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„Cooperation behaviour in human-dog and human-wolf dyads during a walk on the leash“

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1. Introduction

Humans and dogs have been companions for a long time. Dogs live in close social contact with humans all over the world, as social partner (Kotrschal, 2009; Kotrschal & Ortbauer, 2003; Wedl, 2009), working dogs, herding and hunting dogs, assistant dogs, which guide blind people (Naderi et al., 2001), and in some cultures for their meat.

The dog family or Canidae is a biologically cohesive group of carnivores that is divided into thirty-eight species, including the wolf *(canis lupus)* and its subspecies the domestic dog *(canis lupus familiaris)* (Clutton-Brock, 1995). All canids communicate with each other by means of facial expression, body postures, tail-wagging and vocalizations (Bradshaw & Nott, 1995). The dog, *Canis familiaris*, is the only member of the Canidae that can be said to be fully domesticated (Clutton-Brock, 1995).

Dogs were domesticated from wolves, which shared a common ecology and history with humans (Clutton-Brock, 1995) for over 35.000 years (Vilà et al, 1997).

Wolves are a prime example for living in social groups. They live in family unions with complex social organization (Mech, 1999), they show intelligent cooperative behaviour in hunting (Mech, 1970; Muro et al., 2011) and they live in a territory and rear their pups colletively (Zimen, 2003). It is likely those social abilities make it possible, that wolves can cooperate with humans and were domesticated. Domestication is an evolutionary process controlled by human influence (Price, 1984).

1.1. The origin of dogs

Combined results of different studies indicate that the ancestors of the dogs are exclusively wolves, *Canis lupus* (Clutton Brock, 1995) and not the Golden chakal (*Canis aureus*), as previously thought. The Canine genome sequence was released in 2005 by Lindblad-Toh et al. (2005) and it confirmed the deduction that the dog originated from the wolf, which was earlier made likely based on a behavioural study by Zimen (1988). Pang et al. (2009) found by analysing mitochondiral DNA that the domestic dog originated in southern China, south of the Yangtze River, less than 16,300 ya, from several hundred wolves. The “dogification” probably leaped at this time in this area, because this was the time when people there became sedentary and developed rice agriculture at this time, so the dogs may have originated among sedentary hunter-gatherers or early farmers, and the numerous founders indicate that wolf taming was an important culture trait (Pang et al., 2009) at this time. The primary split between wolves and dogs, however, already happened some 35.000 years ago in central Asia

(Vilà et al., 1997). Schleidt and Shalter (2003) proposed that wolf and human first had mutual contact and, because of subsequent changes in wolves and humans, they co-evoluted to sedentary hunters, benefitting both. Archaological evidence shows what dogs mean to human. Since about 12,000 – 14,000 years ago people have been burying dead dogs, which directly reflects the relationship of humans and dogs (Morey, 2006).

1.2. What is cooperation?

The oxford dictionary defines cooperation as the action or process of working together to the same end (Oxford University Press, 2013). Naderi et al. (2001) added three independent dimensions to the definition of Boesch and Boesch (1989), who definied co-operation as "individuals acting together to achieve a common goal"; Congruence, synchrony, and spatial co-ordination. This means that the shown behaviour has to be simliar, simultaneous and the partners have to stay in proximity. This entails a certain measure of understanding of the task and work share by cooperation partners. The coordination of herrings or starlings in a big swarm to avoid predators would therefore not qualify as cooperation in the proper sense. But if wolves or lions are hunting, with a few individuals chasing the prey and others intersect its trajectory, this would qualify as cooperation, if the interceptors understand what they are doing and when they share the prey among those who contributed to the success.

Due to the fact that vertebrates, especially mammals, have common social tools, like homologues brain centres for social behaviour and emotions (Panksepp, 2005; Goodson, 2005), social bonding in groups (as well as mother-infant bonding) (Curley and Keverne, 2005) and social physiology (de Vries et al., 2003; Kotrschal, 2009), it is possible to engage in truly social, individualized, long-term dyadic relationships. The better the partners know each other and the more they are socialized with each other, the better may be their emotional and motor coordination as a dyad. Nagasawa et al. (2009) proposed that animals share social cues and can distinguish a particular individual, which is necessary for survival of the animal. Although animals have species-specific attachment styles, similar behavioural and physiological processes in early socializing of different species allows relationships and emotional bonds to build between species (Kotrschal, 2009; Nagasawa et al., 2009).

Kotrschal et al., 2012 defined three features which characterize a relationship: How strongly is the bonding between individuals? What kind of attachment quality does the dyad mutually have? And operationality: what are the partners actually doing together, what is their interaction style?

An important cue for cooperation is communication (Chalmeau and Gallo, 1996). Most communication is not only verbal, but also non-verbal and is learned during the period of socialisation (Olbrich, 2009; Bohnet, 2009). Dogs can communicate with humans, because of some adaptation during the domestication process. They may have acquired cognitive abilities, such as being able to use human visual cues (Nagasawa et al., 2009; Reid, 2008; Topál et al., 2009). For instance, dogs and even wolves can understand human pointing gestures (Soproni et al., 2002; Gácsi et al., 2009). When animals show human-like social behaviour, the human biological response is activated. Nagasawa et al. (2009) supposed further, that dogs, and its ancestor the wolf, are the only animals able to use these human-like social cues, so they were able to establish a niche in human society. They expect as well, that not only genetics, but also interspecies-specific symbiotic relations form the basis of cross-species empathy abilities.

Topál et al. (2005) proposed two hypotheses on the base of Freedman, et al. (1961), Hare et al. (2002) and Miklósi et al. (2003). The socialization hypothesis suggests that intensive individual contact to human social environment and extensive hand rearing during the critical period of socialization (Freedman et al., 1961) is important to form attachment. On the other hand, the domestication hypothesis claims that because of selective breeding for human preferable behaviour specific genetic changes arised. He found evidence that genetic changes lead to a human - analogue attachment system, which probably enabled integration of the dog into human social system (Topál et al., 2005).

The prefrontal cortex is known as the place of conscience and is important for decision-making in mammals (Kotrschal, 2012). In case of the WSC wolves, it is likely that they know that it would be easy to confront the humans or steal food from them. But because of the prefrontal cortex, they may do not want to, because it would be socially wrong to act against social and working partners. Such behaviour would ruin the social relationships (Kotrschal, 2012). This respectful behaviour arises from the method of early raising and therefore the base for further cooperation. Wolves develop a special relationship to their handraisers when they get socialised from the very beginning. Dogs, in contra, do not need such intensive contact to form proper relationships (Kotrschal, 2012).

1.3. Cooperation with humans

Dog interactions with humans have a wide range. Dogs can be social companions (Kotrschal et al., 2009), be appointed as working dog like herding and police dog, or guide blind or disabled people as assistant dog and, furthermore, studies confirmed that dogs have a positive effect on human wellfare (Naderi et al., 2001; Wedl & Kotrschal 2009; Beetz et al., 2011; Kotrschal & Ortbauer, 2003; Walsh, 2009).

Human-animal relationships are influenced by the quality of the relationship and, potentially, of attachment. Dyadic partners can be mutual social supporters to reduce stress parameters (Kurdek, 2009; Schöberl et al., 2009). The quality of dyadic relationships has an influence on success in practical tests (Kotrschal et al., 2009; Topàl et al., 1997). In every dyadic bond, within-species and between-species, distinct dyadic assymmetries and conflicts will occur, in human-animal dyads as well (Kotrschal et al., 2009).

Individual discrimination is the base for long-lasting bonds (Nagasawa et al., 2009). It was shown, that dogs can discriminate between human beings. In several studies, dogs behaved differently with their owner than with strangers (Adachi et al., 2007; Topál et al., 1998). In hand reared wolves studies showed different results. Topál et al. (2005) found no treatment differences of wolves with familiar people and strangers. Already young hand reared wolf pups show avoidance and aggressive behaviour towards a familiar person, whereas dog puppies are more communicative and stay in proximity to the caregiver in an object preference test (Gácsi et al., 2005). But lots of studies of the wolf science center in Ernstbrunn indicate contrast (Gácsi et al., 2009; Range & Virányi, 2011). The hand reared wolves like to interact with familiar people, get frequent contact with them and use human pointing cues very similar to hand reared pack dogs.

Evidence for attachment was found independently. Dogs were observed during an Ainsworth's Strange Situation test. A secure base effect was suggested when dogs explored more, played with the stranger and concerned in individual playing when the owner was present. Secure attached dogs greeted their owners more when coming back than the stranger (Palmer and Custance, 2007; Prato-Previde et al., 2003; Topál et al., 1998). Topál et al. (1998) claims that the dog-human relationship is analogous to child-parent or chimpanzee-human attachment behaviour, because the observed behavioural phenomena are similar to those described in mother-infant interactions. Sometimes social stimuli have more effect on desirable behaviour than food reinforcement, even in wolves (Frank & Frank, 1988; Gácsi et al., 2005).

Wedl et al. (2010) investigated the social attraction of dogs to their owners using a "picture viewing test". The dog was allowed to move free in the room while the owner's attention was focused on solving a task. The owner's attention to the dog and the dogs contact seeking behaviour were observed. They found out that the nature of the human-dog relationship and the personality of dyad members influence dogs social attraction to their owners (Wedl et al., 2010; Horn et al., 2012). Furthermore men-owned dogs approached their owners more often than dogs of female owners.

An important behaviour in social cognition is gaze-following. It is a complex social behaviour to pass information to another individual, independent if it is on purpose or not. The ability to follow human gaze affords the animal to get human information and to use it for its own benefit. Results show affinity of context-specific responsiveness to human referential signals between adult pet dogs and preverbal infants, so an attachment like a parent-infant bond can be formed (Téglás et al., 2012; Prato-Previde et al., 2006). Téglás et al. (2012) predicted that dogs might have evolved, during socialization to human environment, a special, functionally infant-analog "cognitive mindset", which allows communicative interaction with people (Gaunet, 2007; Ityerah & Gaunet, 2008). However, latest research showed that 14 week old hand reared wolves are already able to follow human gaze (Range & Virányi, 2011). Kotrschal et al. (2009) found that dyadic interaction styles of dogs and humans were influenced by sex and personalities of both dog and owner, and by owner attitude and attachment style. Dogs' response to human communication is driven by their motivation to satisfy human requirements (Topál et al., 2009).

An established method to investigate personality traits in humans is the NEO-Five Factor Inventory (NEO-FFI), which categorise personality in five traits (neuroticism, extraversion, conscientiousness, openess and agreeableness) (McCrae & Costa, 1987, 1989; Costa & McCrea, 1992). A study on human-animal dyads found that the higher a dog owner scored in "neuroticism", the longer dog and owner spent time close or next to each other in a picture viewing test (Wedl et al., 2010). Kotrschal et al. (2009) suggest that these owners need their dogs as an emotional social supporter. These dyads were less successful in operational tasks. Owners high in extraversion spent a lot of time with their dogs in activities. Owner gender influences the dyadic interaction style as well (Kotrschal et al., 2009; Aliabadi et al, 2011). Owners in successfully performing teams praise their dog more and these dogs stay closer to their human partner (Alibadi et al., 2011). But closely attached dyads share less activies and need longer time to master tasks (Kotrschal et al., 2009). Owners of more weakly attached

human-animal dyads are less satisfied with the behaviour of their dog than more strongly attached ones (Serpell, 1996).

But it is not only in dog dyads that interactions are influenced. Owner gender, age, attitude and attachment (Serpell, 1996) as well as cat sex, owner personality, and interactions have an effect on dyadic behaviour in human-cat interactions (Wedl et al., 2010). Owners high in neuroticism initiate more often and more intense social contact and feed their cats more, whereas extrovert owners communicate less but have relatively self-confident and bold cats (Kotrschal et al., 2012). The kind of gender and personality interactions in human-cat dyads could be a general pattern in long-term dyadic relationships in mammals, within or between species (Kotrschal et al., 2012).

Furthermore, personality of dogs plays a role in dyadic interactions (Aliabadi et al., 2011). "Sociable, active, unconfident and anxious" dogs which are less "vocal, aggressive, clever and attentive" spent more time approaching the owner during a picture viewing test (Wedl et al., 2010). The influence of dog personality in the study indicates that human-dog dyadic relationships are comparable to human-human dyads because they indicate the attachment style (Wedl et al., 2010). Social behaviour towards conspecifics is determined by age, sex, training experience and time spending together. In general males are less sociable towards their conspecifics than females (Kubinyi et al., 2009).

Not just domesticated animals but even wolves are able to cooperate with humans, when they are properly socialized. The leash walking pilot study by Auer et al. (2011) indicates an influence of walkers' and wolves' personality in the walking performance. Walkers with no adequate contact during or after raising the wolves had difficulties in walking the wolves. So there is an individual influence of the dyadic relationship practical performances and cooperation (Auer et al., 2011).

The WSC wolves and dogs are working for food as positive reinforcement. Most of the time they are cooperative with humans. None of the animals would ever get treated negatively. This would be very dangerous, as wolves may know that they are stronger and could sometimes dominate the humans, but they have been given no reason to do this (Kotrschal, 2012). Differences in human-dog and human-wolf dyads were investigated independently. Both dogs and wolves can read pointing cues from humans. Older wolves performed better than younger and took shorter time to build eye contact (Miklósi et al., 2003; Gácsi et al., 2009; Kotrschal, 2012). But when trying to solve an unsolvable task dogs look more for human help than wolves (Miklósi et al., 2003; Kotrschal, 2012). This suggests that during the domestication process, the dogs ability to look into the humans face, has built some human-

dog communication cues. But willingness to cooperate in wolves increases through years of socialisation. Dogs instead have a predisposition of willingness to cooperate with humans just for the sake of social recognition (Miklósi et al., 2003; Gácsi et al., 2009; Kotrschal, 2012), probably because dogs were selected for tameness during domestication (Belyaev et al., 1985).

1.4. Leash walking

A walk on the leash may be considered a model paradigm of complex cooperative tasks between human and animal, because the dyadic partners are connected by a leash and have to work together in order to walk in a certain direction, avoid problems, etc.. A leash walk fulfills the criteria for a cooperative task Naderi et al. (2001) defined; congruence, synchrony and spatial co-ordination. Both partners influence the walk equally. Human and animal can work together or they can act as two individuals who just have to walk next to each other but with great conflict. Securely attached dyads will perform a more homogeneous walk then insecure attached or especially unfamiliar partners (Topál et al., 2005; Kotrschal, 2012; Auer, 2010; Heszle, 2012). Relationship and attachment is controlled by bidirectional attention. Especially on leash walks, constant attention is important to build a proper relationship and send explicit signals, so the dyad can work together without any conflicts (Kotrschal, 2012). At least one partner should keep attention towards the other to react in an appropriate way and prevent conflict situations.

Walker gender, canide sex and personality of both influence the individual performances during the walk (Kotrschal et al., 2005). In general, male owners seem to control their dogs more, and male dogs seemingly get more controlled by their owners, independent of owner gender (Alibadi et al., 2011). Familiarity plays a major role in the performances of the walks, especially in wolves. Less contact with the walkers during the raising of the wolves leads to less successfully walking performances. Therefore, individual dyadic relationships will affect practical cooperation (Auer et al., 2011).

In dyadic walks, guidance/leadership is not always equally distributed between the partners. Most of the times, one partner leads the walk. He determines in which direction they walk, when to stop and what they do next. Sometimes guidance will be distributed over the two partners, but it is also possible that one partner is dominant. Mostly guidance will alternate within the dyad.

During leash walks conflicts can be identified easily. The dyadic partners can act in-between the length of the leash, which can be described as an instrument of communication. When the

individuals do not want to walk in the same direction, for example, the leash will be strained. Further, the walker can use the leash to guide and direct the animal.
Food reward also has an influence on the walking performance. The walker may attain the animals' attention and will influence their motivation to cooperate.

1.5. Hypothesis

To investigate influence of domestication, I compare leash walks of human-dog and human-wolf dyads from equally raised wolf and dog packs. A leash walk is a cooperative task; both partners influence the performance and the partner in equal parts.
I expect that more conflicts will occur during the walk with wolves, because dogs are domesticated and therefore potentially more cooperative with human; they may walk closer to the walker and may react faster when the walker is calling compared to wolves. This willingness to cooperate in dogs is predicted because of their breeding to tameness during domestication (Topál et al., 2005), but because of individual socialisation wolves can cooperate with humans as well. Auer (2010) showed that individual dyadic relationships have an influence on the performances of wolves on a leash in walks with humans. Wolves seem to discriminate between their working partners to a greater degree than dogs and have more conflicts with unfamiliar individuals or when they did not form a proper relationship (Kotrschal, 2012; Topál et al., 2005; Auer et al., 2011). Walkers with no adequate contact during raising had difficulties walking the wolves (Auer et al., 2011).
I expect more attention and physical contact in human-dog dyads, because dogs ask humans for help in an unsolvable task, whereas wolves generally try to solve it on their own (Miklósi et al., 2003). Furthermore, wolves will stuggle more with the leash and have more guidance conflicts during the walk, similar behaviour as found by Gácsi et al. (2009) in a human pointing study.
I further expect that wolves will explore more than dogs, because it is more important for them to be attentive to their environment and to know what happens around them. Dogs are more secure in their environment because they may be more attentive towards their human partner than wolves. These expectations were supported by a study by Topál et al. (2005) on wolf and dog pups in a strange situation test. Wolf puppies explored more than dogs. But they also found that wolf puppies spent more time in physical contact to the human partner than dogs. However, in an object preference test, dogs stayed in proximity to the caregiver, whereas wolves showed different behaviour in 4 different test trials (Gácsi et al., 2005).

Nevertheless, for the recent study, I would suggest that dogs will spend more time in proximity to the walker than wolves and pay more attention towards them.

Experience showed that the WSC wolves are very well established in human environment and are used to learning and behaving well in order to get rewarded. The socialization by human hand-raising made it possible that they behave more like dogs rather than in a way expected for wolves (Kotrschal, 2009). The WSC wolves are used to walking on the leash and to obeying commands, but the exploring and guidance behaviour will still be different between wolves and dogs.

Previous studies documented that personality, owner gender and dog sex have an influence on dyadic performances which may also be relevant for the present situation. Owners high in neuroticism need their dogs as emotional support and touch them more. Such dyads will stay in proximity to each other, but will be less successful in operational tasks (Wedl et al., 2010; Hezsle, 2012; Kotrschal et al., 2009). In contrast, extroverted owners show more clear interaction styles, so they will perform successfully during the walk and the sit and down trials (Kotrschal et al., 2009). Owners high in extroversion and openness, and owners low in conscientiousness had less leadership conflicts in the leash walking study of Heszle (2012). Dyads with neurotic walkers often had a strained leash (Heszle, 2012). I expect similiar results for walks with dogs and wolves.

The attention of neurotic owners is focussed on the animal and they also feed cats more often (Kotrschal et al., 2012); maybe this will be found in the present study with dogs and wolves as well. Sociable but less excitable Canids will perform better because their attention is directed towards the walker. Men talk less than woman, but touch the animal more often and usually try to achieve the task faster, whereas woman will interact more verbally with their dogs (Prato-Previde et al., 2006; Hart, 1995). In the study of Heszle (2012), neurotic walkers and men more often strained the leash and called a command than walkers high in extroversion and women. Male dogs explored more frequently but female dogs had lots of conflicts in guidance.

So all in all, dyads in close spatial contact with bidirectional attention towards each other, with not very neurotic owners who praise the animal frequently, may perform more successfully than others (Alibadi et al., 2011). If this is independent of subspecies, ontogeny has more influence on behaviour than genetics.

In short, my study is based on the following hypotheses:

1. There are differences of performance in dogs and wolves on the leash with human walkers. Dog dyads will act more homogenously, whereas wolf dyads will struggle more and will have more frequently conflicts in leadership.
2. Specific parameters, like human gender, animal sex, personality of both and food reward influence different behaviour.
3. Individual dyads will act differently. Differences of individual walkers will be found when walking with dogs or wolves

2. Methods

2.1. Subjects and setting

The study was conducted at the Wolf Science Center (WSC, www.wolfscience.at), located in the game park of Ernstbrunn (Austria). At the time of the study 11 wolves and 16 dogs were living in six packs in the WSC enclosures. All animals at the Wolf Science Center were seperated from their mothers and hand-raised from, at the latest, 10 days after birth (before eye opening) (see Klinghammer and Goodmann, 1987; Frank et al., 1989; Freedman et al., 1961). They were used to humans and a few pet dogs. During the first 5 months they had close contact to the hand-raisers throughout the day and night. They have also learned several requested commands and were used to working for food rewards, so it is possible to investigate their cooperative and cognitive skills. Both dogs and wolves have learned the same commands like sit down, lie down, come by name and several other requests that are not important for this study. Additionally, they learned to walk on a leash without pulling. None of the animals were castrated, but the males were vasectomised, and therefore hormonally intact but were not able to reproduce.

The study is based on five dogs (*canis lupus familiaris*) (2 female, 3 male), all mongrels, taken as pups from a shelter in Hungary. At the start of the approach they were about one year old. Four of the participating dogs were living together with two others in one ~ 4000 m² enclosure. The fifth dog was living in a two pack enclosure.

The two male Timberwolves (*canis lupus occidentalis*) were taken from a zoo in Canada. When the study starts they were at the age of 1,5 years and were living in a pack together with two other wolves in a 8000 m² enclosure. They were also used to pet dogs owned by the hand-raisers.

Table 1: Participating WSC dogs and wolves, their sex, subspecies and the month of birth.

name	sex	month of birth	dog / wolf
Hakima	M	Sept. 2010	dog
Binti	F	Sept. 2010	dog
Asali	M	Sept. 2009	dog
Bashira	F	Sept. 2010	dog
Meru	M	Oct. 2010	dog
Wapi	M	April 2010	wolf
Kenai	M	April 2010	wolf

Six employees of the WSC have participated in the study (Prof. Dr. Kurt Kotrschal, Dr. Friederike Range, Dr. Zsófia Virányi, Marleen Hentrup, Rita Takács and Bea Belenyi). All of them had very close contact to the animals which is known to be important for building social relationships (Freedman et al., 1961; Serpell, 1996) and some of them trained daily with the wolves so they differed in contact intensity. Also, during the phase of hand-raising, they spent different amounts time with the animals. The employees were allowed and able to take the wolves on a walk outside the enclosure, using a 10 meter long leash. There are some guidelines on how to handle the wolves and dogs at the WSC, such as to reinforce and not to punish the animals. Depending on the contact intensity, every employee established a different individual human-animal relationship to the Canids.

Each human walked with each animal three times at three different sites for the study, so we collected data from 35 dyads. During the experiment they were asked to fill in several data sheets. In this paper the participating humans will be called walkers.

2.2. Additional data

In order to compare the whole set of data, previous measurement data of three studies with wolves and dogs from the WSC, based on the same model, were used in the statistical analyses. The first study was carried out by Margit Auer 2009 at the gamepark of Grünau im Almtal (Auer, 2010). Data of three one year old wolves and eight humans were taken to compare individual differences. Most of the walkers were the same in the second, third and last study. In the second study, six wolves and seven humans participated. Data was taken from Nora Bauer and Barbara Glatz at the WSC in Ernstbrunn. The wolves were seven/eight to ten/eleven months old during the experimental period. In the third study by Marion Heszle, only dogs participated. The four one year old, hand-raised dogs lived in one enclosure when the experiment took place. Seven colaborators of the WSC walked with the dogs.

Table 2: Names of wolves and dogs participating in previous studies of the WSC.
Their sex, subspecies, month of birth and in which study they participated.

name	sex	month of birth	dog / wolf	study
Aragorn	m	May 2008	wolf	1st
Kaspar	m	May 2008	wolf	1st
Shima	m	May 2008	wolf	1st
Tatonga	f	April 2009	wolf	2nd
Nanuk	m	April 2009	wolf	2nd

Geronimo	m	May 2009	wolf	2nd
Yukon	f	May 2009	wolf	2nd
Cherokee	m	May 2009	wolf	2nd
Apache	m	May 2009	wolf	2nd
Raffiki	m	Nov. 2009	dog	3rd
Alika	f	Nov. 2009	dog	3rd
Maisha	m	Nov. 2009	dog	3rd
Kilio	m	Nov. 2009	dog	3rd

So, in total, 11 humans (2 male, 9 female) and 20 Canids (11 wolves, 9 dogs) participated in standardized leash walks. Some of the walkers walked with all animals, others just walked with a few. But each dyad walked two or three times along different tracks.

2.3. Procedure

2.3.1. Standardized Walk

We designed a standardized walk along an 80 m long path to test cooperative behaviour of human-wolf and human-dog dyads (Figure 1). The animals had to perform the walk on a 10 meter long leash with the walkers. Three tracks were located at three different places within the game park Ernstbrunn, to make sure that there are no influences on the performance due to environmental conditions; every dyad had to walk on every track once. Each track was marked at the beginning and end with coloured wooden poles. In between the track, in equal distance, two addtional marks were fixed, where the animal had to do an exercise. The dyad had to walk the path two times bidirectionally. On the way forwards, they had to stop at the first mark and do the exercise “sit down”; after finishing the exercise correctly, they walked on to the end of the track and turned around. On the way back, they had to stop at the other mark and do the exercise “lie down”. After this they could walk to where they started. Then they had to do the same procedure again, so the complete walk lasted 320 meter. No further instructions were given, so it was up to each dyad itself how to perform the walk.
The three tracks were based on the same model, but were at different sites.

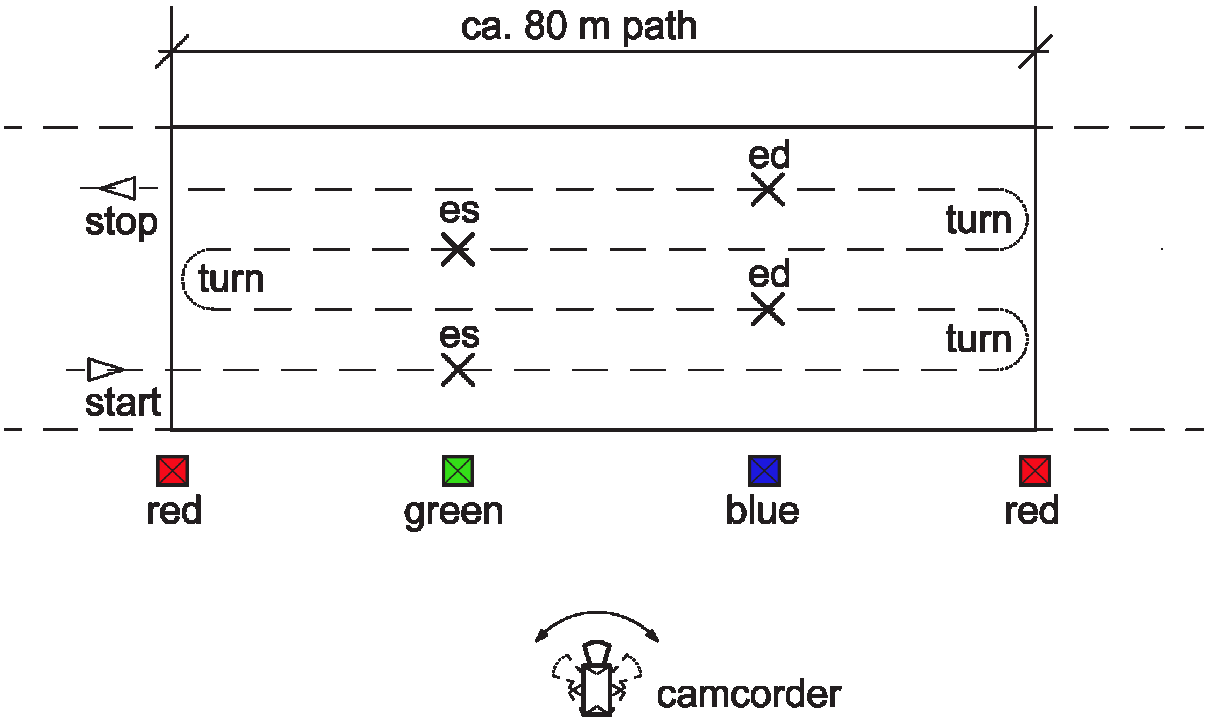


Figure 1: Model of the track with the standardized walk.
First stop at the green mark exercise "sit", then the dyad had to walk to the end of the path and turn around. On the way back they had to stop at the blue mark and do the exercise "down". After arriving at the start they had to do the same procedure a second time. The camera operator was located in the middle of the track (Auer, 2010).

2.3.1.1. The exercises

All of the tested animals were generally able to perform the requested commands. The commands were requested with a verbal and a hand command, such as the animals are used to. It depended on the dyad how often the walker asked for the exercise; the walker spoke the verbal command as often as necessary. The exercise "sit down" was completed when the Canid set down after the command. "Lie down" was completed when the animal lied down completely with the belly on the floor.

2.3.1.2. Walking conditions

Each participating walker got an information sheet (Appendix A) where the whole standardized walk was explained. The walkers were asked not to talk to the camera operator during the walk, not to act in a special way and to walk as usual without trying to do a perfect performance. Rewarding with dry food during the whole walk was allowed and there was no time limit. The walkers were also allowed to do other performances additionally and the dyad could walk along the 10 meter long leash as long as the general WSC rules were adhered to.

2.3.2. Timing

Data collection of the last study started in October 2011 and lasted till April 2012. The walks of the first study were done from January to April 2009 (Auer, 2010). The other two studies were in-between. All of the animals were about one year old. Walks were done at days when the weather was not too bad, because the walks were recorded using a camcorder. Dyads performed in a randomised order. To avoid any habituation effect, or the canids getting bored, none of the animals were allowed to do more than one walk per day. Futhermore, we considered that no dyad had two walks in a row, so the walkers had to interchange with the animal intermediate. Usually one walker did a few walks with different animals on different tracks in one day. A counterbalanced schedule made sure that the order of the walks were as randomised as possible and no dyad walked twice in a row. Neither walker nor animal should be stressed. If the Canid refused to leave the enclosure, the trial was cancelled and repeated on another day. When the game park was opened and the chance of meeting a lot of strangers, the walks were done at another time or another day. If the dyad did meet a stranger, the camera operator had to make sure that the stranger stood aside and didn't interrupt the walk. In addition, all influences that might affect the performance, such as weather conditions or meeting a stranger during the walk, were noted.

2.3.3. Recording the walk

The walk was recorded by a camerawoman, who was familiar with the animals, using a Sony handycam. The camerawoman was positioned in the middle of the track, five meters aside, so the whole walk could be filmed (Figure 1). Additionally the walker wore a dictaphone to record the voice of the walker.

2.4. Additional information

After each walk the camera operator filled in a protocol. She noted the date and time of the walk, the dyad, the number of the walk, the track, the weather conditions, if anybody joined the walk, meeting strangers or other occurences. The walkers were asked to fill in questionnaires while the study took place; a walker personality test, using the NEO-Five Factor Inventory (NEO-FFI) (McCrae and Costa, 1987; McCrea and Costa, 1989; Costa and McCrae, 1992) (Appendix D), an attitude-towards-wolves or dogs scale (modified after Topál et al., 1997; Johannson, 1999; Kotrschal et al., 2009) (Appendix B), and a wolf/dog personality rating (modified after Feaver et al., 1986; Kotrschal et al., 2009) (Appendix C).

2.4.1. NEO-FFI

Kotrschal et al. (2009) found out that owner personality affects operational performances of human-dog dyads, so all walkers had to fill in the NEO-FFI for personality traits.
There are five broad dimensions of personality which could define human personality, called the “big five”: Openness, Conscientiousness, Extroversion, Agreeableness and Neuroticism. The NEO-FFI test consists of 60 questions regarding the human personality and is a frequently used personality test for adults.

2.4.2. Animal-walker-attitude

This test compares the attitude of the walkers towards the Canid packs. With several questions they were asked in which ways the interaction between the walker and the wolves/dogs is working. In addition, there are some statements regarding the sympathies of the person towards the animals and to what extent they feel responsible for them. The answers were marked on a 100mm scale from right to wrong.

2.4.3. Animal personality rating

The walker had to rate the personality of the animals, using 49 characteristics. Every wolf was rated from one to five. The more typical a trait was for an animal, the higher the number was that was filled in.

2.5. Observation

Video and Audio file were assembled with the Software Adobe Premiere Pro CS3 and transformed with the AVS Video Converter 8. For coding the behaviour and the interactions of the dyad, the list Margit Auer used for her Diplomatheses was used, but was slightly modified to incorporate the dogs, so that the different studies could easily be compared (Auer, 2010). This Configuration included 11 behavioural classes (Appendix E). Behaviour was encoded with The Observer Video Pro® (Version XT 10.0; Noldus). Before coding the study files, an inter-observer-reliability (IOR) test was done with two people who encoded some of the previous study files (Nora Bauer, Marion Heszle). In this IOR, three one-minute video sequences were encoded independently. The values of the three observers were compared and showed over 81% agreement in duration (Cohen’s Kappa: 80%) and 79% agreement of frequencies (Cohen’s Kappa 77%). The walks from the last two studies (all dogs and two wolves) were encoded by one observer (Carina Hampl). This behaviour coding was carried

out from November 2011 till July 2012. The first study was encoded by Margit Auer (Auer, 2010) and the second by Barbara Glatz and Nora Bauer.

2.6. Data preparation

Some walks have been excluded due to aborted walks. One walker carried out, due to pregnancy, just 2 walks with each animal. So in total 116 walks were taken from the latest study for analysis. Together with the data from the previous measurements, (Auer: 61, Glatz & Bauer: 123 and Heszle: 72), there was a final dataset of 372 walks by 133 different dyads.
The data set was prepared with MS 2000. Data was edited individually per walk and the total number and total duration were calculated, regardless of how long the whole walk lasted. Additionally, in some cases 0,1 factors (0 = behaviour didn't occur, 1 = behaviour occurred) were used. Additionally to the coded behaviour data sets, I analysed the results from the questionnaires in the Excel File, focussing on the five NEO-FFI for each walker, how often the person walks generally with the WSC animals and two traits of the wolf personality (determined by examining different wolf-personality-rating questions). For the influence of the wolf-personality I used the same items Margit Auer used in her study (Auer et al., 2010).

- sociablility (also meaning to be less anxious and less nervous)
- excitability (also meaning to be more tempered and less calm)

Contact intensity was also included in both studies. To measure this, I used the question "How often do you walk with the WSC animals?" (Appendix B, Question B6). This could be important because, if some people walk frequently with the Canids, they are more self confident with the animals than others, and this may influence the performance.
Because some of the walkers participated a few times in the studies, they answered four questionnaires in three years. Some of the results differ, so all answers from the different questionnaires were used. For instance, Bea has three different rates in neuroticism.

2.7. Statistical analyses

I used three of the five NEO-FFI factors for testing personality influence of the walkers on the performance. I decided to use the three items

- neuroticism
- extraversion
- conscientiousness

due to a PCA made in SPSS 11.5 for Windows.

To analyse duration components (Dur.) (Total Duration of the Walk, Leadership Walker, Leadership Animal, Exercise successful, Distance more than three meters, Calling Close), I calculated linear mixed effect models (LME) including the animal's identity into the model as random effect. We investigated whether certain factors, listed in table 3, were influencing the animal's behaviour on the walk. in R 2.15.2. The residuals were not normal distributed in all cases, therefore I used a squareroot transformation in case of Leadership Walker, Exercise Successful, Distance More than Three Meters and Calling close. In case of Total Duration of the Walk and Leadership Walker, it was not possible to get a normal distribution of the residuals therefore, I conducted a Mann Whitney U test (MWU) using arithmetic mean of each animal to investigate if there was a difference in subspecies performance.

To analyse Food Reward, Calling "Sit" and "Down" and Calling Name or "Come" I calculated a generalized linear mixed model (GLMM) using the poisson distribution. I was interested whether certain factors listed in table 3 had an influence on the mentioned response variables. Again I included the individual's identity as random effect.

To analyse Leadership Conflicts, Leash Strained and Incomplete or Not Successfully Performed Exercise I calculated a Mann Whitney U test (MWU) using arithmetic mean of each animal to investigate if there was a difference in subspecies performance.

Because most of the walkers who participated in the study were female, walker gender influences were not tested.

Table 3: Calculated behaviours measured in duration (linear mixed effect models (LME), counted data (general linear mixed models (GLMM) and occurance of a behaviour:

Behaviour	Definition	Model	Tested Factors
Total Duration of the Walk	Total duration of the complete walk	Mann Whitney U Test	Subspecies
Leadership Walker	Relative duration that the walker determined the walk	Mann Whitney U Test	Subspecies

Leadership Animal	Relative duration that the animal determined the walk	LME; squareroot transformation	Subspecies, Sex Canid, Canids Sociability, Canids Excitability
Exercise successful	Total duration the animal needed to complete exercises, started with the first call for the exercise till the dyad walked further	LME; squareroot transformation	Subspecies, Sex Canid, Canids Sociability, Canids Excitability, Nr. Call “Sit” and “Down”, Nr. Food Rewards Dur. Orientation to Walker
Distance more than 3 meters	Relative duration that the distance between animal and walker was more than three meters apart	LME; squareroot transformation	Subspecies, Nr. Food Rewards, Dur. Canid Explores, Dur. Leadership Canid
Calling Close	Total duration the animal took to come from the first call of the walker until it was next to the walker	LME; squareroot transformation	Subspecies, Sex Canids, Canids Sociability, Canids Excitability Dur. Leadership Conflict, Nr. Food Rewards, Dur. Canid Explores, Dur. Leadership Walker
Food Reward	Relative number of times the walker fed the animal during the walk	GLMM (Poisson)	Subspecies, Neuroticism Walker, Extraversion Walker, Conscientiousness Walker, Walkers Contact Intensity

Calling "sit" and "down"	Total number of times the walker said "sit" or "down" during the walk	GLMM (Poisson)	Subspecies, Canids Sociability, Canids Excitability, Nr. Food Rewards, Dur. Canid Explores, Dur. Orienation To Walker
Calling name or "come"	Relative number of times the walker called the animal by name or "come here"	GLMM (Poisson)	Subspecies, Sex Canid, Canids Sociability, Canids Excitability, Nr. Food Rewards, Dur. Canid Explores
Leadership Conflicts	Factor, if walker and animal had a conflict in leadership during the walk	Mann Whitney U Test	Subspecies
Leash Strained	Factor, if the leash was strained during the walk	Mann Whitney U Test	Subspecies
Incomplete or Not Successfully Performed Exercise	Factor, if the animal did an exercise incorrectly	Mann Whitney U Test	Subspecies

Graphs were done in SPSS 11.5 for Windows. For dog-wolf comparison, arithmetic mean of each animal was used.

To measure if walkers differed in their behaviour with wolves and dogs, four walkers who made walks with all of the animals were tested for subspecies differences in individual performances. Arithmetic mean values of each animal per walker were used and calculated by Mann-Whitney-U Tests in SPSS.

3. Results

3.1. Walking conditions

3.1.1. Total duration of the walk

Wolf-human dyads and dog-human dyads need significantly different lengths of time to complete the standardized walks (Figure 2). Human-wolf dyads took more time to complete the walk than human-dog dyads (Mann-Whitney-U-Test (MWU): z = -3.533, $p < 0.001$).

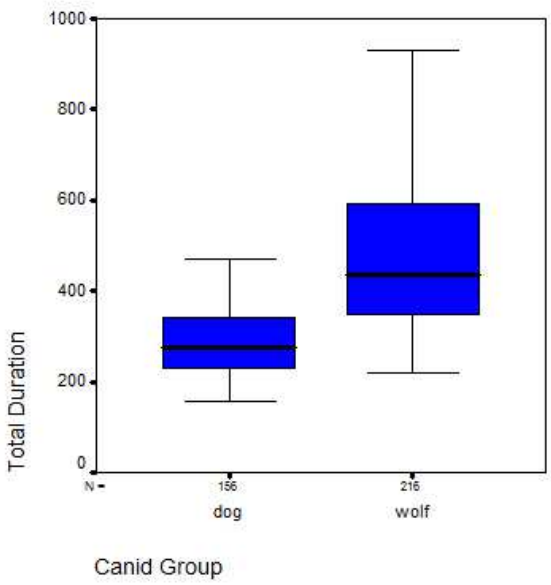


Figure 2: Differences in the total duration of the whole walk of dogs and wolves.
Dyads with wolves took longer to complete the walk than dyads with dogs.

3.1.2. Leadership walker

There was no significant difference found in dyads with wolves or dogs. Walkers guided the Canids for approximately the same relative duration (MWU: z = -0.418, p = 0.710), independent of whether walking with dogs or wolves.

3.1.3. Leadership animal

Wolves led the walk for a significantly longer relative duration than dogs did (linear mixed effect model (LME): $F_{1,362} = 34.400$, $p < 0.001$) (Figure 3). Canid sex (LME: $F_{1,289} = 0.02$, p = 0.90), the sociability of the Canid (LME: $F_{1,290} = 0.08$, p = 0.8) or its degree of excitability (LME: $F_{1,288} = 2.58$, p = 0.1) did not influence how long the animal guided the walk.

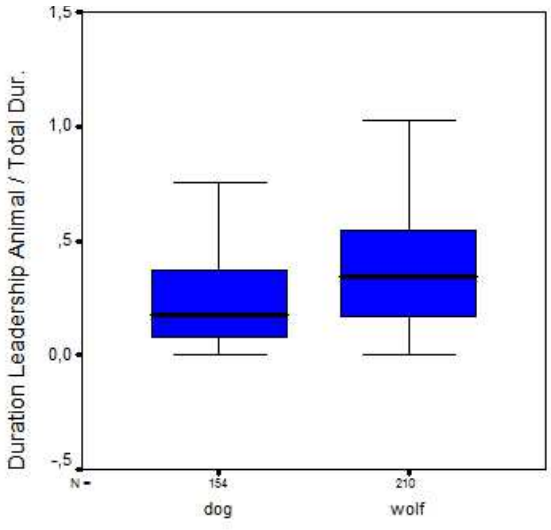


Figure 3: Duration differences of how long the dogs or wolves led in the walk.
Wolves guided the walk for a longer period of time relative to test duration than dogs did.

3.1.4. Duration of successful exercises

The sum of the duration the dyads took to complete the exercises “sit” and “lie down” correctly were analyzed.

No differences between human-dog and human-wolf dyads were found (LME: $F_{1,286} = 0.02$, $p = 0.88$). As seen in figure 4, the more often the walker had to call “sit” or “down”, the longer the dyad needed to perform the exercises correctly (LME: $F_{1,361} = 136.02$, $p < 0.001$). And the longer the animal was orientated towards the walker, the slower the exercises were completed (LME: $F_{1,361} = 7.06$, $p = 0.008$) (Figure 5). The amount of food rewards did not have a significiant effect on the duration the dyad needed to complete the exercises successfully (LME: $F_{1,288} = 1.10$, $p = 0.29$), neither did the personality of the animal (sociable: LME: $F_{1,289} = 1.78$, $p = 0.18$; excitable: LME: $F_{1,287} = 0.02$, $p = 0.86$) or its sex (LME: $F_{1,285} = 0.01$, $p = 0.92$).

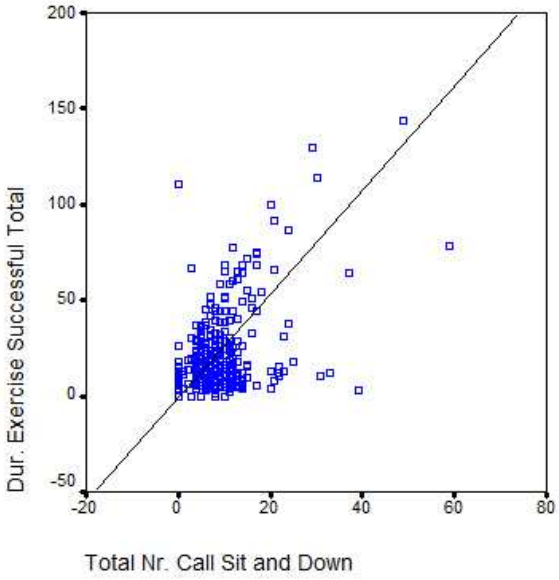


Figure 4: Effect of “sit” and “down” commands on the total duration of the exercises.
When the walker had to ask for sit or down more often, the task took longer to complete.

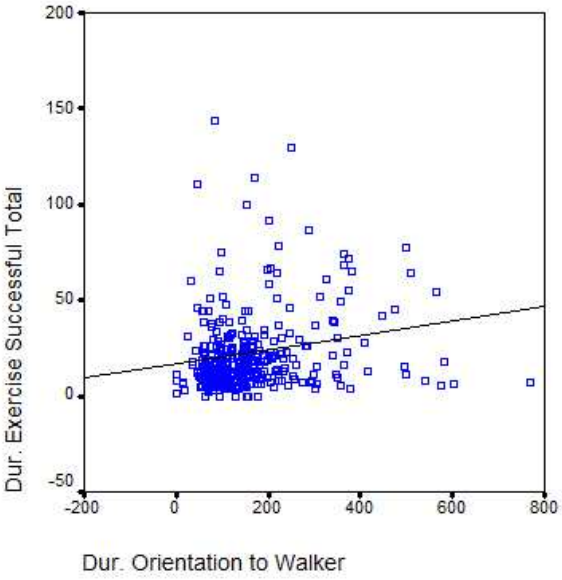


Figure 5: There was a positive effect of the Canids orientation towards the walker on the total duration of the exercises.
The exercises were finished faster when the animal looked shorter to the walker.

3.1.5. Relative duration that the distance between the dyadic partners was more than three meters apart

An interaction between the subspecies and their time of exploring the environment during the leash walk was found (LME: $F_{1,350}$ = 6.030, p = 0.010) (Figure 6). The longer the animal explored, the longer the distance between walker and animal was more than three meters apart. This effect is stronger in dyads with wolves (LME: t = 7.014, Estimate = 0.002, Std.Error = 0.001) than in human-dog-dyads (LME: t = 1.464, Estimate = 0.001, Std.Error = 0.001). The longer wolves explored, the longer they stood further from the walker (LME: t = 1.464, Estimate = 0.001, Std.Error = 0.001), whereas dogs stood far from the walker for a shorter amount of time (although they explored for the same relative duration of the walk) (LME: t = 7.104, Estimate = 0.002, Std.Error = 0.001).

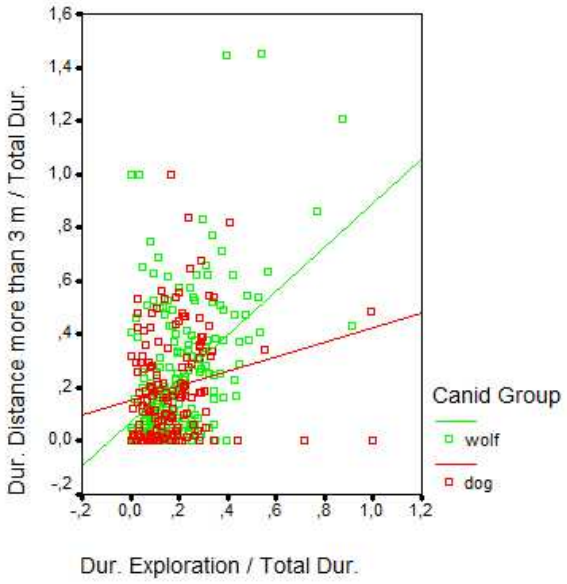
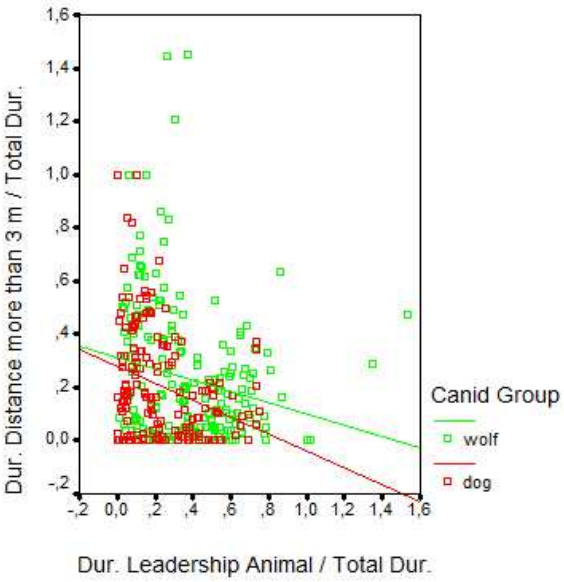


Figure 6: Effect of the time the animal spent exploring at a distance of more than three meters between the dyadic partners plotted for wolves and dogs.

Both wolves and dogs stood for longer in a far distance to the walker, when they explored for a longer period of time. This effect is stronger in wolves than in dogs.



The longer the Canid guided the walk, the shorter the length of time that the distance was more than three meters (LME: $F_{1,353}$ = 4.07, p = 0.04). As visible in figure 7, the effect was stronger in human-dog dyads

Figure 7: Influence of the duration the animal leads the walk on distance between animal and walker, plotted for wolves (green) and dogs (red). Dogs and wolves guided the walk for a longer period of time when the duration of distance greater than 3 meters to the walker was short. This effect was greater in dogs than in wolves.

(LME: t = -4.579, Estimate = -0.001, Std.Error = 0.001) than in human-wolf dyads (LME: t = -4.475, Estimate = -0.001, Std.Error = 0.001).

How much the walker fed the animal didn't seem to have an influence on the distance between the walking partners. They walked further than 3 meters from each other, independent of whether the walker gave a lot of food rewards to the Canid or not (LME: $F_{1,155} = 1.430$, $p = 0.230$).

3.1.6. Calling close

Calling close was defined as the duration the animal needed to come close to the walker, starting with the first call of the walker.

The duration animals needed to come back after getting called was influenced by the duration the animal explored and the duration a conflict in leadership lasted. The longer the animal explored, the longer it took for coming back after getting called (LME: $F_{1,311} = 9.67$, $p = 0.002$) (Figure 8). As visible in figure 9, the longer a conflict in leadership lasted, the more time the canids took for coming back (LME: $F_{1,358} = 9.37$, $p = 0.002$).

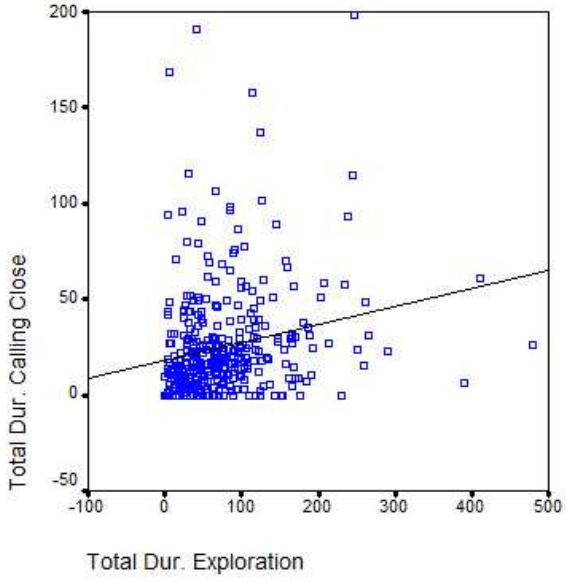


Figure 8: Influence of the exploration time of the animal on the duration needed for call close.
The longer the animal explored, the longer it took to return after calling.

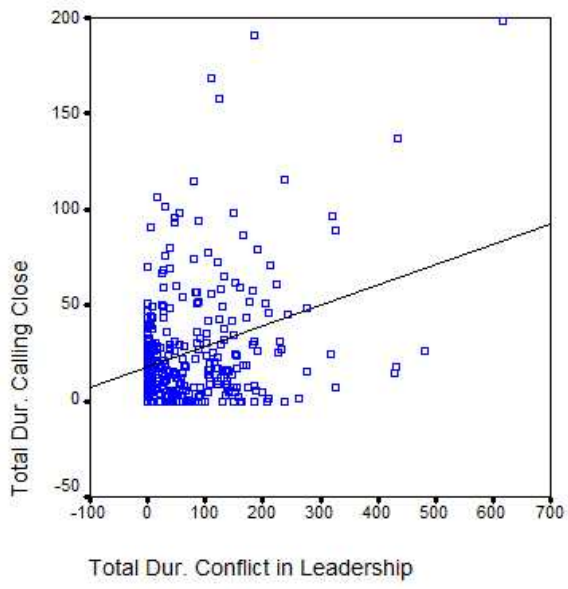


Figure 9: Influence of the duration of a conflict in leadership on the duration the animal took to come back after getting called.
The longer conflicts lasted during the walk, the longer the animal took to come.

No influence was found on the animals sex (LME: $F_{1,19} = 1.28$, $p = 0.272$), its personality (sociable: LME: $F_{1,14} = 0.95$, $p = 0.347$; excitable: LME: $F_{1,9} = 1.14$, $p = 0.3$), how long the human guided the walk (LME: $F_{1,272} = 1.15$, $p = 0.284$) or how much food rewards the human gave to the animal (LME: $F_{1,281} = 0.69$, $p = 0.405$). No differences between dyads with dogs or with wolves were found to have an influence on the duration the animals needed to come back (LME: $F_{1,15} = 1.45$, $p = 0.248$).

3.1.7. Relative number calling the animals name or “come here”

The walkers called dogs more frequently by name, relative to the test duration than they called wolves (generalized linear mixed model (GLMM): t_{18}= -3.112, p = 0.006) (Figure 10). The canids sex (GLMM: t_{11} = 0.03, p = 0.97), its personality, like excitability (GLMM: t_{13} = 1.72, p = 0.11) and sociability (GLMM: t_{12} = 1.18, p = 0.26), showed no effect on the calling behaviour of the walker. Neither the amount of food rewards during the walk (GLMM: t_{194} = -1.14, p = 0.26), or the time the animal explored (GLMM: t_{185} = 0.20, p = 0.84) had an effect on the number of times the walker called the animals.

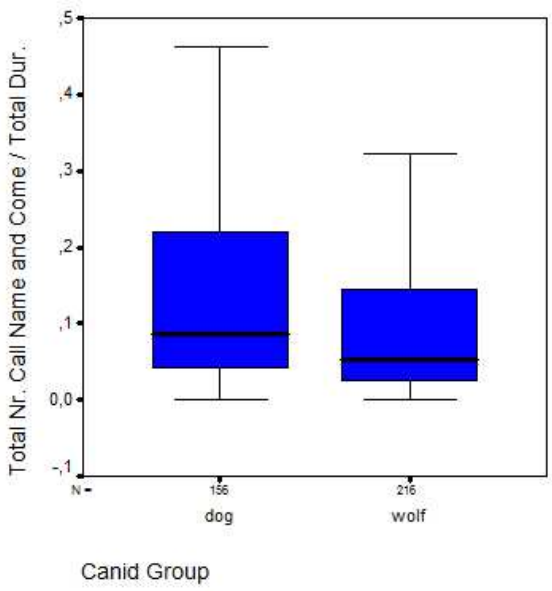


Figure 10: Differences in the frequency how often the walker called the animal by name or "come here".
Dogs were called significant more often than wolves.

3.2. Motivation

3.2.1. Food reward

Wolves got less food rewards from the walkers than dogs got, relative to the test duration, (GLMM: F_{20} = 5.160, p = 0.030) as plotted in figure 11.

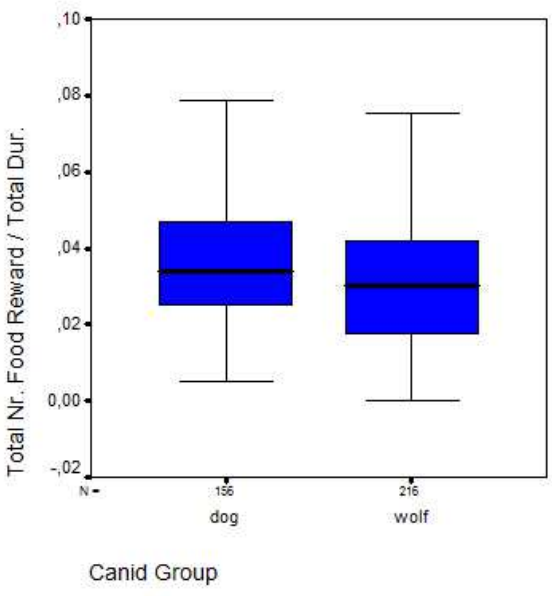


Figure 11: Total amount of food rewards the walker gave to the animal during the walk.
Dogs got relative more food reward than wolves.

Walkers who have a close contact intensity with the WSC animals (measured on the amount of regular walks), feed the animals relative more often during the standardized walks (GLMM: F_{179} = 12.000, p < 0.001) (Figure 12).

The walkers personality, like neuroticism (GLMM: F_{220} = 1.49, p = 0.22), extraversion (GLMM: F_{23} = 0.77, p = 0.39) and

conscientiousness (GLMM: F_{152} = 0.63, p = 0.43) didn't influence the amount of food rewards they gave to the animals.

3.2.2. Calling "sit" and "down"

The walkers called, in total "sit" and "down" equally often for dogs and for wolves (GLMM: $F_{1,285}$ = 0.01, p = 0.90). But the longer the animal was orientated towards the walker, the more often the walker had to call "sit" or "down" (GLMM: $F_{1,360}$ = 4.13, p = 0.04) (Figure 13).

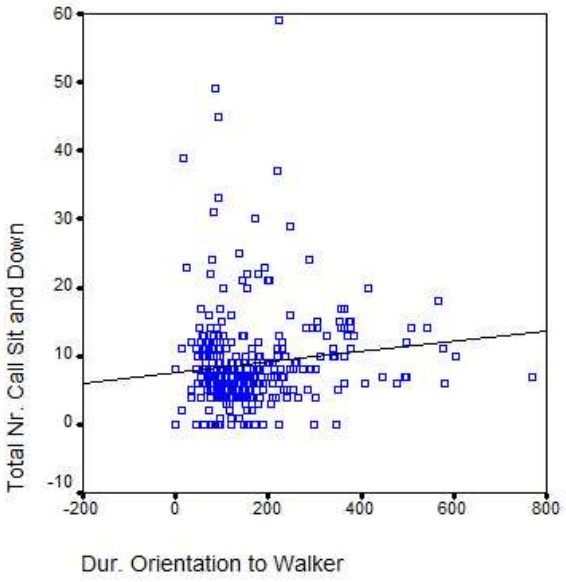


Figure 13 Influence of the duration the animal was orientated towards the walker on the frequency the walker had to call sit or down per exercise.

The longer the animal looked to the walker during the walk, the more often the walker had to call sit or down per exercise.

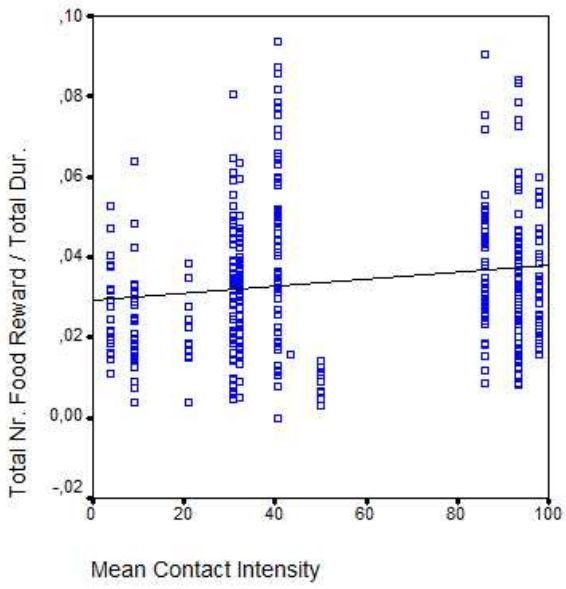


Figure 12: Walker – Animal contact intensity and its effect on the relative amount of given food reward.

The more often the human walks with the pack animals, the more food he gave during the experimental walks.

How much food reward the animal got did not influence the frequency of how often the walker had to give the command (GLMM: $F_{1,208}$ = 3.69, p = 0.06). A sociable personality of the animal did not reduce the numbers of "sit" and "down" (GLMM: $F_{1,288}$ = 0.19, p = 0.66), neither did an excitable personality of the animal influence (GLMM: $F_{1,288}$ = 0.35, p = 0.55) or how long the Canid explored (GLMM: $F_{1,286}$ = 0.13, p = 0.72).

3.3. Conflict situations

3.3.1. Leadership conflicts

The occurance of a conflict in leadership was tested for in human-wolf and human-dog dyads. In more than 70% of the walks, conflicts in guidance occurred, independent if it was a dyadic walk with a dog or a wolf. All in all dogs had more frequent conflicts during the walk than wolves (MWU: z = - 2.297, p = 0.022) as shown in figure 14.

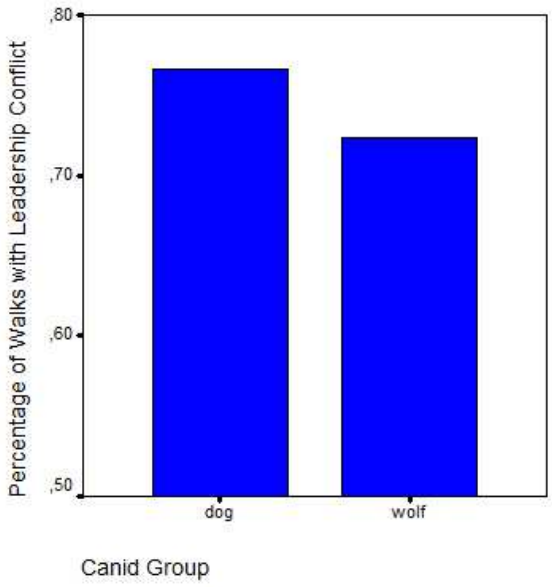


Figure 14: The figure shows how often a conflict in leadership occurred in percentage of all walks for dogs and wolves independently.
For analyses it didn't matter how often or how long a conflict situation occurred during a walk, just the fact that it occurred.

3.3.2. Strained leash

In most of the walks, a strained leash occurred at least once. This happened with human-dog dyads in more than 80% of the walks, and was more frequent than in human-wolf dyads (MWU: z = -4.133, p < 0.001), as shown in figure 15.

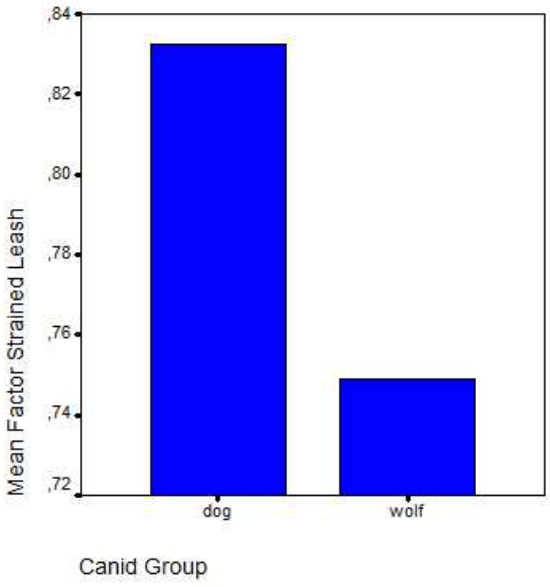


Figure 15: How often the leash was strained was different for dogs and wolves.
In human-dog dyads a strained leash occurred more often than in dyads with wolves.

3.3.3. Incomplete or not successfully performed exercises

The differences between human-dog and human-wolf dyads when an exercise was performed incorrectly or unsuccessfully were analyzed.

It depends on the subpecies whether the exercise was performed correctly (MWU: z = -2.279, p = 0.023). Dyads with wolves performed in general better than dyads with dogs. But all in all it occurred just in 20% of the walks that the exercise was not performed as desired from the walker. (Figure 16).

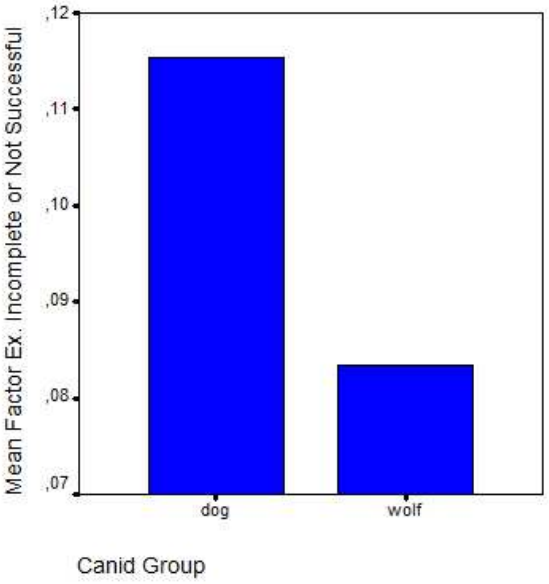


Figure 16: Incomplete or not successful exercises plotted for dogs and wolves.
Dogs had more frequent problems in completing the exercises correctly than wolves.

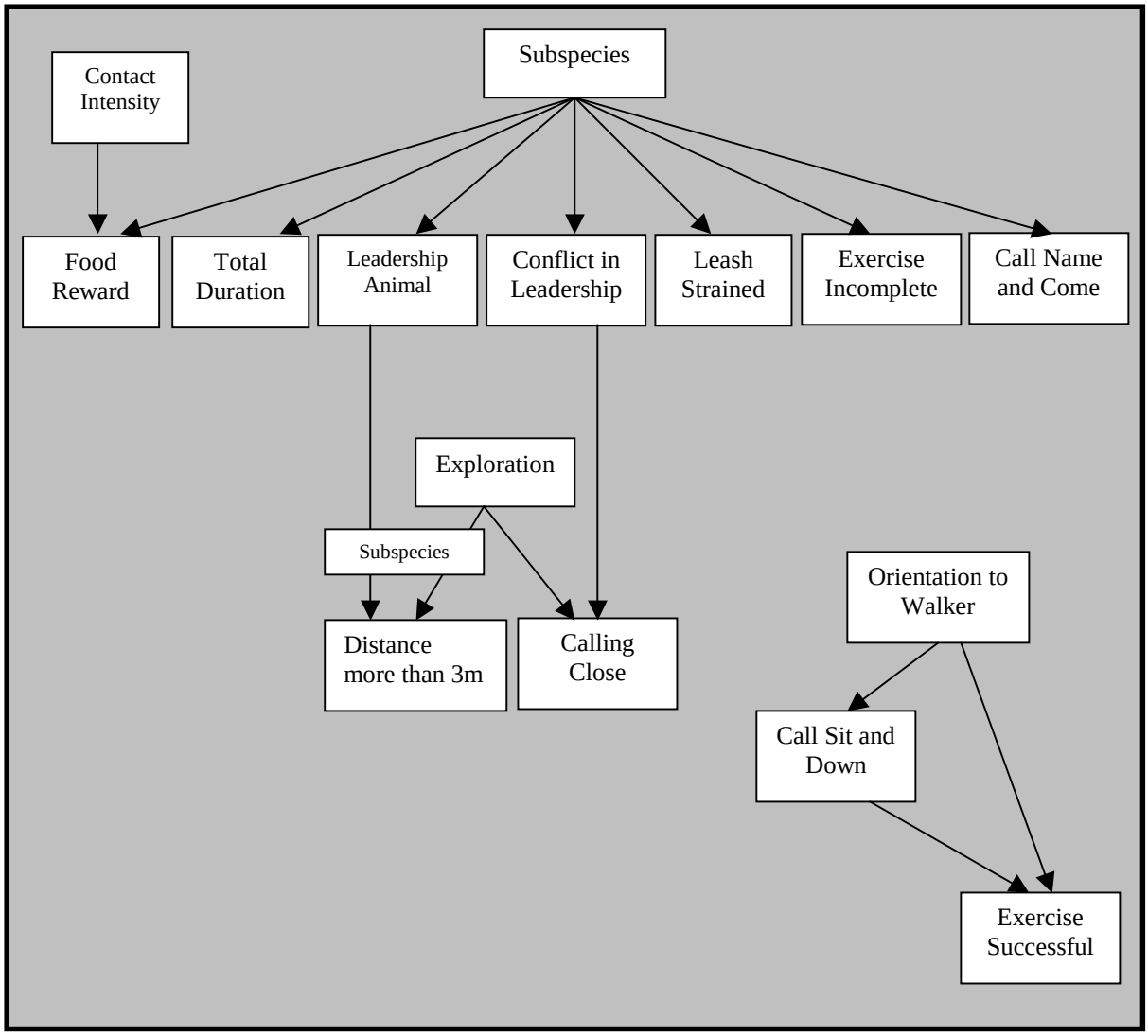


Figure 17: Tested factors and how they influence each other.

Human-wolf and human-dog dyads differed in the total duration of the walk, the amount of food reward relative to the total walk duration, the relative duration the animal guided the walk and the relative number the walker called the animal by name or "come". Further, subspecies differed in whether the leash was strained during the walk, if a conflict in leadership occurred and if an exercise was performed incorrectly. The walkers contact intensity to the WSC animals had an effect on the relative amount of food reward he gave. The duration a conflict in leadership lasted and the duration the animal explored had an influence on the duration the dyad needed for calling close. And the relative duration the animal led the walk and the relative duration the animal explored influenced the relative time animal and walker walked in a distance of three meters apart. This was different for human-dog and human-wolf dyads. The duration the Canid was orientated towards the walker affected the frequency the walker had to call "sit" or "down". The orientation of the Canid and the frequency of call "sit" and "down" both influenced the duration the dyad took to complete an exercise successfully.

3.4. Individual walker differences

While walking, humans differed in their behaviour of handling wolves and dogs. Four walkers were tested for differences in individual performances, because they did walks with all of the animals, whereas other walkers just walked with a few Canids.

All four walkers differed in the frequency conflicts in leadership occurred and in the frequency of calling close of wolves and dogs. The dogs get called close more often than the wolves by all four walkers (MWU: A: $z = -4.559$, $p < 0.001$; B: $z = -4.281$, $p < 0.001$; C: $z = -4.840$, $p < 0.001$; D: $z = -3.730$, $p < 0.001$) (Figure 18). As seen in figure 19, in walks with wolves leadership conflicts occurred more frequently. This is independent of the walker (MWU: A: $z = -5.319$, $p < 0.001$; B: $z = -6.062$, $p < 0.001$; C: $z = -4.997$, $p < 0.001$; D: $z = -5.714$, $p < 0.001$). But this is only apparent for the four independent tested walkers; in all observed walks with all 11 walkers together, conflicts with dogs occurred more frequently (Figure 14).

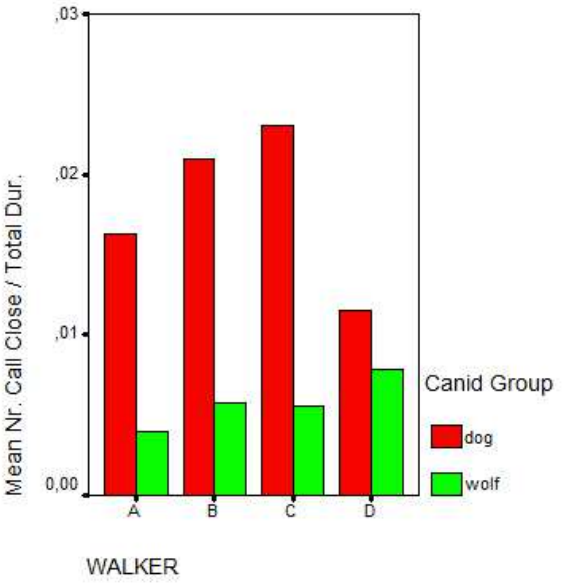


Figure 18: Mean number of call close differed in dogs (red) and wolves (green) by the individual walkers.
All walkers called the dogs close more often, relative to the test duration, than the wolves. Walker C called the dogs the most, whereas walker D called them seldom. In wolves the relative number of calling close did not differ strongly.

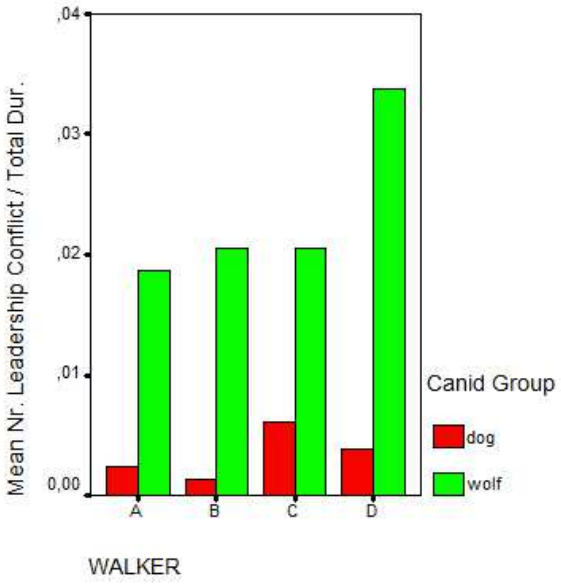


Figure 19: Differences of the amount of leadership conflicts in dogs and wolves with different walkers.
Conflicts in leadership occurred more often in wolves (green) than in dogs (red), independent of the walker. In dyads with walker D and wolves the most leadership conflicts occurred.

Concerning the walkers' relative attention towards the animals, and the relative duration of walker leadership, individual dyads differed. For instance, one walker looked significantly longer to the dogs (MWU: B: z = -4.479, p < 0.001), whereas another one was orientated for longer towards the wolves (MWU: C: z = -3.409, p < 0.001) (Figure 20). Walker A and walker D did not significantly differ in their orientation behaviour towards wolves and dogs.

Whereas in the relative duration of walker leadership of all 11 walkers no differences for dogs and wolves could be found, two walkers showed differences in guiding the two subspecies. Both guided the walk relatively longer when performing with dogs (MWU: B: z = -3.101, p = 0.002; C: z = -2.798, p = 0.005) (Figure 21).

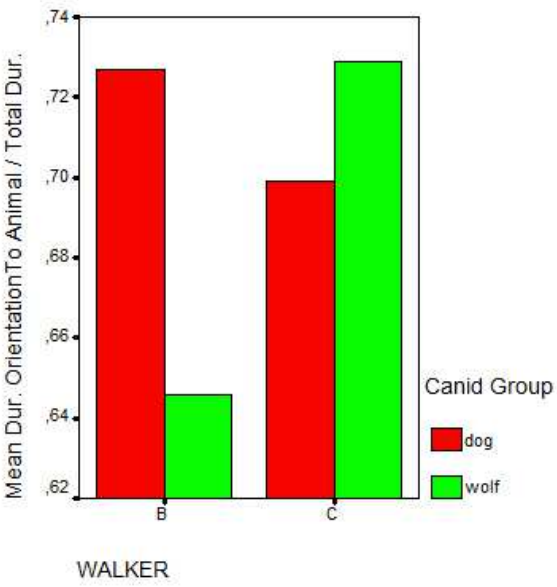


Figure 20: Orientation of two walkers towards the animals, separated for wolves (green) and dogs (red).

Walker B looked longer to the dogs than to the wolves, whereas walker C spent more time orientated towards the wolves than to the dogs. Walker A and D showed no significant differences in their orientation behaviour towards the two subspecies and because of this did not get plotted in the figure.

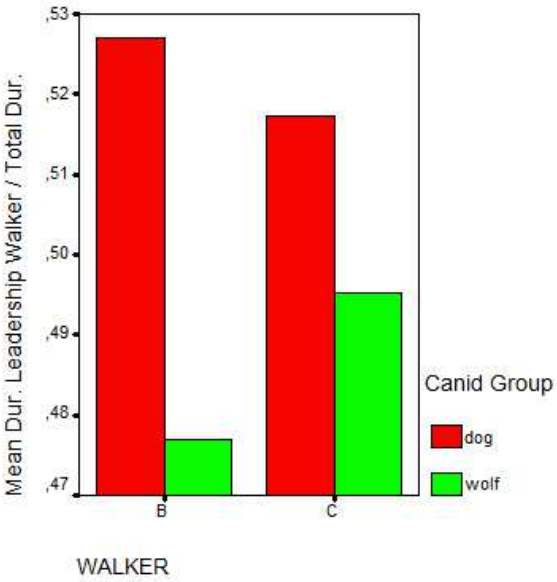


Figure 21: Differences in the relative duration of walker leadership when walker B and C guided dogs and wolves.

Both guided dogs relative longer than wolves, but Walker B seldom assumed the leadership during a walk with a wolf. Walker A and D led dogs and wolves approximate the same relative time period and did not get plotted.

4. Discussion

The aim of the study was to find differences between dyadic performances in human-wolf and human-dog dyads. Differences may indicate how much dogs have been domesticated to cooperate with humans and if they cooperate better than wolves.
I expected that, due to domestication, dogs would perform better in cooperation with humans and have less conflict situations than human-wolf dyads. Further, I wanted to know which parameters influenced the individual behaviour (animals sex, personality of walker and animal, food reward,..) and whether walkers handled wolves different than dogs.

The total duration of the walks differed between dogs and wolves. Wolves took in general longer for the test walks then dogs. This could be because wolves guided the walks for a longer relative duration than dogs did and because of this wolves determined the speed of the walk and the duration they explored. When the Canids guided the walk, the dyad stayed shorter amounts of time in far distance to each other, maybe because the animal decided where to walk and where to explore; perhaps the human followed because he did not want to have a great distance between himself and the animal.
Dogs were called by names more often than wolves, maybe because the walkers expected the dogs to walk beside them and the wolves not. Or the wolves reacted already at the first time of calling, whereas dogs ignored the walkers calling more often. It was observed that some dogs often came when the walker called, but immediately turned around and ran away again into the strained leash, so the walker had to call the dog again.
When the Canid explored longer, as well as when a conflict in leadership lasted for a long time, the animal took longer to come back after getting called. These two behaviours may influence each other. When the animal explored and the walker wanted to walk further, a conflict in leadership occurred and calling close lasted long. In the four independent tested walkers, dogs got called close more frequently than wolves. Perhaps this is because of the "run away" behaviour of some dogs. So this behaviour explains the frequency of calling the animals name, the duration and frequency of calling close and the frequency of a strained leash.

Interestingly, wolves got less food reward than dogs relative to the test duration. It is known that animals can influence the owner in when, what and how much food it receives (Day et al., 2009). Maybe dogs know better how to beg for food and can manipulate the walker better to achieve food than wolves, because of the experience since the domestication process.

Walkers with close contact to the WSC animals gave more food than more unfamiliar individuals; perhaps, due to their experience, they know that the animals cooperate better when they are fed more frequently, or they feed the animals more often because they are more attached and are more receptive to begging in the canids.

Surprisingly, conflicts (strained leash, conflicts in leadership and incompleted exercises) occurred more frequently in human-dog dyads than in human-wolf dyads. I expected more conflicts with wolves. Data from the first wolf generation suggested difficulties in walking the wolves, especially for people who have not had adequate contact during and after raising (Auer, 2010). Wolves are known to struggle more with the handler and avoid eye contact (Gácsi et al., 2009). But obviously, the kind of relationship and attachment is more important for dyadic performances. When wolf and human are firmly attached to each other and have experience in cooperating (Auer et al, 2010), they can even perform better than human-dog dyads. Willingness to cooperate is determined by the age of the animal and the maturation of the brain (Kotrschal, 2012). So adult wolves are more likely to cooperate with humans than younger ones and don't avoid eye contact. The participating wolves differed in age; the youngest were about six months old and the oldest one and a half years, whereas all dogs were about one year old. Dogs should also have an inherent willingness for cooperation which should not change with age (Topál et al., 2009). Some wolves who cooperate with humans as social partners performed similarly to dogs in human pointing tasks (Gácsi et al., 2009). In another study, hand-reared wolves outperformed dogs in reading human pointing gestures (Udell et al., 2008). Because of experience, wolves and dogs can learn social responsibilities; the socialized wolves are still wolves, but adapt to the social environment they live in (Kotrschal, 2009). The fewer conflict situations in dyads with wolves could also be because they were unconsciously better trained than the dogs. Helton & Helton (2010) found such results in reading pointing cues by small and large sized dogs. Large dogs are often better trained than smaller dogs, as smaller dogs often do not get very disciplined by their owners because it is not that dangerous if a small dog ignores the command, whereas a disobedient large dog is a greater danger (Wynne et al., 2008). I think that the wolves in this study performed better than the dogs because they were more relaxed than most of the dogs. Dogs are already bred for living with humans and not in a pack; due to this fact it could be possible that the stress regulation in dogs is less effective than in wolves. Usually, in a stressful situation for a dog, the owner interferes, so it has human support. This is not the case in a pack dogs life. The WSC pack dogs are perhaps still nervous, because of agonistic situations

in the pack, that when they do a walk on the leash they are not concentrating enough to master the exercises well. The wolf packs have a more relaxed interaction towards each other because of adequate stress regulation, even if they are not family members. Additionally, dogs are vain; when the ground was wet some dogs refused to completely lie down or only did so after long latency. This is likely to have influenced the freqeuency of uncompleted exercises. Wolves did not care if the ground was dry or wet.

The four independent walkers had, in contrast to the sum of all walkers, more conflicts in leadership when walking with wolves. Maybe this is because they were the only ones who walked with the first generation of wolves, who were the most difficult on the leash while walking (Auer, 2010). Maybe wolves of the further studies were better socialized due to increased experience of the hand-raisers and therefore walked better on the leash. The proficiency of raising and training wolves increases the self-confidence of the trainers with regards to handling a wolfs behaviour and the dyad can perform better because of clear commands. A stressed walker or animal will make mistakes and send unclear signals towards the dyadic partner.

Personality should influence the walking performances as well. The latest wolf generation often behaved particularly dog-like and had a great willingness to cooperate with humans. But no personality influences were found to have significant impact on the walking performances, as in the study by Alibadi et al. (2010). The walkers' degree of neuroticism, extraversion and conscientiousness and the Canids sociability and excitability may influence the dyadic interaction style, but not in a major way, neither in exercise, performances nor in the amount of food rewards. In the first period of data taking, very familiar (hand-rearers) and less familiar people walked with the animals, but in the latest walks all walkers had similar contact to the wolves. So the experience in wolf rearing and the individual dyadic relationships influenced the human-wolf walks. For dogs, the experience and individual relationship should not have a great influence on the performance (Topál et al., 2009).

It was assumed that, especially for wolves, social support and reward is sometimes more important than food reward (Frank & Frank, 1988; Gácsi et al., 2005). The results showed that food reward did not affect attention and willingness for cooperation or the distance between the dyadic members during the walk, but exploration behaviour did. Dyads had a far distance between the members for a longer relative time when the animal explored for longer.

This effect was stronger in wolves than in dogs. Canids usually explore things which are interesting for them, usually these are not on the track they walk on, but in the wood, so they leave the track and walk as far as the leash allows them to. Wolf puppies explore more than dog puppies (Topál et al., 2004). This could be because dogs can rely on their human partner, but for wolves it is essential for survival to recognize what happens around them. However, in the recent study no differences in exploring behaviour between dogs and wolves were found. Likewise, dogs and wolves showed no significant differences in their attention towards the walkers. This supports the results Horn et al. (2010) found; that attention depends on the familiarity and the relationship between dog and human, but is contrary to the hypothesis of Gácsi et al. (2005), which suggested that wolves avoid looking into a humans face.

The Canids orientation towards the walker, independent if dog or wolf, affected the frequency the human had to call “sit” or “down” and also influenced the duration the dyad took to complete the exercises correctly. The longer the animal looked towards the walker, the more frequently the human had to call the command and the more time the dyad needed to complete the exercises successfully. An explanation could be that an inattentive and excited animal first had to concentrate and pay attention to the walker before succeeding in an exercise. This happened with wolves equally as often as with dogs. For instance, wolves looked longer to walker C, whereas in walks with walker B dogs showed more attention.

Actually the walkers should pay the same amount of attention towards wolves and dogs, but each dyad has different needs so it is very unlikely that no wolf/dog differences occurred in the individual attention behaviour. Same could be said for walker leadership in wolves and dogs. It would be great if the walkers handled wolves and dogs the same way, but discrete differences in behaviour towards dogs and wolves are very probable. Losing control in guiding a dog is generally not a big deal, but with a wolf it can be very dangerous. So it is logical that the walkers handle the wolves more respectfully, even if unconsciously. There is a difference between a 50 kg “wild wolf” on the leash and a domesticated 20 kg dog. It is not really possible to handle both the same way, because each walker knows exactly which animal he guides.

4.1. Conclusion

Subspecies influenced the duration of the walk, how long the animal led the walk, how often the animal got called by name, the amount of food the walker gave, how frequent the leash was strained, how many conflicts in leadership occurred and how often an exercise was performed incorrectly. All in all, wolves performed with less conflict situations than dogs; they had less conflicts with the walker, got called less often and carried out less exercises incorrectly. This is different to the hypothesis I expected. The individual relationship of the dyadic partners (Auer et al., 2011; Heszle, 2012) and the training experience had more influence then the dogs capability to interact with humans evolved by domestication (Reid, 2009).

Sex and personality of walker and Canid did not influence the performances significantly. But contact intensity, exploration behaviour, orientation towards the walker, calling a command, guidance of the animal and conflicts in leadership did.

Walkers differed in how they treated wolves and dogs. Attention towards the animals, how long they guide them and the frequency of leadership conflicts differed between some of the walkers. Either the walkers consciously treated dogs and wolves differently, despite the WSC rules regarding same treatment, or they unconsciously treated dogs and wolves differently, because the walkers know with whom they walk. It is clear that most of the walkers try to guide a wolf more than a dog, due to the increased need for control.

Of course it is possible, but unlikely, that wolves can perform and cooperate better with human partners than dogs. It is more probable that the walkers differed in their behaviour towards dogs and wolves, not only in the test walks, but also in the daily routine training.

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6. Acknowledgments

First of all I want to thank my supervisor Ao. Univ.-Prof. Mag. Dr. Kurt Kotrschal, who gave me the chance to work with these amazing animals and to analyze human-dog and human-wolf cooperation. Futher thanks to Dr. Friederike Range, Dr. Zsófia Virányi, Marleen Hentrup, Bea Belényi and Rita Takacs for their input, support and participation. Special thanks to Marianne Heberlein who helped me a great deal in the statistically analyses and answered my questions with her scientific knowledge. Further I want to thank Margit Auer, Barbara Glatz, Nora Bauer and Marion Heszle for sharing their collected data with me, so I could analyze the complete data set. I also want to thank Brianna Nauen and Veronika Starkl for correcting language. And of course my family and friends who supported me all the time. Last but not least a special thanks to all walkers and animals participating in this study.

7. Zusammenfassung (German summary)

Hunde kooperieren täglich mit ihren menschlichen Partnern. Um das Potential für Kooperationsbereitschaft ihrer nächsten wild-lebenden Verwandten zu erforschen, machte Margit Auer 2010 Leinenspaziergänge mit handaufgezogenen Wölfen und ihnen vertrauten Menschen (Auer, 2010).

Ich wollte nun Kooperationsverhalten von Wölfen und domestizierten Hunden mit Menschen vergleichen. Dafür analysierte ich standardisierte Leinenspaziergänge am Wolfsforschungszentrum in Ernstbrunn. 133 Paare aus verschiedensten Mensch-Hund und Mensch-Wolf Kombinationen machten jeweils drei Testspaziergänge auf drei unterschiedlichen markierten Wegen, und führten an bestimmten Stellen die Kommandos „Sitz“ und „Platz“ aus.

Alle teilnehmenden Tiere wurden mit der Hand aufgezogen und hatten tägliches Training um bestimmte Kommandos auszuführen und zu lernen ordentlich an einer Leine zu gehen.

Jeder Mensch der teilnahm füllte verschiedene Fragebögen aus, wie den NEO-FFI Persönlichkeitstest, eine Bewertung zur allgemeinen Einstellung gegenüber Wölfen und Hunden und einen Fragebogen zur Bewertung der Persönlichkeit der teilnehmenden Tiere.

Mensch-Hund und Mensch-Wolf Dyaden zeigten in dem Versuch unterschiedliche Performances und die Resultate lassen darauf schließen, dass Spaziergänge mit trainierten, gezähmten Rudelwölfen weniger stressbehaftet sind, als Spaziergänge mit trainierten Hunden welche in einem Rudel leben. Wölfe haben zwar die gewünschten Übungen nicht schneller oder besser absolviert, jedoch traten mit Hunden mehr Konfliktsituationen, gespannte Leinen und inkorrekt gezeigte Übungen häufiger auf.

Spaziergänge an denen Wölfe beteiligt waren, dauerten länger als solche mit Hunden, und Wölfe führten diese auch, relativ zur gesamten Testdauer, länger an. Dafür wurden Hunde von den Menschen häufiger beim Namen gerufen und auch öfters mit Futter belohnt. Persönlichkeitsmerkmale von Mensch und Tier hatten keinen signifikanten Einfluss auf die Performance der Testspaziergänge, im Gegensatz zu den Ergebnissen welche Auer (2010) und Heszle (2012) in ihren Studien fanden. Allerdings zeigten individuelle Paare unterschiedliches Verhalten. Zum Beispiel spendete ein Spaziergänger den Wölfen mehr Aufmerksamkeit, wohingegen ein anderer länger zu den Hunden hin orientiert war. Der Erfolg einer Übung und die Zeit welche dafür benötigt wurde, war abhängig von der Dauer welche das Tier zum Menschen hin blickte und der Häufigkeit mit welcher der Spaziergänger das Kommando wiederholen musste. Je länger das Tier zum Menschen blickte, desto öfter sagte dieser „Sitz“ oder „Platz“ und desto länger dauerte die Übung. Die Menge der

Futtergabe hatte keinen Einfluss auf den Testspaziergang. Jedoch beeinflusste die Dauer welche das Tier explorierte den Abstand zwischen sich und dem Partner und die Zeit welche Wolf oder Hund brauchten um nach dem Rufen zurückzukommen.

Die Ergebnisse zeigen, dass mit konsequentem Training, Wölfe und Hunde gleich gute Ergebnisse bei Leinenspaziergängen darbringen können. In dieser Studie kooperierten Wölfe sogar besser mit Menschen als die domestizierten Hunde. Das deutet darauf hin, dass Wölfe die notwendigen Merkmale besitzen, welche für den Domestikationsprozess notwendig waren und lässt Andeutungen zu, dass einige Wölfe damals möglicherweise sogar leicht zu zähmen waren.

8. Abstract

Dogs cooperate daily with their human partners. To investigate the potential for cooperation of their closest wild-living relatives, Margit Auer made dyadic leash walks with humans and wolves in 2010 (Auer, 2010).

Now I wanted to compare cooperation behaviour in wolves and domesticated dogs, of the wolf science center in Ernstbrunn, during such dyadic leash walks on standardized tracks. 133 dyads of different human-dog and human-wolf combinations walked three times on different tracks and had to do exercises like “sit down” and “lay down” on marked places. All animals were hand-raised and trained daily to walk on a leash and to adhere to commands like “sit”.

Each walker was asked to fill in several questionaires, including the NEO-FFI personality test, an attitude-towards wolves and dogs scale, and an animal personality rating.

A lot of differences in performances of human-dog and human-wolf dyads were found. Results indicate that walking with trained pack wolves is less stressful than walking with trained pack dogs. Wolves did not perform the exercises faster or better, but in dogs more conflict situations, strained leashes and incorrect performed exercises occurred. Dyads with wolves took longer for the whole walks and wolves led the walk for longer duration relative to test duration, whereas in dyads with dogs the animal got called by name more frequently and the walker fed dogs more often. Personality traits of the walker or the animal did not show any influence, in contrast to what Auer (2010) and Heszle (2012) found in their studies. But independent tested dyads showed different performances. One walker paid more attention towards wolves, whereas another looked longer to the dogs. The success of an exercise and its duration was affected by the duration the Canid looked to the walker and the frequency with which the walker had to call the command for the exercise. The longer the animal looked into the walkers face, the more often the walker had to call “sit” or “down” and the longer the dyad took for the exercise. Food reward did not affect the performance of the walk, but exploration behaviour did influence the distance between the dyadic partners and the amount of time the animal needed to come back after getting called.

The results showed that with consistent training wolves and dogs can perform equally. In the study wolves even cooperated better with humans than domesticated dogs. This shows that wolves provide the basis for the domestication process of dogs and maybe some of the first wolves to experience human contact got socialized easily.

9. Appendix:

Appendix A: Handout for the performance of the standardised walks

1) Please read through the handout. If you have any queries, please ask me.
2) Conditions for a walk: no rain- or snowfall (because of the camera); good daylight; motivated dogs
3) Each dyad has to do the walk three times. The same dyad is not allowed to do the walk two or three times in serial and if possible it should not walk more then once at the same day.
4) Performance

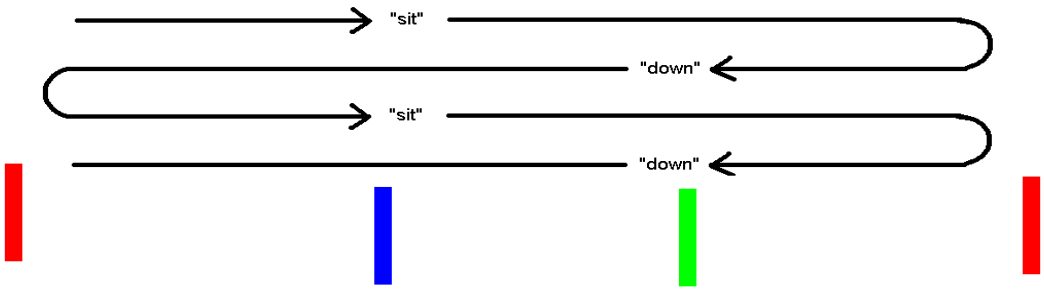
✓ Try to walk uninfluenced, “as always”! Do not brace oneself or mind on perfectness because of the filming camera.

✓ During the walk please do not contact with the cameraman/woman. Also there should be no intervisibility with the escort (persons, wolves, dogs).

✓ The order and place (look after coloured dowels) of the practices have to be considerd (s. course, layout and overview)

✓ Do not do the practices with your back to the camera; The camera should see the faces of human and wolf – lateral presentation is optimal.

5) Course



6) Also the spoken words are important for the analysis. Thus each wolf-walker get a dictaphone and a small microphone with a short introduction about the handling. Afterwards we leash the wolves. From the enclosure to the begining of the walk it takes about 10 minutes. I will antedate with the camera to be timely at my position. The red dowel marks the beginning of the standardised walk. (**Important**: Switch on the recorder!). You walk until the blue dowel. There you do the first practice “sit”. You walk on, pass the green dowel and turn at the red dowel. Back at the green dowel you do the second practices “down” and walk on. Pass the blue dowel and turn at the red dowel. Now you repeat this once again: do the practice three “sit” at the blue dowel, walk on, pass the green and turn at the red dowel. At the green dowel you do the practice four

"down" and walk on pass the blue dowel and when you pass the red dowel the standardised walk is finished.
One cycle needs about 7 to 10 minutes.

7) Anonymity

For the analysis each wolf-walker gets a number. Full anonymity can not be given during taking the data but for analysis and publication it is guaranteed.

8) Further

Additionally to the walks, each wolf-walker has to fill out a personality-test (NEO-FFI), a wolf-attitude questionaire and a wolf-personality-scoring questionaire.

Appendix B: Dog/Wolf-Walker Attitude Form

Please answer the following questions conscientiously. There are no “correct” or “false” answers, answer on your own feeling. If there is any question which does not apply to you (e.g. give water, feed), pleas elide it.

Depending on the question please tick the appropriate point or the appropriate position on the scale.

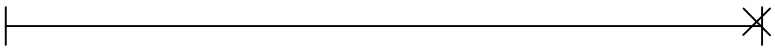
Please regard that the scale is lateral bounded and can be utilised completely as shown in the examples.

Don’t forget to answer the subquestions as well.

If you have mistaken your answer, please scratch it out clearly and make your tick at the appropriate position.

Examples:

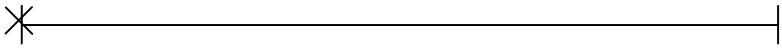
x) How often do you walk with the dogs?



never *not less then once per week*

(I walk with the wolves at least once per week.)

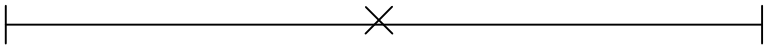
xi) How often do you walk with the dogs?



never *not less then once per week*

(I never walk with the wolves.)

xii) How often do you walk with the dogs?



never *not less then 3 times per week*

(I walk with the wolves about once per month.)

The questionnaire will be kept anonymous and in confidence.

A) General questions:

1. Name:

2. Age:

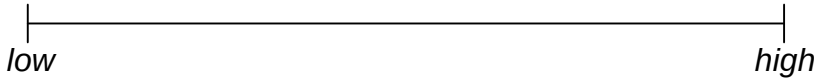
3. Profession:

4. Do you live with domestic animals?
   □ No
   □ Yes
   If yes, which and how much:

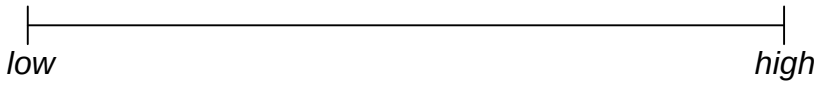
5. How do you estimate your daily stress?

   a. during a workday:

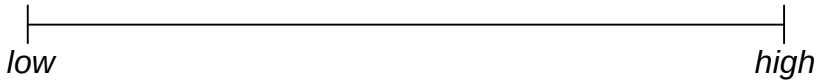
   b. during a day off



6. How do you estimate the daily stress of our dogs?
   a. during a workday (lot of training and tests):

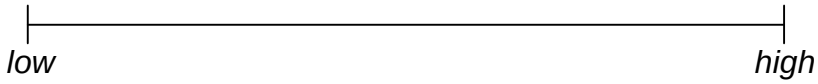


   b. during a day off (no training or tests):

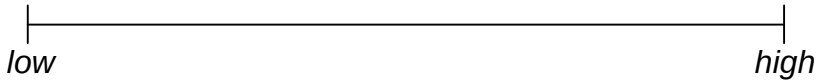


B) Attitude questions

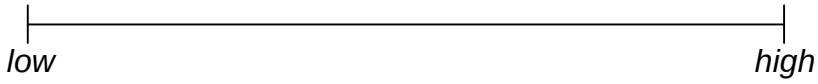
3. How do you react, when you meet a stranger during your walk?
    a. I take the leash short enough to have the dog under control and keep the leash short until the stranger has passed.



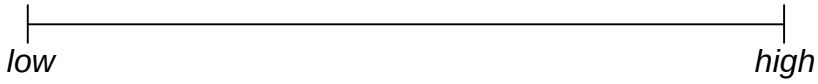
    b. I give him a command(sit, down, stay, close,...).



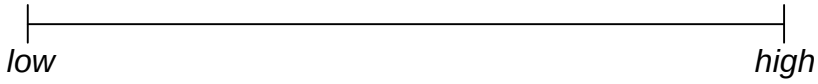
    c. I try to avoid the stranger and occupy the dog.



    d. I don't react at all and keep on walking.

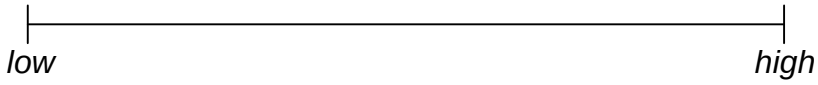


    e. I reinforce the animal when it ignores the stranger.

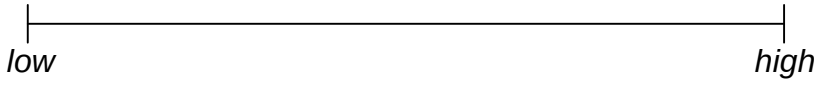


    f. I react in another way (please describe!)

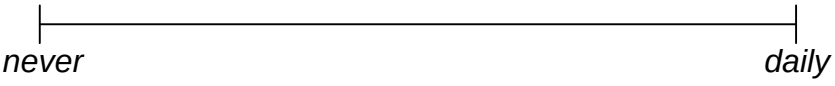
    ……..



4. The dog/wolf like being petted by me.

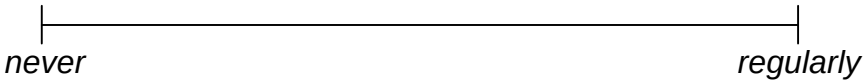


5. How often do you play with the dogs/wolves?



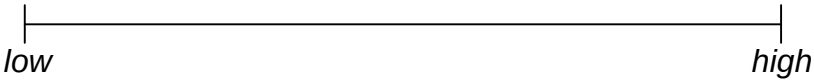
6. How often do you walk the dogs/wolves (all together; generel frequency)?

7. How often do you talk to the animals without giving them commandos, when you are in the enclosure?

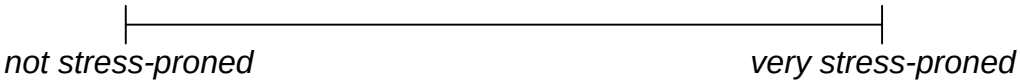


8. What do the dogs/wolves mean to you?

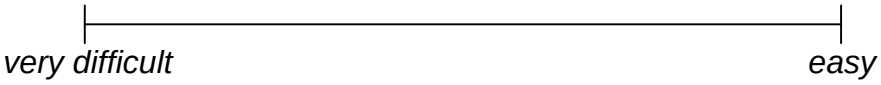
9. The dogs/wolves feel joy/suffer with us.



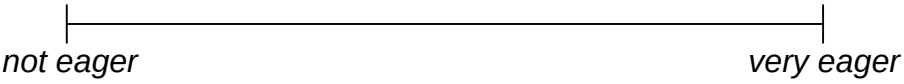
10. How immunized to stress do you think are our animals?



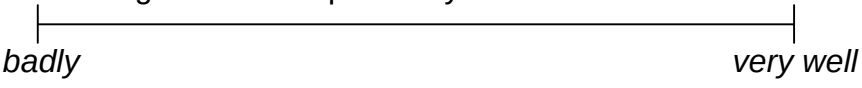
11. How easy is it for you to teach the dogs/wolves something new?



12. Are the dogs/wolves eager to work with you?

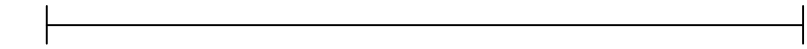


13. How well do the dogs/wolves respond to your commandos?



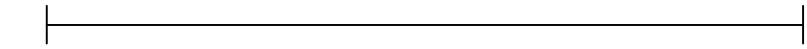
14. How often do you tell the dogs/wolves that you dislike its behaviour?

a. „mild“ scolding



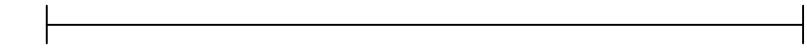
never *very often*

b. physical reprehension like pushing away or pulling on the leash



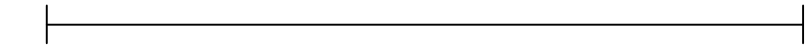
never *very often*

c. Ignore



never *very often*

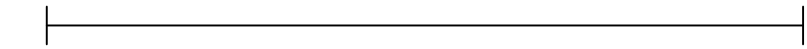
d. „Schnauzengriff“ (take the dog's muzzle with the hand)



never *very often*

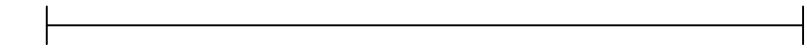
15. How often do you reinforce the dog/wolf using following methods?

a. food



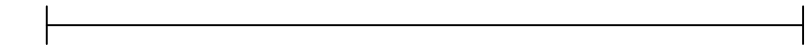
never *very often*

b. praising



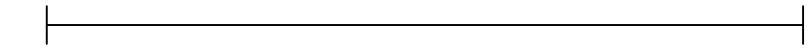
never *very often*

c. playing



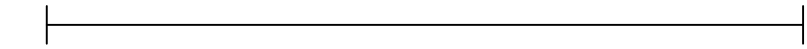
never *very often*

d. petting/socio-positive interactions



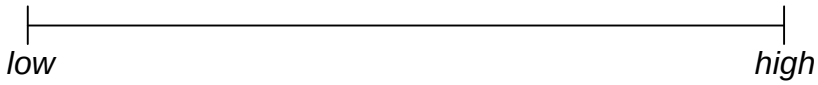
never *very often*

e. short touchin/petting

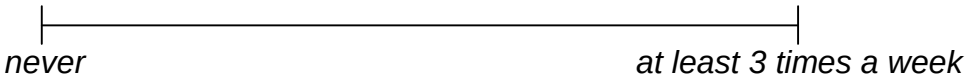


never *very often*

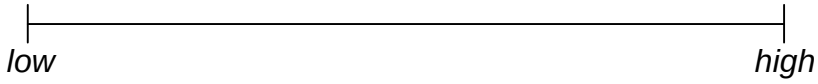
16. I like teaching the animals something new.



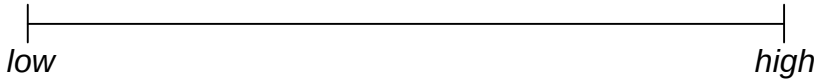
17. I train/play a lot with the dogs/wolves.



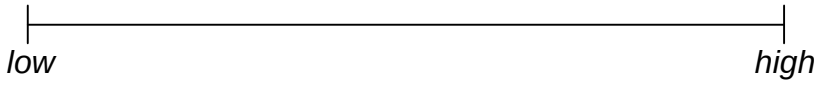
18. Even if other WSC-members are present, the animals contact me, when they need/want something.



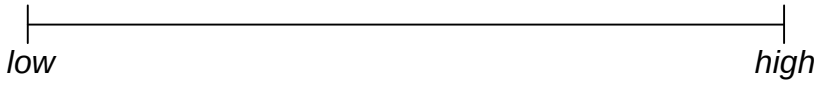
19. I make sure that the animals always have fresh water.



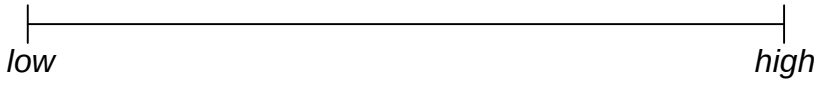
20. I think, that the animals understand me.



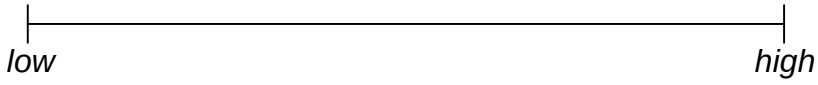
21. It's a good feeling to talk to the dogs/wolves.



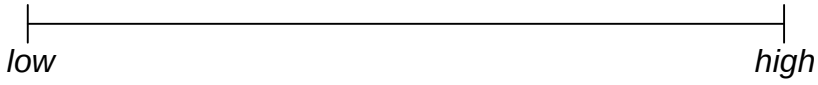
22. Sometimes the dog/wolf makes me laugh doing something.



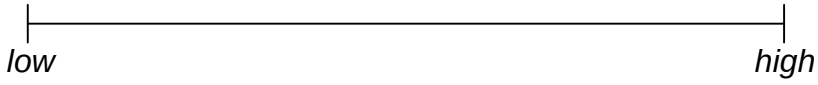
23. The dog/wolf wants my attention.



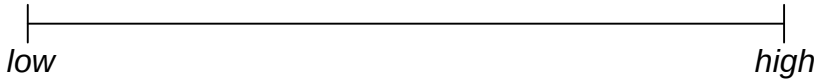
24. The dogs/wolves are always fooling around.



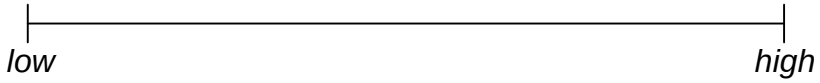
25. I like caring for the animals. The daily routine doesn't matter to me.



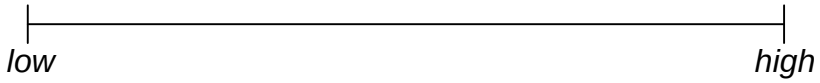
26. Sometimes I spend time with the dogs/wolves even if I had something more important to do.



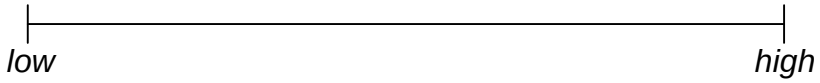
27. I feel responsible for the animals and that's good.



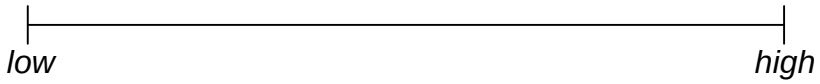
28. It would make me very sad if we would loose an animal due to a disease or an injury.



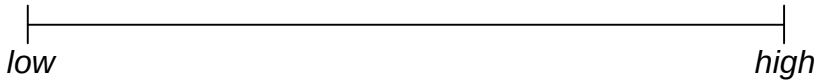
29. The dogs/wolves mean a lot for me.



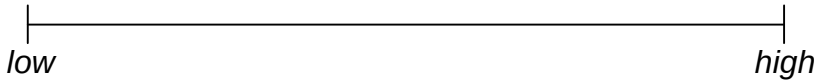
30. I like simply spending time with the dogs/wolves, relaxing and doing nothing.



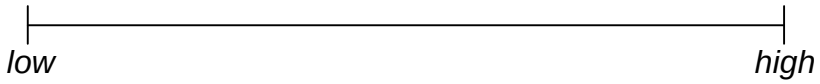
31. Simply being with the dogs/wolves makes me feel good.



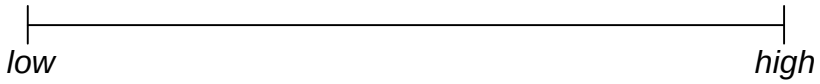
32. The dogs/wolves know, when I'm really sad, worried, or angry.



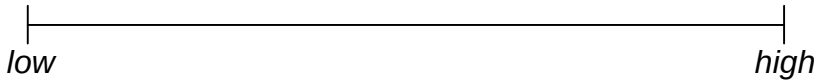
33. It makes me feel better spending time with the animals, when I'm sad, worried, or angry.



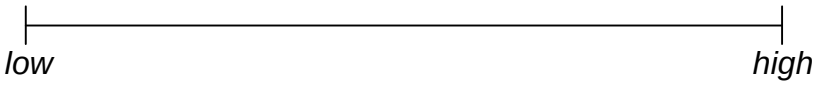
34. The dogs/wolves don't realise how I'm feeling.



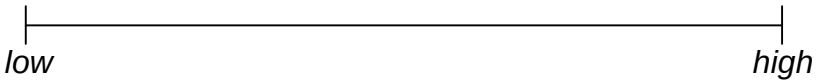
35. I'm missing the dogs/wolves, when we are not together.



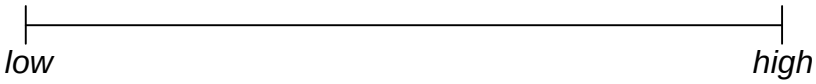
36. The dogs/wolves are good fellows/friends



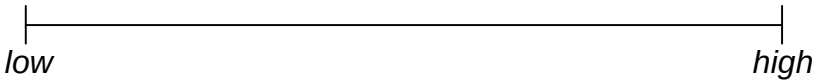
37. I like cuddling with the dogs/wolves.



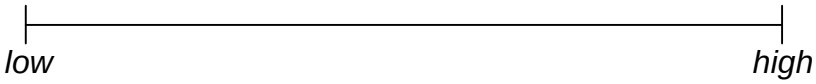
38. It's important for me to spend time with the dogs/wolves.



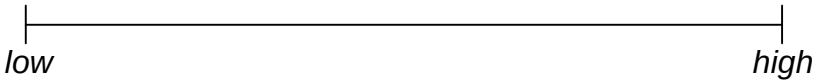
39. The animals help me being in balance.



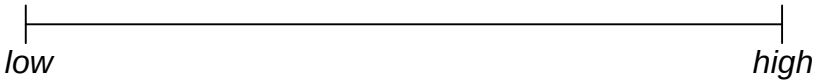
40. I spend a lot of time with the animals.



41. I always wanted to have/work with dogs/wolves.



42. The dogs/wolves like me.



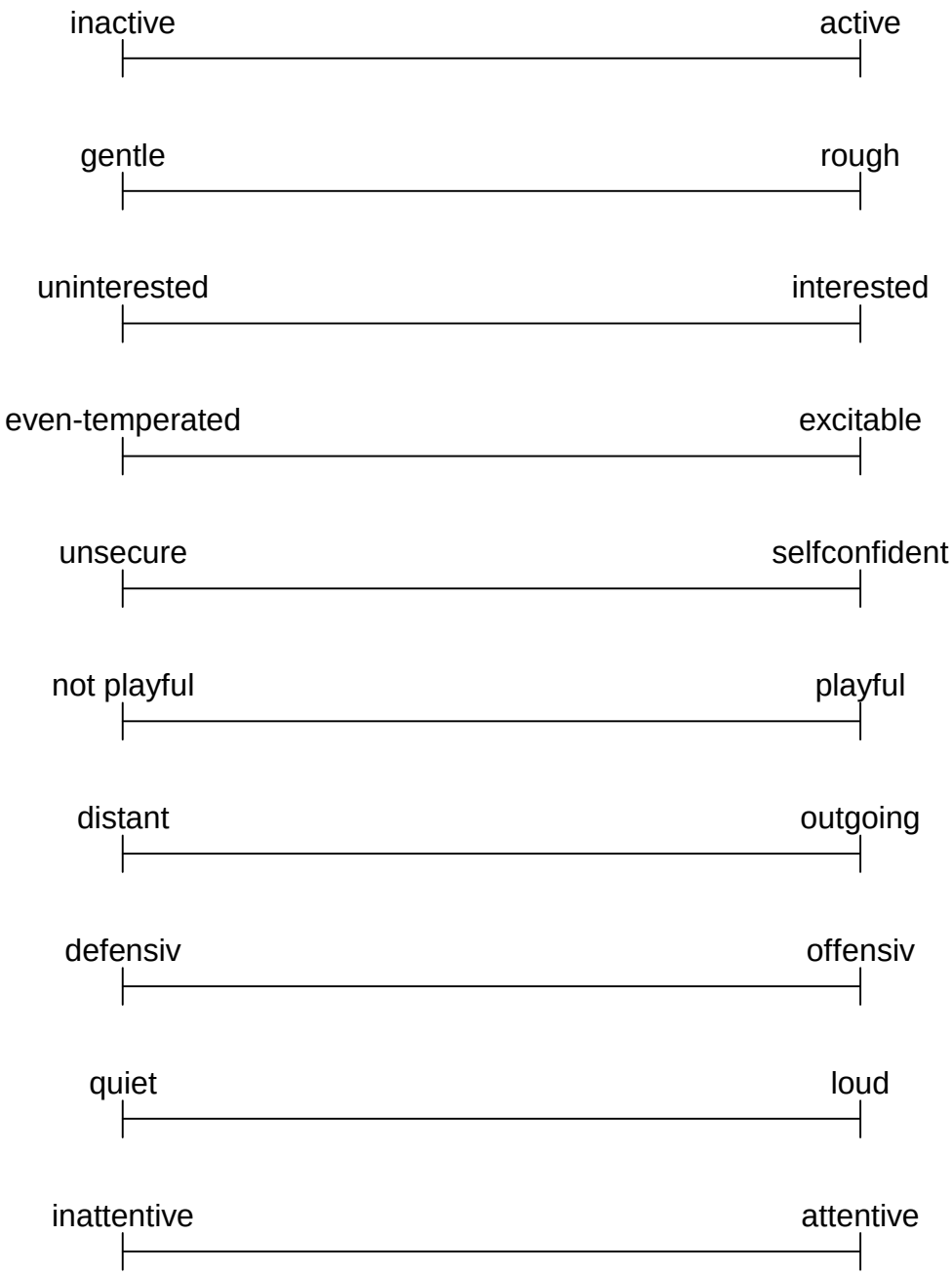
Appendix C: Dog/Wolf Personality Scoring

Evaluated by: .....

Evaluated animal: .....

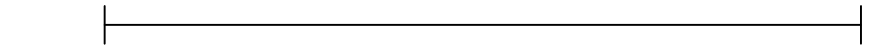
Please mark the appropriate point in the scale:

The dog/wolf is

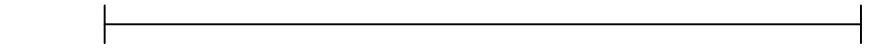


Which, and how strong would you assign the following characteristics with the dog/wolf?

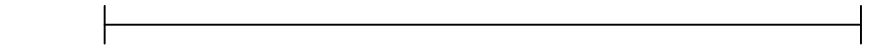
- It is playful.



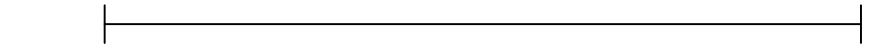
- It is anxious.



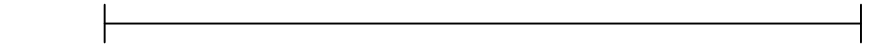
- It is aggressive.



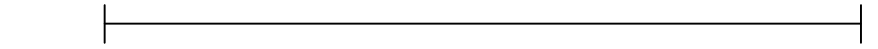
- It is nervous.



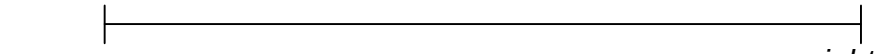
- It is calm and well-temperated.



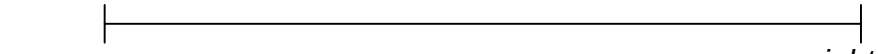
- It is cheerful.



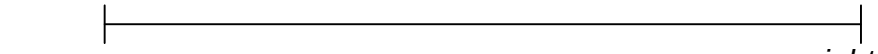
- It is clever.



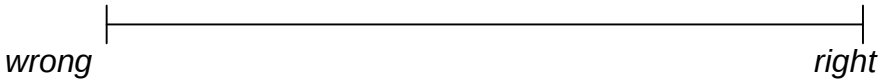
- It is reliable.



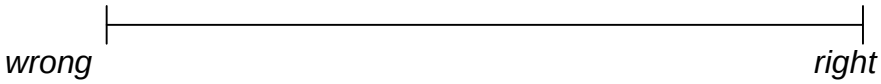
- It is animated.



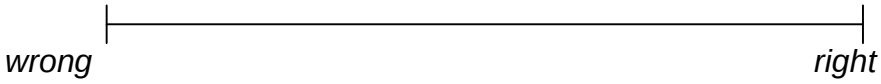
- It is advertend.



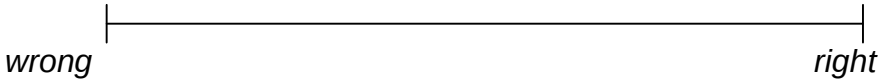
- It is sometimes silly.



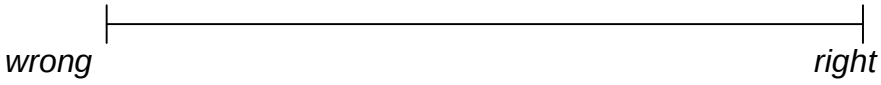
- It likes other (human) people.



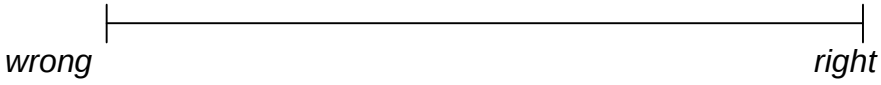
- It likes other animals.



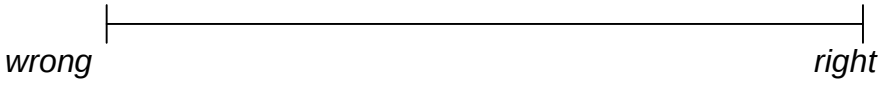
- It is stupid.



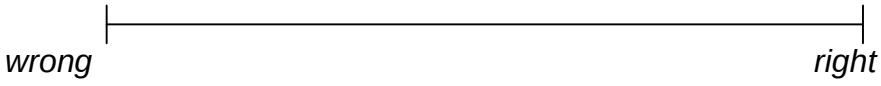
- It is friendly.



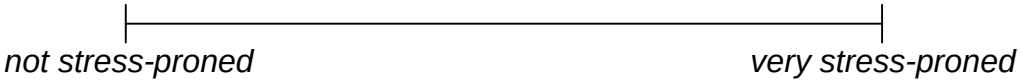
- It is curious.



- It is stubborn.



How stress-proned do you think the dog/wolf is?



Appendix D : Neo-FFI Personality Scoring

Fragebogen — NEO-FFI

Name: _____ Datum: _____

Geschlecht: männlich ◯ Alter: _____

weiblich ◯ Beruf: _____

Schulabschluss: _____

Hinweise: Dieser Fragebogen enthält 60 Aussagen, welche sich zur Beschreibung Ihrer eigenen Person eignen könnten. Lesen Sie bitte jede dieser Aussagen aufmerksam durch und überlegen Sie, ob diese Aussage auf Sie persönlich zutrifft oder nicht. Zur Bewertung jeder der 60 Aussagen steht Ihnen eine fünffach abgestufte Skala zur Verfügung. Kreuzen Sie bitte an:

	Starke Ablehnung	Ablehnung	Neutral	Zustimmung	Starke Zustimmung
Starke Ablehnung, wenn Sie der Aussage auf keinen Fall zustimmen oder sie für völlig unzutreffend halten.	◯	◯	○	◯	◯
Ablehnung, wenn Sie der Aussage eher nicht zustimmen oder sie für unzutreffend halten.	◯	◯	○	◯	◯
Neutral, wenn die Aussage weder richtig noch falsch, also weder zutreffend noch unzutreffend ist.	◯	◯	○	◯	◯
Zustimmung, wenn Sie der Aussage eher zustimmen oder sie für zutreffend halten.	◯	◯	○	◯	◯
Starke Zustimmung, wenn Sie der Aussage nachdrücklich zustimmen oder sie für völlig zutreffend halten.	◯	◯	○	◯	◯

Es gibt bei diesem Fragebogen keine „richtigen" oder „falschen" Antworten, und Sie müssen kein Experte (keine Expertin) sein, um den Fragebogen angemessen beantworten zu können. Sie erfüllen den Zweck der Befragung am besten, indem Sie die Fragen so wahrheitsgemäß wie möglich beantworten.

Bitte lesen Sie jede Aussage genau durch und kreuzen Sie als Antwort die Kategorie an, die Ihre Sichtweise am besten ausdrückt. Falls Sie Ihre Meinung nach dem Ankreuzen einmal ändern sollten, streichen Sie ihre erste Antwort bitte deutlich durch. Bitte bewerten Sie die 60 Aussagen zügig, aber sorgfältig. **Lassen Sie keine Aussage aus.** Auch wenn Ihnen einmal die Entscheidung schwer fallen sollte, kreuzen Sie trotzdem immer eine Antwort an, und zwar die, welche noch am ehesten auf Sie zutrifft. Beginnen Sie bitte jetzt mit der Beantwortung!

	Starke Ablehnung	Ablehnung	Neutral	Zustimmung	Starke Zustimmung
1. Ich bin **nicht** leicht beunruhigt.	○	○	○	○	○
2. Ich habe gerne viele Leute um mich herum.	○	○	○	○	○
3. Ich mag meine Zeit **nicht** mit Tagträumereien verschwenden.	○	○	○	○	○
4. Ich versuche zu jedem, dem ich begegne, freundlich zu sein.	○	○	○	○	○
5. Ich halte meine Sachen ordentlich und sauber.	○	○	○	○	○
6. Ich fühle mich anderen oft unterlegen.	○	○	○	○	○
7. Ich bin leicht zum Lachen zu bringen.	○	○	○	○	○
8. Ich finde philosophische Diskussionen langweilig.	○	○	○	○	○
9. Ich bekomme häufiger Streit mit meiner Familie und meinen Kollegen.	○	○	○	○	○
10. Ich kann mir meine Zeit recht gut einteilen, so dass ich meine Angelegenheiten rechtzeitig beende.	○	○	○	○	○
11. Wenn ich unter starkem Stress stehe, fühle ich mich manchmal, als ob ich zusammenbräche.	○	○	○	○	○
12. Ich halte mich **nicht** für besonders fröhlich.	○	○	○	○	○
13. Mich begeistern die Motive, die ich in der Kunst und in der Natur finde.	○	○	○	○	○
14. Manche Leute halten mich für selbstsüchtig und selbstgefällig.	○	○	○	○	○
15. Ich bin **kein** sehr systematisch vorgehender Mensch.	○	○	○	○	○
16. Ich fühle mich selten einsam oder traurig.	○	○	○	○	○
17. Ich unterhalte mich wirklich gerne mit anderen Menschen.	○	○	○	○	○
18. Ich glaube, dass es Schüler oft nur verwirrt und irreführt, wenn man sie Rednern zuhören lässt, die kontroverse Standpunkte vertreten.	○	○	○	○	○
19. Ich würde lieber mit anderen zusammenarbeiten, als mit ihnen zu wetteifern.	○	○	○	○	○
20. Ich versuche, alle mir übertragenen Aufgaben sehr gewissenhaft zu erledigen.	○	○	○	○	○
21. Ich fühle mich oft angespannt und nervös.	○	○	○	○	○
22. Ich bin gerne im Zentrum des Geschehens.	○	○	○	○	○

	Starke Ablehnung	Ablehnung	Neutral	Zustimmung	Starke Zustimmung
23. Poesie beeindruckt mich wenig oder gar nicht.	○	○	○	○	○
24. Im Hinblick auf die Absichten anderer bin ich eher zynisch und skeptisch.	○	○	○	○	○
25. Ich habe eine Reihe von klaren Zielen und arbeite systematisch auf sie zu.	○	○	○	○	○
26. Manchmal fühle ich mich völlig wertlos.	○	○	○	○	○
27. Ich ziehe es gewöhnlich vor, Dinge allein zu tun.	○	○	○	○	○
28. Ich probiere oft neue und fremde Speisen aus.	○	○	○	○	○
29. Ich glaube, dass man von den meisten Leuten ausgenutzt wird, wenn man es zulässt.	○	○	○	○	○
30. Ich vertrödele eine Menge Zeit, bevor ich mit einer Arbeit beginne.	○	○	○	○	○
31. Ich empfinde selten Furcht oder Angst.	○	○	○	○	○
32. Ich habe oft das Gefühl, vor Energie überzuschäumen.	○	○	○	○	○
33. Ich nehme nur selten Notiz von den Stimmungen oder Gefühlen, die verschiedene Umgebungen hervorrufen.	○	○	○	○	○
34. Die meisten Menschen, die ich kenne, mögen mich.	○	○	○	○	○
35. Ich arbeite hart, um meine Ziele zu erreichen.	○	○	○	○	○
36. Ich ärgere mich oft darüber, wie andere Leute mich behandeln.	○	○	○	○	○
37. Ich bin ein fröhlicher, gut gelaunter Mensch.	○	○	○	○	○
38. Ich glaube, dass wir bei ethischen Entscheidungen auf die Ansichten unserer religiösen Autoritäten achten sollten.	○	○	○	○	○
39. Manche Leute halten mich für kalt und berechnend.	○	○	○	○	○
40. Wenn ich eine Verpflichtung eingehe, so kann man sich auf mich bestimmt verlassen.	○	○	○	○	○
41. Zu häufig bin ich entmutigt und will aufgeben, wenn etwas schief geht.	○	○	○	○	○
42. Ich bin **kein** gut gelaunter Optimist.	○	○	○	○	○
43. Wenn ich Literatur lese oder ein Kunstwerk betrachte, empfinde ich manchmal ein Frösteln oder eine Welle der Begeisterung.	○	○	○	○	○

	Starke Ablehnung	Ablehnung	Neutral	Zustimmung	Starke Zustimmung
44. In Bezug auf meine Einstellungen bin ich nüchtern und unnachgiebig. . .	○	○	○	○	○
45. Manchmal bin ich **nicht** so verlässlich oder zuverlässig, wie ich sein sollte. . .	○	○	○	○	○
46. Ich bin selten traurig oder deprimiert.	○	○	○	○	○
47. Ich führe ein hektisches Leben.	○	○	○	○	○
48. Ich habe wenig Interesse, über die Natur des Universums oder die Lage der Menschheit zu spekulieren.	○	○	○	○	○
49. Ich versuche, stets rücksichtsvoll und sensibel zu handeln.	○	○	○	○	○
50. Ich bin eine tüchtige Person, die ihre Arbeit immer erledigt.	○	○	○	○	○
51. Ich fühle mich oft hilflos und wünsche mir eine Person, die meine Probleme löst.	○	○	○	○	○
52. Ich bin ein sehr aktiver Mensch.	○	○	○	○	○
53. Ich bin sehr wissbegierig.	○	○	○	○	○
54. Wenn ich Menschen **nicht** mag, so zeige ich ihnen das auch offen.	○	○	○	○	○
55. Ich werde wohl niemals fähig sein, Ordnung in mein Leben zu bringen. . .	○	○	○	○	○
56. Manchmal war mir etwas so peinlich, dass ich mich am liebsten versteckt hätte.	○	○	○	○	○
57. Lieber würde ich meine eigenen Wege gehen, als eine Gruppe anzuführen.	○	○	○	○	○
58. Ich habe oft Spaß daran, mit Theorien oder abstrakten Ideen zu spielen. . . .	○	○	○	○	○
59. Um zu bekommen, was ich will, bin ich notfalls bereit, Menschen zu manipulieren.	○	○	○	○	○
60. Bei allem, was ich tue, strebe ich nach Perfektion.	○	○	○	○	○

	N	E	O	V	G
Summenwerte					
Zahl beantworteter Items					
Mittelwerte					
Testwerte					

Appendix E: Configuration

Behaviour:

Behavior Name	Description	Code	Behavior Type	Modifiers
leash			State Event	
leash start		la	Initial State Event	
leash strained	walker or wolf strains at the leash	ls	State Event	initiator
leash tight soft	walker keeps leash tight without pulling	lt	State Event	
leash loose	walker keeps leash loose and it droops	ll	State Event	
leash out of sight	leash is out of sight	lo	State Event	
leash unspecified	leash is not defined	lu	State Event	
walk phases			State Event	
walk start		wa	Initial State Event	
walk/no exercise	the walk starts when walker and wolf have passed the red mark and also end when both have passed the red mark; they do not do any exercise, or just have done an exercise (e.g. wolf is sitting on command)	wn	State Event	
exercise "sit down"	do exercise "sit down"; start when walker speaks the command or shows the hand signal (hand up); end when wolf does the exercise successfully (as soon as the wolf is sitting) or when walker breaks off	ws	State Event	exercise success, kind of extra exercise
exercise "down"	do exercise "lie down"; start when walker speaks the command or shows the hand signal (hand down); end when wolf does the exercise success-fully (as soon as the wolf lies down) or when walker breaks off; sometimes the walker starts this exercise with the exercise "sit down"	wd	State Event	exercise success, kind of extra exercise
exercise turn	about-face at the red mark; start when walker initiates by turning, passing the red mark or calling the wolf; end when both walk new direction	wt	State Event	kind of extra exercise

extra exercises	walker does some extra exercises during the walk; start and end see exercise "sit down" or "lie down"	we	State Event	exercise success, kind of extra exercise
call close	walker calls the wolf close for doing the exercises "sit down" or "lie down"; not when calling for extra exercises	wc	State Event	
meet stranger	event occurs when walker or wolf show the first reaction on strange park visitors (single or in a group), cars or other strange things	wm	State Event	
walk break off	break off the walk	wb	Point Event	break off
phases out of sight	walker and wolf are out of sight	wo	State Event	
phase unspecified	phases is not defined	wu	State Event	
posture/locomotion walker			State Event	
locomotion walker start		pa	Initial State Event	
stand still	walker stands at one place and do not move, crouch, sit or lie; duration at least one second; inclusive scurry at the same spot	ps	State Event	initiator
crouch/lie/sit	wakler crouches, knees get strongly bend up or walker reclines on surface	pc	State Event	
walk/go	walker walks forwards, backwards or sidewards inclusive pauses between the steps of maximum one second	pw	State Event	initiator
run	walker moves faster than walking; like jogging	pr	State Event	initiator
walk and scretch	scretches the wolve, while walking or running	pk	State Event	
scretch and play	walker scretches the wolve or plays with it	pp	State Event	
manipulating the leash	just when the leash is around a tree or around the dogs feed (not normal leash handling)	pm	State Event	
loco.walker out of sight	walker is out of sight, not visible	po	State Event	
loco.walker unspecified	posture or locomotion of the walker is not defined	pu	State Event	
posture/locomotion wolf			State Event	
locomotion wolf start		da	Initial State Event	
stand	wolf stands at one place and do not sit, lie, explore or play; duration at least one second; inclusive scurry at the same spot	dn	State Event	tail

sit	wolf is sitting down on the surface and does not explore or play - except during sitting on command	ds	State Event	command
lie	wolf lie on the surface, not wallowing, exploring or playing - except during lie on command	dl	State Event	command
walk	wolf walks slowly forward, sideward or backward; inclusive pauses between the steps of maximum one second and does not explore or play	dw	State Event	tail, command, direction
run/trot/jump	wolf move faster than walk and does not explore or play	dr	State Event	command, direction
explore	wolf plays with objects (no interaction with walker), in the snow (eg. mouse jump), is sniffing or wallowing in something, eating or chewing, not during lie or sit on command	de	State Event	
play with walker	wolf plays and interact with walker; wolf at least shows interest for the manipulated object by the walker; not when lying or sitting on command	di	State Event	
explore camerawoman	wolf interact with camerawoman	dc	State Event	
pee	urinate with its hind leg on the ground; not especially on an object	dp	State Event	
defecate	evacuate solid waste	dd	State Event	
locomotion out of sight	wolf is out of sight, not visible	do	State Event	
locom. wolf unsecified	posutre or locomotion of the wolf is not defined	du	State Event	
head orientation walker			State Event	
head walker start		ka	Initial State Event	
orientation not to wolf	the walkers head is not orientated to the wolfs body	kn	State Event	
orientation to wolf	the walkers head is orientated to the wolfs body	kb	State Event	kind of walker orientation
walker orient. out of sight	the walkers head orientation is out of sight	ko	State Event	
walker orient. unspecified	orientation fo the walker is not defined	ku	State Event	
head orientation wolf			State Event	
head wolf start		ha	Initial State Event	
orientation not to walker	the wolfs head is not oriented to the walkers body	hn	State Event	

orientation to walker	the wolfs head is oriented to the walkers body	hb	State Event	
lick mouth	wolf licks walkers mouth	hl	Point Event	
wolf orient. out of sight	the wolfs head orientation is out of sight	ho	State Event	
wolf orient. unspecified	the wolfs orientation is not defined	hu	State Event	
vocalization walker			State Event	
vocalization walker start		va	Initial State Event	
call hey	walker calls hey or other loud sound to get the wolfs attention	c	Point Event	
call wolf name	walkers calls the wolfs name	vw	Point Event	
call sit	walker calls "sit" as command	vs	Point Event	
call down	walker calls "down" as command	vd	Point Event	
call come	walker calls "come/komm"	vc	Point Event	
call reward false	this is an false coded behavior --> use vr	vx	State Event	
call reward	walker calls "super" or other positive reward	vr	Point Event	
speak with wolf	walker speaks to wolf; any kind of vocalization (eg. whistle,..); with pauses in between not longer than one second	vt	State Event	
speak with persons	walker speaks to persons or to him/herself; any kind of vocalization (eg. whistle,...); with with pauses in between not longer than one second	vp	State Event	
do not speak	walker does not speak anything	vn	State Event	
speak walk information	speaks date, walkers name, dogs name in the microphone	vi	Point Event	
do not hear	the voice recording is too quiet to decide if the walker speaks or not	vu	State Event	
vocalization wolf			State Event	
howl	point the muzzle upward and forward and make a long wavering open-mouthed vocalization like hauuu; with pauses in between not longer than one second	th	State Event	
growl	a low guttural, menacing sound; sometimes with showing the teeth; sounds like grrrr; with pauses in between not longer than one second	tg	Point Event	

whimper	high tough soft, intermittent and plaintive sound like hihihiiii; with pauses in between not longer than one second	tw	State Event	
whisper	sounds like waawaa; often occurs if someone apprach the wolf; with pauses in between not longer than one second	ti	State Event	
bark	dog is barking; with pauses in between not longer than one second	tb	Point Event	
choke	dog chokes on the dryfood (verschluckt)	tc	State Event	
guidance			State Event	
guidance start		ga	Initial State Event	
guidance walker	wolf walk/run behind or lateral the walker or does the exercises the walker awnts to do (even standing next to the walker without showing interest for going on)	gp	State Event	
guidance wolf (along route)	wolf walks in front of the walker along the route	gd	State Event	
guidance wolf (leave route)	wolf walks in front of the walker and the walker follows and leave the route	gl	State Event	
guidance conflict	walker wants to go on along the route but the wolf does not come with him/her (waiting for the wolf) or walker stops and wolf wants to go on (calling the wolf close)	gc	State Event	
guidance out of sight	wolf and/or walker are/is out of sight so that it is not possible to decide guidance	go	State Event	
guidance unspecified	guidance is not defined, both are walking next to each other	gu	State Event	
distance walker-wolf			State Event	
distance start		ea	Initial State Event	
less 1m	distance between walker and wolf is not more than one meter; so that the wolf can easily be touched by the walker	ec	State Event	
between 1-3	distance between walker and wolf is between one and three meters	em	State Event	
more than 3 m	distance between walker and wolf is more than three meters; the walker is not possible to touch the wolf	ef	State Event	

distance out of sight	wolf and/or walker is out of sight and its not possible to decide the distance	eo	State Event	
reward with food			State Event	
reward start		ra	Initial State Event	
food in hand	walker has some dry food in his/her hand or just grab for some and the hand is in the pocket	rh	State Event	
give food	walker gives the wolf dry food	rg	Point Event	take food
no food in hand	walker has no dry food in his/her hand	rn	State Event	
food out of sight	is it not visible if the walker has some dry food in his/her hand	ro	State Event	
feeding unspecified	feeding is not defined	ru	State Event	
Start-Stop			State Event	
Start-end		ss	Initial State Event	

Modifier

Modifier Name	Description	Code
initiator		n
wolf	wolf initiate interaction e.g. by walking away and pulling at the leash or being the first starting the action	id
walker	walker initiate interaction e.g. by pulling at the leash to get the wolf closer or being the first starting the action	ip
initiator unclear	initiator is not visible	in
initiator out of sight	wolf and/or walker are/is out of sight and the initiator is not visible	io
initiator unspecified	initiator is not defined	iu
kind of walker orientation		w
tactile	walker touches the wolf for at least one second; e.g. to stroke the wolf; not when playing with the wolf and not during offering food when the wolf touches the walkers hand	kt
playing	walker plays with the wolf mostly by manipulating an object like a stick or a snowball	kp
command orientated	walker looks at the wolf cause of giving a command	kc
not tactile/playing	walkers head is orientated to the wolves body but no tactil or playing interaction	kn
kind orient out of sight	it is not visible how the walker is orientated to the wolf	ko
kind orient unspecified	walkers orientation to the wolf is not defined	ku
exercise success		e
successful	wolf achieves exercise	es
incomplete	wolf achieves exercise incomplete; e.g. doing exercise down and only make sit or does not put its backside down; wolf shows interest for doing exercise	ei
not successful	wolf does not achieve the exercise; wolf does not show any interest for doing the exercise	en
exercise out of sight	it is not visible if the wolf achieves the exercise	eo
exercise unspecified	exercise success is not defined	eu
break off		b

walker brake off	walker decides to break off the walk	bw
other person	other person decide to break off the walk	bp
weather brake off	break off the walk because of weather changing (snowstorm)	bh
brake off unspecified	reason for brake off not defined	bu
take food		a
takes food	wolf feeds the offered dry food	ft
do not take food	wolf does not feed the offered dry food	fn
take food out of sight	its out of sight if the wolf takes the food	fo
kind of extra exercise		i
no extra extercise	normal exercise is just done once	n
ex. sit down	walker does extra exercise sit	xs
ex. down	walker does extra exercise down	xd
ex. turn/twist	walker does extra exercise turn	xt
ex. stand	walker does extra exercise stand	xn
ex. stay	walker does extra exercise stay	xy
ex. foot	walker does extra exercise foot	xf
ex. wait	walker does extra exercise wait	xw
ex. touch	walker does extra exercise touch	xc
kind of ex. out of sight	kind of exercise is out of sight	xo
extra exercise unspecified	walker does an undefined exercise	xu
command		c
on command	wolf sits or lie down after walker gabe the command	cc
no command	wolf sits or lie down without any command	cn
command out of sight	its not visible if the walker give any command	co
tail		t
tail not tucked	the wolfs tail is not tucked; it is hanging relaxed or other	tn
tail tucked	the wolfs tail is tucked between its hind legs	tt
tail out of sight	the wolfs tail is out of sight	to
tail unspecified	posture of the wolfs tail is not defined	tu
direction		d
forwards		df
backwards		db
sidewards		ds

Appendix F: Curriculum Vitae

PERSONAL INFORMATION

Carina Hampl

3423 St.Andrä-Wördern

a0606957@univie.ac.at

Sex female | Nationality Austria

WORK EXPERIENCE

September 2012 – June 2013

Teacher in dance on the ISMS Tulln

Interessensorientierte Sportmittelschule Tulln

Kirchengasse 32a

3430 Tulln

- Main activities and responsibilities
- Warm up, teach the students dances and choreos

Business or sector Teacher in dance

(March 2011 –)

Coach of the Vienna Vikings Junior Cheerleader

Raiffeisen Vikings Vienna

Kölgengasse 43, 1110 Wien

- Main activities and responsibilities
- Coordinating and executing training sessions, planning the year activities, teaching basics and skills in tumbling, stunts, pyramids and dance; preparing for national and international championships, creating and teaching routines; organisation; education in sports; mental trainer for 10-15 year old girls

Business or sector Coach

(September 2000 –)

Coach in Gymnastics

Sportunion St.Andrä-Wördern

Sektion Turnen

Südtirolergasse 25

3423 Wördern

- Main activities and responsibilities
- Coordinating and executing training sessions, planning the year activities, teaching basics and skills on balance beam, floor, uneven bars and fault; preparing for national championships, creating and teaching routines; organisation; education in sports; mental trainer for 5-15 year old children

Business or sector Coach

(February 2010 – June 2013)

Coach for ski-strainght and conditional training

Sportunion St.Andrä-Wördern

Sektion Ski

Südtirolergasse 25

3423 Wördern

- Main activities and responsibilities
- Warm up with conditional and coordinative aspects; work out for the whole body to be prepared for the winterseason; stretching

Business or sector Coach

(2011 -2012)

Tutoress

- Main activities and responsibilities
- Private lessons for children in junior high school in english and maths

Business or sector Tutor

(July 2010 – August 2010)

Veterinary surgeon assistant

Tierarztpraxis Königstetten

Tulbingerstrasse 2, 3433 Königstetten

- Main activities and responsibilities
- Holding the animals on the table; helping the vet in basic treatment and surgeries; learning of animal therapy and collecting knowhow

Business or sector Veterinary medicin

(2007-2010)

Working in service- and kitchen in the family-owned Buschenschank

Buschenschank Hüpfel-Vender

Massingergasse, 3424 Wolfpassing

- Main activities and responsibilities
- Service, preparing of cold meals; accounting

Business or sector Catering

(September 4.th 2006 –September 29.th 2006)

Intern in the field of administration of the municipality

Marktgemeinde St.Andrä-Wördern

Altgasse 30,

3423 Wördern

- Main activities and responsibilities
- Telefone service, photocopying

Business or sector Management

(July 3.rd 2005 – July 28.th 2005)

Au-Pair in the french part of switzerland

Claire und Blaise Martignier, St.Aubin, Schweiz

- Main activities and responsibilities
- Babysitting 4 children (3-7 years), learning french; keeping housework

Business or sector Au pair

(June 1.st 2004 – August 31.st 2004)

Intern in the office operational

A.Tobias Ges.m.b.H.

Eduard Klinger-Straße 15

3423 St.Andrä-Wördern

- Main activities and responsibilities
- Putting bills and delivery notes; phone service; sending products; personnel withholding; copy work

Business or sector Management

EDUCATION AND TRAINING

(October 2006 – November 2013)

Universität Wien,

Department für Zoologie

Althanstrasse, 1090 Wien

- Accomplishment of my diploma thesis “Cooperation behaviour in human-dog and human-wolf dyads during a walk on the leash“ at the wolf-science Center in Ernstbrunn
- Principal subjects: Zoology, Ethology

(September 2001 – June 2006)

Reife- und Diplomprüfung

Höhere Bundeslehranstalt für wirtschaftliche Berufe, Donaulände 72, 3430 Tulln

- Principal subjects:
- Accountancy, english, french, diet and nutrition, management studies, word processing, economy computer science, cooking and service

(September 1997 – June 2001)

Musikhauptschule,

Konrad von Tulln Gasse 2

3430 Tulln

- Principal subjects:
- Music, english, german, maths

(September 1993 – June 1997)

Harald Godai Volksschule

St.Andrä-Wördern

PERSONAL SKILLS

Mother tongue(s): German

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	C1	B2	B2	B2
French	A2	A2	A2	A2	A2

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

- Good and polite communication skills gained through my experience in management
- A lot of experience in communication with children
- Ability to explain exercises and motion sequences to people

Organisational / managerial skills

- Coordination and organisation of events (championships, public events,..)
- Cooperation in the coaching staff
- Organisation of trainingscamps
- Organisation and preparing of daily trainings and of a year plan
- Really good timing of university, work and coaching in two organisations
- Leadership

social skills

- Teamspirit
- Diplomatically
- Empathic
- helpful

Computer skills	-	Excelent knowledge of MS Word, Excel, Power Point, Internet Explorer,
	-	Basic user ov Photoshop, Adobe Premiere Pro CS3, The Observer XT 10, SPSS, R-Statistics
Other skills	-	Dancing
	-	Gymnastics (state certified instructor)
	-	Cheerleading
	-	Snowboarding
	-	Musical
	-	Very ambitiously
	-	Creative
Driving licence	-	B