3 Observation protocol and long-term data collection in Taï

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Photo 3: South Group males Kuba, Woodstock and Shogun during an intensive grooming session after a morning display by the alpha male. c/o Roman Wittig

Anecdote

In March 2008, while I was sitting under a tree with a couple of field assistants from the Budongo Conservation Field Station (BCFS), a few chimpanzees were feeding in the tree above us. I had just started my second postdoc with Klaus Zuberbühler from St Andrews University and was planning to observe the Sonso Community in the Budongo Forest, Uganda, for the next two years. Suddenly, I heard a hunt bark. I looked up in the tree. The chimpanzees had stopped feeding and looked into the direction of the call, but remained in the tree.

Used to observation protocol from Taï, I shouldered my backpack to move towards the caller, but quickly found out that the field assistants were staying with their party. Monday, one of the field assistants working with me, confirmed that the vocalization sounded like the chimpanzees were hunting. Although the interpretation of the call was the same, the focus of his work for the BCFS required him to stay with the original party. However, in Taï it was protocol for field assistants to change focus. I realized during my observations at the Sonso Community that behavioural differences between study sites can be a result of observation biases due to the scientific focus of different chimpanzee projects.

Roman Wittig

3.1 Introduction

The common chimpanzee (*Pan troglodytes*) ranges all over tropical Africa: from Senegal, across the tropical belt of the continent, to Tanzania (Figure 3.1). Although *Pan troglodytes* is one species, divided into four subspecies, behavioural differences can be observed between communities or populations. Sometimes genetic differences cannot be excluded from causing behavioural differences (Langergraber et al., 2010). Considering that common chimpanzees live in multiple different landscapes (primary forests, secondary forests, woodland savannas and even in bushy savannas), some of the differences could be influenced by the ecological variation encountered (Boesch, 1994; Wessling et al., 2018). At the same time, numerous cultural differences have been documented that are at least partially independent of ecological influences (Gruber et al., 2009; Boesch, 2012; Luncz et al., 2012; Luncz & Boesch, 2014) and explain the behavioural differences.

Figure 3.1 Distribution of the common chimpanzee (*Pan troglodytes*) across Africa subdivided into four subspecies. The long-term field sites are marked with dots.

Before one can discuss whether differences are due to genetics, ecology or culture, the differences need to be documented and observation/focus biases need to be excluded. Therefore, a clear and well-defined observation protocol is necessary. Such a protocol goes beyond a clearly defined ethogram (e.g. Nishida et al., 2010) and should include how data are collected and how comparable certain behaviours are, which may even share the same name across sites, but could have different functionalities.

One example is how party composition data is collected. While in some sites party composition data are taken continuously (Boesch, 1996), others use scan sampling (Newton-Fisher, 1999; Wittig & Boesch, 2003) or an accumulative composition over a certain time (Kawanaka, 1984), and while some define party composition as all individuals in visibility (Boesch, 1996; Wittig & Boesch, 2003) others use all individuals within a certain distance (Newton-Fisher, 1999). However, in comparisons, published data are used to drawing conclusions on chimpanzee behaviour and their sociality, using party compositions which have been collected with all of these different methods.

The first chapter of this book describes the history of the Taï Chimpanzee Project (TCP) and how it was initially a project started by two researchers, Hedwige and Christophe Boesch, which progressively included students and then local assistants. Later, the project expanded in order to study more than one chimpanzee community: first with the North Group, and then the Middle and South Groups, followed by the East Group and eventually the North-East Group (here, group being interchangeable with community, i.e. North Community). Over the years and decades, our data collection protocols have adapted to this expansion to ensure the compatibility of the data collected. The focus of our research has evolved over this time frame, ranging first from a concentration on the different aspects of nut-cracking behaviour, followed by hunting behaviour. In the early 1990s, we introduced some long-term data protocols based on what Christophe observed in Gombe with Jane Goodall and her team. This mixture of long-term data collection in combination with more topic-oriented data collection remains constant in the TCP ever since.

3.2 History of general observation rules

The basic tenet of our observation is, and has been since the beginning in 1979, to observe animals with the least possible interference, as non-invasively as possible. At the onset of the project, Christophe focused on nut feeding behaviour and nut-cracking and did not want to interfere with the feeding of the chimpanzees. As a result, the Taï chimpanzees were never provisioned, unlike chimpanzees in Gombe and Mahale (Nishida, 1968; Van Lawick-Goodall, 1968), and physical contact or social interactions with them were strictly avoided, as is now standard practice at all field sites.

Furthermore, being interested in understanding how the individuals find their way in this dense forest, Christophe decided not to cut any trails in the forest. Although cutting trails in the forest makes progression much easier for observers and therefore facilitates the work, Christophe thought that the ranging behaviour of the chimpanzees could be affected by the presence of transects. This last decision was also facilitated by the fact that the undergrowth in Taï's primary rainforest is relatively open and easy to walk through for human observers compared to the much thicker undergrowth growing at other chimpanzee sites. With the increasing number of students over time, this policy changed and the project cut trails in the forest so observers could reach the chimpanzee nests before sunrise (Figure 3.2).

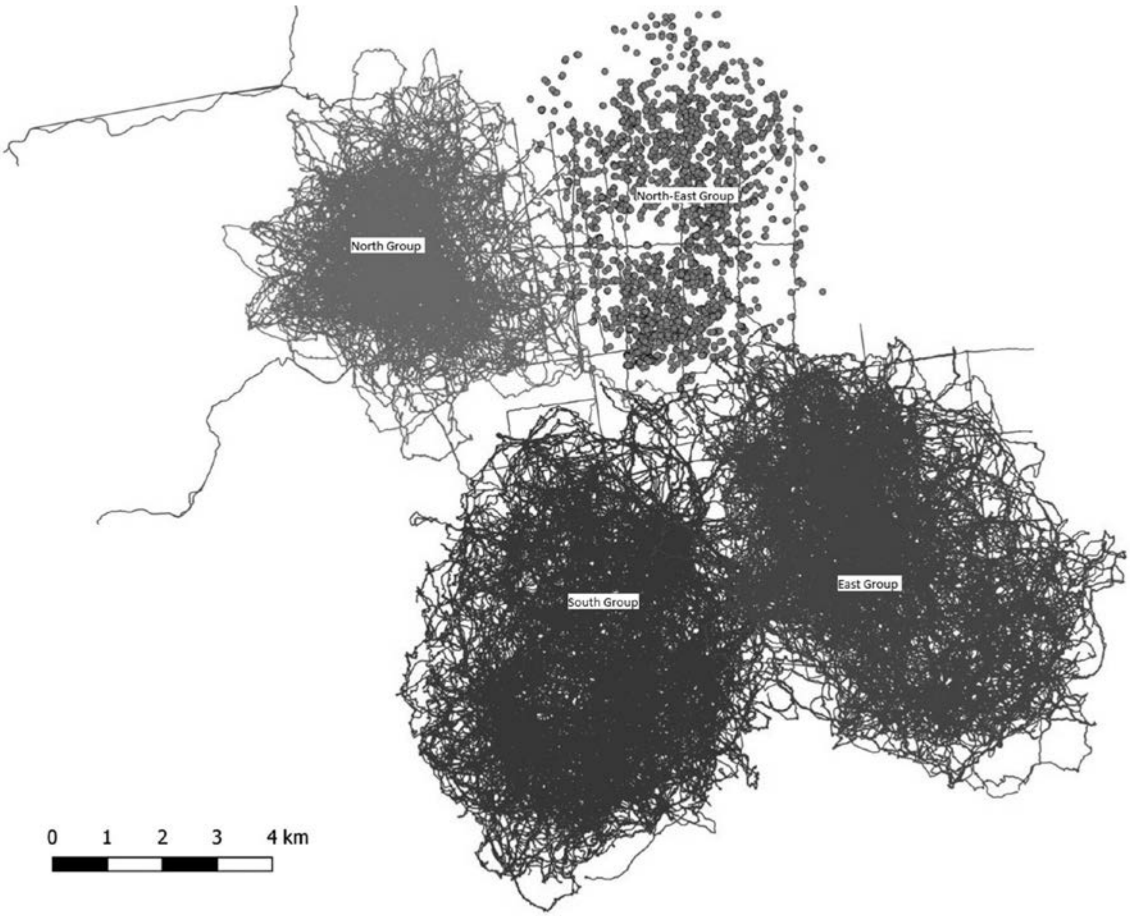


Figure 3.2 The trail system of the Taï Chimpanzee Project with GPS track logs from the field assistants in 2014–2016 for the three habituated communities (North, South, and East Group) and sightings of the North-East Group with dots.

Christophe also adopted some habits from Jane Goodall; one is to give the chimpanzees we could identify names and the other is to give offspring names which start with the same letter of their mother's name (Goodall, 1986). The first three letters of each chimpanzee's name is an identifier which is unique for the chimpanzee to facilitate data collection. Once all of the individuals in the North Group were named and could be followed by foot, Christophe adopted the focal-animal–sampling method as quickly as possible and followed focal individuals all day long. This required a high level of tolerance from the chimpanzees and was therefore only possible at first with some males.

However, their intense cravings for meat after successful hunts helped many males overcome their fear of observers, as otherwise they would not receive a share of the meat. Furthermore, the focus the project initially had on nut-cracking behaviour made observers especially patient with and concentrated on adult females, which are the main nut-crackers. It nevertheless took the Boeschs some 15 years to gain the trust of all of the females in the North Group. This implies that some of the detailed TCP protocols we explain in this chapter were put into place years into the habituation process of the different communities.

3.3 Observation rules

At the Taï Chimpanzee Project, a team of observers is responsible for completing a monthly programme for long-term data collection. The monthly programme requires each adult chimpanzee to be focal-followed at least once a month using focal-animal sampling (Altmann, 1974) from nest to nest. If there are subadult individuals of specific interest in the group, e.g. orphans or new immigrant females, they are added to the focal-sampling list. Following the chimpanzees on a daily basis for the whole day has remained our basic observation method, but in order to make this possible, the observers must stick to the following four rules.

First, at the TCP, we aim to follow the focal animal from the side and not from behind. There are two key advantages to this approach: (i) the observer can keep pace with the focal and is not held back by slower chimpanzees (because it is protocol not to cross in front of a travelling chimpanzee to keep the chimpanzee's travel direction unaltered) and the view of the focal is less easily blocked by vegetation; and (ii) the observer can see ahead as can the focal animal, to see what or who is coming. Chimpanzees often increase their travel pace as they approach trees with food sources or other chimpanzee parties. If you are 10 m behind your focal rather than beside them, this can make the difference between seeing or not seeing the sequence of social interactions that occur with the social exchange or change in activity. Who started the hunt? Who was the first to pick up a tool? Who aggressed whom first?

Second, as in most other sites, we maintain a policy of 'no interaction' with chimpanzees, in order to maintain a level of habituation where human observers have as little influence on the behaviour of the chimpanzees as possible and also to prevent chimpanzees from intimidating humans. Typically, young adolescents entering the social hierarchy try to impress the adult females and may occasionally turn towards observers. That is the moment where it is especially important not to start reacting to them. Similarly, to not attract any attention to us while they are eating or drinking, we move out of the line of sight for chimpanzees bringing food remains back to camp.

Third, the Taï chimpanzees are subject to human predation (see Chapter 1), and we therefore make an effort to have an observer with each of the study groups every day, all year round. Our presence at the sites has served as protection for the chimpanzees (Campbell et al., 2008) and other animal species in the research area (N'Goran et al., 2012). Poaching pressure is, unfortunately, extremely high within Taï National Park. Surveys have shown that the highest mammal densities in the park are in the vicinity of the research areas (Kablan et al., 2019), suggesting that our research presence serves an important protective function, not only for the chimpanzees but for all of the mammals in the park.

Finally, chimpanzee welfare has top priority, which implies that we try to be as non-invasive as possible. Following chimpanzees therefore includes several rules that we follow to ensure the best observations, while affecting their behaviour as little as possible. Therefore, we limit the number of observers per group. Generally there is a maximum of four observers with each group. If, due to fission–fusion activities, there are more observers than adult chimpanzees in a party, some observers are required to move away and look for other parties to follow. We now employ a strict quarantine (Grützmacher et al., 2017) and follow hygienic rules (Wittig & Leendertz, 2014) at the Taï Chimpanzee Project, which are mandatory for everybody. In 2014, IUCN named our approach best practice for quarantine and hygiene rules (Gilardi et al., 2014). These rules are strictly enforced in Taï and influence data collection, for example due to keeping a 7 m distance to the chimpanzees (see Chapter 23).

3.4 Long-term data collection

Ever since Christophe's research visits to the Gombe and Mahale chimpanzee projects in the 1990s, the TCP tries to collect long-term data similarly to the way Jane Goodall and her team has done to make comparisons between different chimpanzee projects more reliable. Trained local field assistants from the villages around the park and international research assistants collect the main bulk of the long-term data (Figure 3.3). These observers collect behavioural data applying the same core data protocol used over the last 25 years, including a few adaptations to new questions of interest, with all habituated groups. Additionally, they collect demography, ranging and food data, as well as urine and faecal samples.

Each chimpanzee group has a designated team of two field assistants and one research assistant who knows the chimpanzees individually (reliability greater than 95%) and shows an interobserver reliability greater than 90% for activity and party composition, and greater than 80% for social interactions. Each team follows a group-specific programme for focal

Figure 3.3 Field assistants with surgical masks during observation of the chimpanzee. c/o Sonja Metzger.

follows, which includes two days of focal-following per adult male and one day of focal-following per adult female each month. Some groups have additional focal individuals depending on the demographic changes (e.g. orphans, subadult immigrants). Students working with chimpanzees within the same group provide additional data. In case of emergencies and illness, when being able to follow many sick individuals at the same time becomes very important, field assistants who know individuals from several groups can flexibly provide additional manpower.

Nowadays, under normal conditions, a group of observers leave camp early in the morning to reach the site where the chimpanzees nested the evening before. Because chimpanzees often leave the nest at dawn (6:00 a.m.), observers need to be at the nest before this time. Each observer choses a focal animal to follow from the party present and then begins focal-animal sampling. If all of the individuals from that party have already been observed for that month, at least one observer will go and search for other chimpanzees.

The observer follows the focal throughout the day, follows the social interaction protocol and collects a urine sample from the focal in the morning (a.m.), one in the afternoon (p.m.) and a faecal sample. The track log of the GPS continuously runs and the observer marks GPS points at any place of specific interest (see below) and at feeding sites of at least 5 minutes. The focal-animal sampling continues until the focal builds a nest in the evening, when the observer returns to camp. Once in camp, the collected samples are stored in liquid nitrogen and the health monitoring chart is completed.

Some behaviours of specific interest require the observer to interrupt focal-animal sampling to complete an alternative data collection protocol. This is in the occurrence of rare or key events, such as when the chimpanzees (i) start a border patrol or detect a rival group; (ii) start hunting; (iii) encounter a leopard or another predator; or (iv) find a dead chimpanzee. After the activity of special interest has passed, the observer returns to the focal and continues with the focal-animal sampling.

3.5 Demography data

Once an individual is identified, either after birth or after immigration, the individual receives a unique name. The first three letters of the name provide a unique code for the individual and the code is only to be used once throughout Taï chimpanzee history. The first letter of the name reflects the maternal kin relationship, as far as known, and is the same letter as the first letter of the mother's name. Based on the information contained in the party composition data for the group, we can extract demography data.

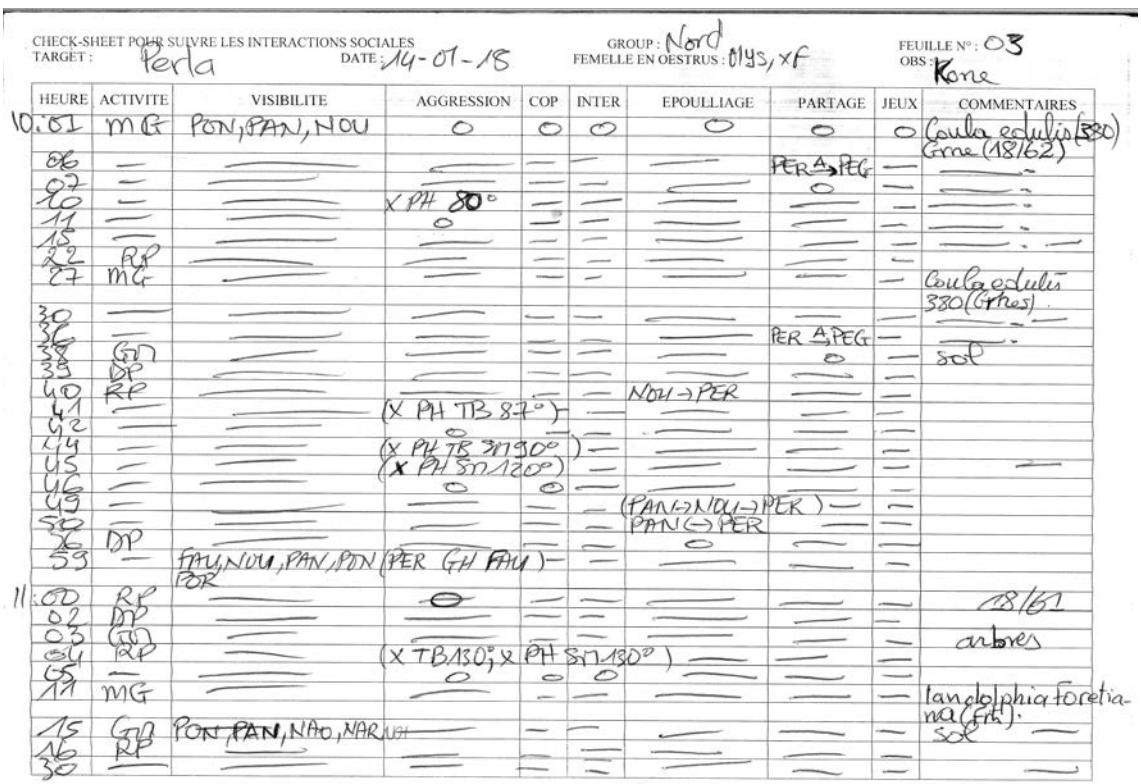
Some demography events need special information and treatment. These demography events are (i) birth, (ii) emigration, (iii) immigration and (iv) death. In the case of a birth to a resident female, the day of the first observation of the infant is taken as its birthday. The last day the mother was seen without the baby prior to the birth is the error margin, which can be between zero days and one month. In case the mother had not been seen for longer than one month, more detailed age determination for the infant is used. For each group from 2013 onwards, the average amount of time mothers were absent, defined as the time from the last observation of the mother before giving birth to the first observation of the mother with her offspring after giving birth, goes as follows: 6.4 days (range = 0–28 days) for the North Group, 8.2 days (range = 1–28 days) for the South Group and 3.5 days (range = 0–10 days) for the East Group. In the early days, the uncertainty of the birth date was much larger and we tried our best to reduce it by taking behavioural data on how much the mother supported the baby with her hand while carrying it to specify an estimated date of birth.

In the case of migration, emigration is accepted when a female is seen in one of the other groups. Potential emigration is assumed when a young female (10–15 years old) in good health with full genital swelling disappears. In both cases, the last day she was seen is the assumed day of emigration. Immigration is easier to detect, as the appearance of an unknown individual is an exciting event for any observer. However, the day of immigration is harder to determine because immigrant females are not usually habituated to human observers and therefore likely avoid being seen by humans. The general rule is that the day of first appearance is used as the immigration date, but immigration is only accepted once the female has been properly identified (agreement on unique features between the observers working with the group) and named.

Finally, death is accepted when the corpse is found. A necropsy conducted by the project veterinarian determines date and cause of death. In cases where a male, a parous female, a female younger than 10 or a female without genital swelling disappears without a trace, then death is assumed. The day after the last day an individual was seen is the recorded day of death and in some cases this can take months to declare.

3.6 Long-term social interactions

Long-term data collection at the Taï Chimpanzee Project is based on continuous focal-animal sampling. Field and research assistants choose a focal animal to follow from nest to nest, from dawn to dusk. Information about the chimpanzee group, observer and focal identity is recorded on observation charts (Figure 3.4), including the date and the names of the females that are seen with anogenital swelling. During the follow, they document each activity change, each party composition change and the occurrence of several social behaviours (aggression, vocalization, copulation, grooming, food-sharing and play bouts) with the time of occurrence (exact to the minute) using the TCP ethogram (see Table 3.1). Each behaviour type has its own column on the observation chart.


CHECK-SHEET POUR SUIVRE LES INTERACTIONS SOCIALES
TARGET : Perla DATE : 14-01-18 GROUP : Nord FEMELLE EN OESTRUS : Olys, xf FEUILLE N° : 03 OBS : Kone

HEURE	ACTIVITE	VISIBILITE	AGGRESSION	COP	INTER	EPOUILLAGE	PARTAGE	JEUX	COMMENTAIRES
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06	—	—	—	—	—	—	PER A PEG	—	
07	—	—	—	—	—	—	O	—	—
10	—	—	X PH 80°	—	—	—	—	—	—
11	—	—	O	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—	—
22	RP	—	—	—	—	—	—	—	
27	MG	—	—	—	—	—	—	—	Coula edulis 380 (Grhes)
30	—	—	—	—	—	—	—	—	—
36	—	—	—	—	—	—	PER A PEG	—	—
38	GN	—	—	—	—	—	O	—	sol
39	DP	—	—	—	—	—	—	—	
40	RP	—	—	—	—	NOU → PER	—	—	
41	—	—	(X PH TB 87°)	—	—	—	—	—	
42	—	—	O	—	—	—	—	—	
44	—	—	(X PH TB SM 90°)		—	—	—	—	
45	—	—	(X PH SM 120°)		—	—	—	—	—
46	—	—	O	O	—	—	—	—	
49	—	—	—	—	—	(PAN → NOU → PER)	—	—	
50	—	—	—	—	—	PAN ↔ PER	—	—	
56	DP	—	—	—	—	O	—	—	
59	—	FAU, NOU, PAN, PON POR	(PER GH FAU)	—	—	—	—	—	
11:00	RP	—	O	—	—	—	—	—	18/61
02	DP	—	—	—	—	—	—	—	
03	GN	—	—	—	—	—	—	—	arbres
04	RP	—	(X TB 130°; X PH SM 130°)			—	—	—	
05	—	—	O	O	O	—	—	—	
11	MG	—	—	—	—	—	—	—	Landolphia foretiana (Frt).
15	GN	PON, PAN, NAO, NAR	—	—	—	—	—	—	sol —
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30	—	—	—	—	—	—	—	—	—

Figure 3.4 A check sheet with entries in the food-sharing, grooming and aggression columns, besides the activity and party composition columns.

Table 3.1 **TCP ethogram**

Time/Heure: This column of the ethogram receives an entry for any time there is another entry either on the hour or every half hour in any of the other columns due to a change. This is done to ensure that the observers keep track of time.
Activity/Activité: Every change in the focal's activity is recorded using a two-letter code for the activity. Activities include eating, drinking, resting, resting in the nest, moving, climbing, drumming and bad observation.
Party Composition/Visibilité: Every change in party composition is recorded by writing the three-letter code of all independent individuals (dependent offspring infants are not marked, but assumed to be there) in the party.
Aggression: In the aggression column, information on aggressive interactions and vocalizations are entered. Aggressive interactions are entered in their complete sequence. The aggressor's name comes first, then the aggressor's activity, followed by the victim's name and the victim's reaction to the aggression. If there is a second interaction bout, this sequence would be recorded in the same line separated by a comma. Vocalizations are recorded with the vocalizer's name and the type of vocalization. If the vocalization is directed the receiver of the vocalization is added at the end of the sequence. In cases where the vocalization is coming from outside the party (out of visibility), the vocalizer is marked with X (= unknown), followed by the type of vocalization and then the compass direction it comes from.
Copulation/COP and Intervention/INTER: Observers record the name of the individual that copulates with the focal individual in the COP column. If there is an interruption in copulation, the name of the interrupter is marked on the same line in the INTER column.
Grooming/Epouillage: In this column, the observer documents all of the grooming interactions by or with the focal individual. The observer writes down the line of groomers, the order in which they are sitting and who is grooming whom. The observers mark the entire line of groomers (all groomers involved in the same grooming bout), even though the focal individual is not directly involved with all grooming partners.
Food Share/Partage: When observers see the focal individual sharing food with another individual, they mark whether the food-sharing is active (possessor cuts piece and hands it over with an arm movement) or passive (possessor allows receiver to access food or take a part) and who (possessor of food) is sharing with whom (receiver of food). In the comment column, the type of food is documented.
Play/Jeu: If the focal animal is involved in a play bout, the observer records the play partner or partners in this column.
Comment/Commentaire: Any additional modifier for the activity or behaviour in the same line will be recorded by the observer in the comment column. This includes the name of the food species, the location in the grid system, name of food being shared, etc.

Behavioural data have now been collected with the observation charts for over 25 years for the North Group, 19 years for the South Group and 10 years for the East Group. These long-term data sets are of unique value as they allow a detailed look into the changes in the social dynamics of these groups over time. Combined with the other long-term data, e.g. hormone, ranging or health data, they will form an important corpus to progress our understanding of the Taï chimpanzees. In 2018, we are planning to change from paper-based data collection to an electronically based data collection set-up using cybertracker (www.cybertracker.org).

3.7 Ranging data

Since the early 1990s, field assistants have been regularly recording the Taï chimpanzees' ranging data. During a typical day between the 1990s and 2013, field assistants would record the locations of the chimpanzees every 30 minutes using a 500 m × 500 m grid system which represented the entire research area. They would also record the time in which a grid change took place. In the evenings, field assistants would transfer the focal chimpanzee's travel route onto a map. The maps and travel routes were then digitalized once they arrived in Leipzig.

Since 2013, observers have been recording the chimpanzees' ranging data using their GPS's automatic tracklog function. The tracklog function saves the GPS location every minute and is activated in the morning after the observer chooses a focal chimpanzee. Their location is then continuously recorded until the focal has made a new nest or is permanently lost (see Chapter 11). Because observers synchronize their watch and GPS every morning, behaviours can be pinpointed to certain locations. This method allows us to investigate the synchrony of different parties or even neighbouring communities.

3.8 Extra data

As mentioned, several special situations require observers to change the focus of their observation. These events include a hunt or a patrol, an intergroup encounter, or an interaction with another animal (mainly predators and snakes). In these cases, observers are required to shift their focus to observe the event. Only after the last piece of meat is eaten, the patrol or intergroup encounter is over, or the predator is gone, only then may the observer return to observing the focal individual.

Hunt: If a hunt is detected, either because observers hear hunt barks (Crockford & Boesch, 2003) or chimpanzees move rapidly towards monkey vocalizations, or they see the chimpanzees climbing up a tree with monkeys in it (likely red or black and white colobus, most of the time during the monkeys' alarm call; Zuberbühler et al., 1999), or if the chimps are found with meat already, then the observer will start the hunt observation protocol.

The protocol starts with the date, the time the observation starts, the GPS coordinates (formerly the grid cell coordinates) and which species is being hunted. If the hunt was observed, the observer marks the duration of the hunt in minutes (from the first hunter climbing up into the tree to the catch), whether the hunt was successful (prey was caught) and, if successful, the sex and age class of the prey. The observer documents which chimpanzees were hunting (names or at least number of all seen in the tree) or were bystanders (names or at least number of all being on the ground and watching). Given that the understorey in Taï is relatively open, and that communities are not large, it is usually possibly to keep track of all hunters during a hunt.

The observation continues with the feeding on the meat. The total duration of meat-eating in the hunting party (from the start to the last individual eating) and the names of those who have been eating is recorded. If transfer of meat was observed, the direction is marked and whether it was active (possessor hands over meat to bystander) or passive (possessor allows bystander to take meat). If possible, the observer marks which individual has eaten which parts of the carcass, which is transferred into an estimation of the percentage of the carcass eaten by each individual. Finally, the observer marks if the different individuals have been eating leaves with the meat and their name. In addition to this information, the observer later writes a detailed report from field notes taken in a notebook about the individual in possession of the largest piece of the carcass, including a timeline and all behaviours observed. If more than one observer is around, the second observer concentrates on the second largest piece, etc. Such data produce very valuable data sets (e.g. Samuni et al., 2018).

Patrol: If the observer detects a patrol, as described by Boesch and Boesch-Achermann (2000) and Samuni et al. (2017), the date, time and GPS location of the start of the patrol is documented.

Intergroup encounter: An intergroup encounter can be a result of the patrol or can happen without prior warning (Samuni et al., 2017). Once the rival group has been detected, the observer documents date, time and their own position with GPS coordinates. The compass direction (in degrees) indicates the relative position of the rival group. The observer records the individuals present in the observed party, their relative movement and activity towards the rival group (approach, retreat), their vocalizations and if and how they react to the rival group (activities and vocalizations). If possible, observers also provide information about the direct interactions between the communities (e.g. physical contact, visual contact), who or how many are in the rival group and the reaction and vocalizations of the rival group.

Predators and other animals: If the chimpanzees meet other animals, mostly leopards or snakes, the observer records the date, time and GPS coordinates. In addition, they document the party composition of the chimpanzees, the behaviour of the chimpanzees and if there is an interaction with the animal, the type of interaction. The observer adds to the record the animal species the chimpanzees met, where the animal was encountered (water, tree, ground, etc.) and how the animal reacted (Boesch, 1991).

3.9 Samples

As part of the long-term database, each field/research assistant collects one faecal sample and two urine samples per focal individual per day. The faecal sample is collected using a plastic bag, slipped on inside-out on the collector's hand. The collector carefully seizes the faeces and turns the plastic bag inside-in again. Marking collection time, date and individual ID on the bag with a permanent marker, the bag gets closed with a knot and stored in a thermos flask.

Urine is collected twice, once in the morning (a.m.) as soon as possible, and the second sample is collected in the afternoon (p.m.), but as close to the evening as possible. Once the focal individual urinates, the collector takes a micropipette and transfers as much urine as possible from leaves into the pipette. Afterwards, the urine is transferred into a 2-ml cryotube and the process might be repeated until a level of at least 0.3 ml is reached. The tube is marked with urination time and date, the ID of the focal and the collector, and a 'u' for urine. The tube also gets stored in the thermos flask.

In the evening at the laboratory in the camp, the faeces get mixed by working them with the fingers in the plastic bag. The collector then transfers the faeces with a wooden/plastic spatula in two cryotubes, creating two aliquots of the same sample. The cryotubes are marked with defecation time and date, the ID of the focal and the collector, and an 'f' for faeces, plus an A or B for the aliquot number. All samples are entered into the laboratory book, including the information on the tube and additional information, such as consistency of faeces, weather conditions during collection, etc. Finally, they are wrapped in aluminium foil and frozen in liquid nitrogen containers. Once a month the containers are moved to Abidjan and the samples get securely transferred into a –80°C freezer located at the Centre Suisse de Recherches Scientifiques.

3.10 Health monitoring

Every evening after returning to the camp, observers work together to complete a health-monitoring chart, where observers record which individuals have been seen on this particular day and which individuals have shown symptoms of illness (coughing, sneezing, runny nose, wounds, etc.). For females, the presenting of swollen anogenital regions is also marked in the chart.

3.11 Additional information

Since 1988, rain and temperature data have been collected daily at the North Camp. Recently (2012), each of the three camps in the project have started running their own station which collects data on the amount of rain, minimum and maximum temperatures of the day, and also humidity measurements. This allows us to look into microclimate differences between measure points that are only a few kilometres apart.

As early as 1991, we started collecting samples for genetic analysis of the North Group in order to assign paternities. As described in the first chapter, this was not an easy task, for the method we currently use in order to work with bad-quality samples was not yet established and it took many years of improvements until a reliable protocol could be established (Chapter 5). Once constructed, this reliable protocol has been applied to data collection on new infants born or females immigrated. Observers collect up to five faecal samples per infant for genetic analysis as soon after birth as possible (using the two-phase storage method; Nsubuga et al., 2004) to keep up-to-date with paternity analysis and the genetic databank for the Taï chimpanzees.

Since 1997, a team of two trained field assistants has been collecting data on the phenology of the 30 most important food species in the area. The team started in the North Group, then the South Group, and they now collect phenology data in each of the four chimpanzee territories. Once a month, they record the amount of leaves (fresh and old), flowers (buds and open) and fruits (unripe, ripe and fallen) of about 1000 individual trees, in each territory (chimpanzee and mangabey) along defined transects, distributed across each territory. The diameter at breast height (DBH) of all individual trees is measured at least every 5 years to allow calculation of food production indices.

Since 2012, students and postdocs follow the TCP data-sharing policy installed by Roman Wittig, under which students who are together in the forest set up their data-collection protocol in a similar way, so that certain data can be used by everybody. This increases data density enormously and provides additional eyes and observations in those groups a single student cannot be in. After the students and postdocs have finished their studies, the data remain with the Taï Chimpanzee Project for further use protected by a co-authorship agreement.

Finally, observers use an ‘events book’ to record anecdotes. Although this is non-systematic data collection, sometimes it is very informative for future project ideas.

3.12 Conclusion

The presentation of data-collection protocols is mainly concentrated on protocols we adopted after many years or decades of testing and after our understanding of the Taï chimpanzees grew. Some protocols proved to be too complex and did not provide the kind of information we needed and were therefore abandoned, as was the case with the mother–infant project. Others evolved to become part of the standard long-term protocol, like our social interaction protocol, that has now been adopted at other chimpanzee study sites. This will open the way to better future cross-population comparisons. Finally, some parts of the protocol are still in the making, as we try to find the best way to collect comparative data with the mangabeys (Mielke et al., 2017, 2018).

Nonetheless, these data have become invaluable because there are not many sites with behavioural, genetic, hormonal, health, ecological and climate data lasting more than 25 years. The data collection allows us (i) to build a genetic pedigree entering its third generation (Chapters 5 and 9); (ii) to follow rank dynamics and social relationships over the entire course (Chapter 18); (iii) to understand territorial changes and overlap between individuals and communities (e.g. Chapter 11); (iv) to analyse survival and fitness outcomes across four communities (Chapter 9); and (v) to compare hormone levels between individuals but also between groups (Chapter 21), etc. Precise documentation and long-term storage also helps us to return with new techniques to old data sets and, for example, reinvestigate old disease outbreaks (Wu et al., 2018), or analyse the effect of behaviour on teeth and bones once they are entered into the collection due to the death of the individual (Hoffmann et al., 2017). Finally, climate and phenology data can even help to answer questions outside the primatology and anthropology field, helping us to understand some of the bigger questions of our times, like those to do with climate change (Adamescu et al., 2018).

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