2005). An analysis of hand-rearing in primates concluded that further research should be done to understand the impact of hand rearing on social behaviors to assist with providing good animal welfare (Porton & Niebruegge, 2006). These studies concluded that differences have been found

between hand-reared and mother-reared individuals and should be researched further. However, this does not confirm that the cause of the behavioral differences found in the two male cheetah groups studied is due to their developmental background. The hand-raised and wild-caught groups in this study were not entirely human-reared from birth, nor entirely mother-reared.

Various limitations to this study may affect the accuracy of the results.

Observations were scheduled around other CCF activities resulting in observations occurring at inconsistent times of day. In addition, few observations were taken of each individual cheetah due to precedence of other CCF research projects. On occasion various disruptions could occur during observations such as a tourist group disturbing the hand-raised cheetahs, or wildlife such as warthogs passing the wild-caught cheetah enclosure. Some behaviors were not seen often such as social play which may have been due to the time of day, or short duration of observations. On rare occasion, the cheetah being observed might be out of view for part of the 30 minute observation and behaviors could have been missed. Additionally, although all observations were taken at a distance as to not disrupt the cheetahs, it is difficult to determine if any locomotive behaviors were the direct result of the observer.

To determine the actual cause of the differences in social and active behaviors found in this study would require more controlled experimental settings controlling for environmental conditions. Challenges to this type of research are difficult to assess due to the limitations of the facilities available. However, further studies comparing social behaviors of more similar groups and enclosures may assist in understanding the differences found in this study. Further research may also be beneficial in understanding

the individual cheetah differences and any social hierarchies involved in groups. Research on vocal calls may assist in understanding any potential social function they may play. Also, additional research between different gendered social groups may expand our understanding of social behaviors and their roles.

This study demonstrates that there are differences in particular social and active behavior frequencies between the hand-raised and wild-caught male cheetah groups studied. The hand-raised cheetahs demonstrated more physical contact, allogrooming and pacing behaviors, whereas the wild-caught cheetahs vocalized and moved around their pen more often. Further research is needed to understand these differences and their potential causes. To be able to observe social behavior to assess individual animal welfare it is essential that we first gain a clear understanding of what social behaviors are common to the individual and if this indicates a healthy animal.

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Animal:
Facility:

CHEETAH

Obs / Exp

Enclosure:

Observer:

Date:

Time:

Visitors:

BEHAV STATES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Affiliation																														
Aggression																														
Allo-groom																														
Auto-groom																														
Contact																														
Explore																														
Locomotion																														
Object Manip																														
Pace																														
Reproduction																														
Rest																														
Soc/Sol Play																														
Tail-flick																														
Vocalize																														
OOV																														
Other																														
HEAD UP																														

BEHAV EVENTS

Allo-groom																															
Approach (ex)																															
Auto-groom																															
Chirp																															
Claw																															
Contact agg																															
Erection																															
Flehmen																															
Ground slap																															
Growl																															
Hiss																															
Lordosis																															
Meow																															
Mock attack																															
Mount																															
N-C agg																															
Pace																															
Purr																															
Roll																															
Sniff other																															
Soc/sol play																															
Stare (ex)																															
Stutter																															
Tail-bite																															
Tail-flick																															
Touch/rub																															
Urin./Spray																															
Ob bite/lick																															
Ob nudge																															
Ob play-bat																															
Ob rub																															
Ob sniff																															

DISTANCE (BL)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
0 to < 1																															
1 to < 3																															
3 to < 5																															
5 +																															

LATENCY TO RESPOND _____

APPROACH TIME _____

CLOSEST DIS _____

COMMENTS: