MASTERARBEIT

COOPERATION IN HUMAN-DOG DYADS DURING LEASH WALKS: THE INFLUENCE OF HUMAN PERSONALITY AND THE INTENSITY OF CONTACT.

Verfasserin

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1 ZUSAMMENFASSUNG (GERMAN SUMMARY)

Das Ziel meiner Masterarbeit war es, herauszufinden ob und inwieweit die Bindung zu einer bestimmten Person, die Kontaktintensität und die Persönlichkeit einer Person das kooperative Verhalten von Mensch und Hund im Laufe von Leinenspaziergängen beeinflusst. Basis meiner Arbeit war die Diplomarbeit von Margit Auer (2009), welche die Kooperation zwischen Wolf und Mensch untersuchte, um festzustellen, welche Parameter diese Interaktion beeinflussen. Meine Studie fand am Wolf Science Center in Ernstbrunn, in Niederösterreich statt. Es nahmen insgesamt 18 Hunde und 28 Spaziergänger daran teil. Daraus resultierten 54 verschiedene dyadische Kombinationen. Um Informationen über die Wichtigkeit, der „sozialen Bindung" zwischen Mensch und Hund zu erhalten, wurden Spaziergänge von den 18 teilnehmenden Hunden zusammen mit dem Besitzer, einer bekannten Person für den Hund, die aber nicht der Besitzer war und einer fremden Person, die der Hund zuvor noch nie gesehen hat gefilmt. Während des 80m langen Spaziergangs wurden die Zweierteams (Dyaden) gebeten, die Übungen „Sitz" und „Platz" zu absolvieren Das Verhalten von Hund und Mensch wurde anschließend vom Videoband kodiert. Farbige Holzpfeiler markierten den Anfang, das Ende und die Position der Übungen. Der Hund und sein Spaziergänger gingen zwei verschieden Routen, welche im Wildpark von Ernstbrunn positioniert waren. Ziel war es, dass jeder der Hunde mit jedem seiner Spaziergänger (Besitzer, Freund, Fremder), jede der zwei Routen zweimal bestreitet. Dafür waren zwei Treffen mit den Teilnehmern vorgesehen. Aus logistischen Gründen schafften es 6 der Hunde nur einmal zu kommen. Die Hunde waren von ein bis sechs Jahre alt und waren alle nicht kastriert. Jeder der Teilnehmer wurde außerdem gebeten, einen standardisierten Fragebogen, der die Persönlichkeit des Halters ermittelt (NEO-FFI Test entwickelt von Costa und McCrae (1989) und von Borkenau und Ostendorf (1993) ins Deutsche übersetzt), auszufüllen. Die Spaziergänge wurden gefilmt und mit Hilfe des Softwareprogramms THE OBSERVER Video Pro® (Version 5.0; Noldus) codiert. Die statistische Analyse beinhaltet Kruskal-Wallis-Tests und LMEs (linear mixed effort model).

Sowohl der Freund als auch die fremde Person zeigten ein weniger kooperatives Verhalten mit dem Hund als der Besitzer, der weniger oft eine gespannte Leine

initiierte. Auch war die Dauer in welcher die Leine lose fiel, länger für Besitzer, als für Freunde oder Fremde. Die Anzahl der Führungskonflikte war außerdem geringer in Spaziergängen mit dem Besitzer.

Außerdem beeinflussten das Geschlecht von Mensch und Hund, sowie die Persönlichkeit des Menschen, die soziale Interaktion innerhalb der Leinenspaziergang - Dyade. Zum Beispiel zeigten extravertierte und offene Spaziergänger eine geringere Anzahl an Führungskonflikten als Gewissenhafte (NEO-FFI Dimensionen). Hunde, mit extravertierten Spaziergängern initiierten weniger oft eine gespannte Leine. Im Gegensatz dazu, initiierten Hunde von neurotizistischen Partnern, sowie die Partner selbst öfters eine gespannte Leine. Neurotizistische und extravertierte Partner streichelten ihre Hunde öfter als gewissenhafte, verträgliche und offene Partner.

Unsere Ergebnisse können zu einem besseren Verständnis von Mensch-Hund Beziehungen beitragen. In diesem Sinn wäre ein systemischer Ansatz, also die Einbeziehung der sozialen Beziehung zwischen Mensch und Hund, sowie die Persönlichkeit beider Partner sicher hilfreich, um zukünftig das Training und die Arbeit mit Hunden zu verbessern.

2 ABSTRACT

When dogs and humans act as social partners, several parameters like the personality of both, their attachment, age and gender will affect this relationship. Here I expanded on previous studies, using leash walking as an experimental paradigm and investigated the influence of these factors on the cooperative performance of human-dog dyads, in particular on the diploma thesis of Margit Auer (2009), who investigated the cooperation behaviour between human and wolves and the effect of personality and intensity of contact on the performance. The present study was performed at the Wolf Science Centre in Ernstbrunn, Lower Austria. Eighteen pet dogs participated with twenty-eight human leash walkers, resulting in .fifty-four different dyadic combinations. I recorded leash walks of a dog together with three different walkers: the owner of the dog, a familiar person who knew the dog well but was not the owner and a stranger, who never had seen the dog before. In addition, dyads were asked to do the exercises "sit" and "down" during the walk. Coloured wooden poles marked the sites where to start, to do the exercises, to turn and to end. The dyads walked two different, 80m long tracks. Therefore each of the dog did at least one walk with each walker at each track. Dogs were between one and six years old and were all not castrated. Each of the walkers, were asked to fill in a NEO – FFI personality test .Walks were videotaped and behaviour was coded with THE OBSERVER Video Pro® (Version 5.0; Noldus). Data was analyzed with Kruskal-Wallis-Test and LMEs (linear mixed effort model). We indeed, found effects of attachment and the intensity of previous contact between walker and dog on leash walking performance. Owners were more cooperative with their own dog, than the friend-dog or the stranger-dog dyads were. In fact, the owner of the dog less often initiated a strained leash than the friend or the stranger and the time the leash was loose was longer for the owner than for the other two walkers. Owners also had less often leadership conflicts with their dogs and they were more successful in completing exercises with the dog than the other two walkers. In addition, owner gender and dog sex, as well as the personality of the walker affected the performance of human-dog dyads. For example, walkers high in extraversion and openness (NEO-FFI dimensions) showed relatively few leadership conflicts, whereas walkers high in

conscientiousness showed more of such conflicts. The higher a walker scored in extraversion, the less often the dog initiated a strained leash. In contrast, the higher a walker scored in neuroticism, the more often a dog, as well as the walker, initiated a strained leash. People high in neuroticism frequently touched their dogs, whereas walkers high in extraversion spoke less often with their dogs, than those low in this personality dimension, but also more often touched the dog during the walk.

In conclusion, our findings may contribute to a better understanding of human-dog relationships and may help trainers with a systemic approach, namely to focus on individual dyadic training, taking into regard parameters like the dog-owner relationships and their personalities.

Key Words: Human-dog interactions, cooperation, dyadic challenges, personality, gender interactions

3 INTRODUCTION

3.1 History of dog-human relationship and the personality of human

Wolves/dogs are known as the first animals which were living in close non-parasitic contact with humans for more then 16.000 years, with Far East (Savolainen et al., 2002; Pang et al., 2009) or Middle East origin (Pang et al., 2009; Gray and Wayne, 2010; Klütsch and de Caprona, 2010). Although the discussion, about when and how domestication started is still going on, it is clear that dogs were domesticated from wolves (Pang et al., 2009; Klütsch and de Caprona, 2010). Pang et al. (2009) analyzed entire mitochondrial genomes of 169 dogs and the results indicate that the domestic dog had it's origin in the southern China, less than 16.300 years ago from several hundred wolves. Schleidt and Shalter (2003) suggested that wolves may have followed humans, in order to benefit from their proximity. Ultimately, they shared a common ecology and history with humans for over 400.000 years (Clutton-Brock, 1995).

Over time, dogs became an increasingly important part of the human's live, be it as an assistant in herding and hunting (Naderi et al., 2001), as a social supporter (Allen, 1991; Friedmann, 1995; Kotrschal, 2009; Kotrschal & Ortbauer, 2003; Wedl, 2009) or as a helper for disabled or blind people (Johnston, 1990), etc. Indeed, the relationships between dogs and humans, and the function of such relationships, may vary widely between cultures and dyads (Hart, 1995). Dogs can act as social supporters, as close friends, as companions for shared activities but also "just" as an animal which happens to live in the same household.

A number of studies revealed that dogs are good at communicating with humans. For example dogs seek contact to humans, if confronted with an unsolvable problem (Miklosi et al., 2003). Topál et al. (1997) showed that simple problem solving in the dog is strongly influenced by the relationship between the dog and the owner. Looking at each other and holding eye contact is an important cue when it comes to communication. Nagasawa (2009) measured urinary oxytocin concentrations of owners before and after interactions with their dogs. They found out that the gaze of dog's increase the urinary oxytocin levels of owners as an expression of attachment behaviour. Using the human as a communication partner and as a facility to perform tasks might be a consequence of the domestication

process (Hare et al., 2002). Some dog-human dyads perform in a highly coordinated way, according to complex tasks, whereas in others, dogs may not even react, when they were called by their owners. The question is which factors are mainly responsible for such relational and interactional differences. A study by Kotrschal et al. (2009) about the relationship between human personality and the performance of dog-human dyads, showed that dog owners who scored highly in neuroticism (according to Neo-FFI), considered their dogs as social supporters and they spent much time with them, but the dyads were less successful in solving a practical task than owners who scored high in extraversion (according to Neo-FFI) and who considered their dogs as companions for shared activities.

3.2 Leash walks in order to test cooperation in human-dog dyads

Auer (2009) found, that the cooperative performance of socialized wolves is influenced by the familiarity to their cooperating partner. Topál et al. (1997) examined, whether dog – human relationships affect problem solving in dogs. They presumed that, poor performances of dogs in problem solving tasks are not due to their cognitive abilities but because of the inherited tendency of dogs to act socially dependently. In accordance with this hypothesis, the more socialized a dog (defined in terms of its fitting into the family structure and the attachment to a certain person), the more likely it is to behave like a member of a social bond. Behaviour problems in dogs arise from poor dog-human relationships rather than from poor obedience training (Voith et al., 1992). Further it is known, that the development of complex human-animal relationships will depend, at least in part, on the mode and intensity of attachment (Bowlby, 1999).

Cooperation can be defined as "individuals acting together to achieve a common goal" (Boesch and Boesch, 1989). Naderi et al. (2001) supposed that co-operative behaviour is an inherited trait in dogs and that it might be an important contributing factor in the development of successful guide dog performance. They studied co-operation behaviour in dogs, when leading a blind person and found out that the initiation of an action alternates continuously between the two partners. In fact, a leash walk is a complex cooperative action, because due to the leash, human and dogs are forced to work together and also the leash may be considered as an

instrument of communication. My study was pioneered by Margit Auer (2009), who did leash walks with the first four of the hand raised wolves at the Wolf Science Centre in Ernstbrunn, in order to investigate the cooperation between wolves and their hand raisers (Auer, 2009). A walk on the leash would also follow the three criteria of cooperation, defined by Naderi et al. (2001), based on definitions by Boesch and Boesch (1989) and Chalmeau and Gallo (1996):

- Congruence as a term to describe, whether individuals perform any behaviour similar or dissimilar. → Regarding the leash walk, our individuals perform actions similarly.

- Synchrony as a term to characterize the timing of the actions, if they are performed in parallel or sequentially. → Regarding the leash walks, the actions are performed in parallel.

- Spatial coordination to specify whether the individuals act together in close spatial proximity (homospheric) or if individuals depart and act independently (heterospheric). →The individuals of our study act together in spatial proximity, depending on the length of the leash (Auer, 2009).

Cooperative performance during a leash walk can be measured by a number of parameters, for example in the domain of communication. For example, we measured the amount of time and the frequency the walkers spoke, or did not speak with the dog. In order to get information about the distribution of leadership in the human – dog dyad, we observed which individual walked in front. A leadership conflict was noticed when the walk came to a stop due to incongruence in behaviour. The leash may be seen as a tool for the walker to make sure that the dog cannot escape, but also as a tool for enforcement and communication and also to provide some support and safety to the dog. A strained leash is caused by dyadic asymmetry between walker and dog, indicating a conflict. Other parameters considered, were the orientation of the head and the eyes of the dog as well as of the human, locomotion of both of the individuals and who initiated an interaction.

3.3 Hypotheses

My study featured 18 pet dogs, which did walks on the leash together with their owner, a familiar person and a total stranger to the dog. As in the case of the former study, I wanted to investigate the effect of the personality of humans and the intensity of contact on cooperation tasks. Further I examined, whether there are differences in the cooperation behaviour, according to the sex of the human and the dog.

Based on previous results (above), my main hypothesis is that there should be a relationship between the outcomes of a cooperative task, as in this case a walk on the leash and the amount of time the three walkers spent with the dog. This was used as an indicator for the intensity of contact. Therefore, we predict that the dog should behave more cooperatively during the walk on the leash, when it is with its owner than with just a known or even an unknown person.

Because personality of the owner was found to play an important role in influencing the relationship between human and dogs (O' Farrell, 1997; Kotrschal et al., 2009; Schöberl, 2009; Wedl and Kotrschal, 2009; Aliabadi, 2010; Wedl et al., 2010), my second hypothesis is that in parallel with the previous studies we expect an influence of human personality on the cooperation behaviour of human – dog dyads, with neuroticism and extraversion (Neo-FFI) being particularly important.

My third hypothesis focuses on the sex/gender differences in dogs as well as in humans. There are already data indicating that human-dog interactions are affected by human gender and dog sex (Wells & Hepper, 1999). Women in general tend to be more emphatic and socially interested than men (Ray, 1982; Rost & Hartmann, 1994; Prato-Previde et al., 2006). Some studies also suggest that women will talk more and will have more interactions with their dogs, while male owners will try to be fast at doing the required action and will not spent much time communicating with their dogs (reviewed in Hart, 1995; Prato-Previde et al. 2006). Therefore, we predict some differences in the interactions female and male owners may have with their male and female dogs and that the dogs may be sensitive to the walker's gender.

4 METHODS

This study was conducted at the Wolf Science Centre, positioned in the game park of Ernstbrunn (Lower Austria). The dogs used for this study, were 18 pet dogs, which are all living in households in the immediate vicinity and which took part voluntarily on this study together with their owners.

4.1 Subjects

This study is based on 18 dogs and 28 humans (twelve female and six male dogs as well as twenty-two female and six male walkers) who volunteered to participate in this experiment. The subjects were recruited by mail, by announcements in newspapers and on the internet and by postings, which I posted at locations near the game park, in Ernstbrunn and Steinbach. A data file with contact information's of owners and their dogs, used by the clever dog lab at the University of Vienna, served as basis for the search for possible volunteers for my study. All of the participated dogs were not castrated, but we imposed no restrictions regarding the breed or the sex of the animal. The dogs ranged from eleven month to five years of age (by the time they did the walks). We had eight border collies, two westland terriers, two huskies, one golden retriever, one miniature pinscher, one eurasier and three mongrels in our study (Table 1). The human participants ranged between 14 to 67 years of age.

DOG	SEX	AGE (in years)	BREED
Alika	Female	1,5	Mongrel
Becky	Female	5	Border collie
Chloe	Female	0,11	Westland terrier
Dakota	Female	5	Husky
Faye	Female	1	Border collie
Forest	Male	5	Husky
Hancoc	Male	1	Golden retriever

Idefix	Female	1,5	Westland terrier
Luke	Male	6	Boarder collie
Luna	Female	5	Eurasier
Mena	Female	1	Border collie
Merlin	Male	1	Boarder collie
Miley	Female	2	Boarder collie
Nanuk	Female	5	Mongrel
Shila	Female	5	Mongrel
Tiffany	Female	2	Miniature pinscher
Ultimo	Male	1	Boarder collie
Winnie	Male	1	Boarder collie

Table 1: Participating dogs

Each of the dogs had to do a walk with his/her owner, a familiar person for the dog and a total stranger. Usually the familiar person for the dog was a friend of the family who spent a lot of time with the dog and who was known by the dog very well but who was not living in the same household as the dog. Just in one out of eighteen cases the familiar person was living in the same household as the dog (Table 2).

Dogs	Familiar Person
Alika	Friend
Becky	Friend
Chloe	Gandfather
Dakota	Friend
Faye	Husband
Forest	Good sister
Hancoc	Friend
Idefix	Friend
Luke	Friend
Luna	Friend
Mena	Workmate
Merlin	Mother

Miley	Boyfriend
Nanuk	Sister
Shila	Sister
Tiffany	Friend
Ultimo	Friend
Winnie	Breeder

Table 2 shows the relationship between the owner of the dog and the familiar person.

Four different subjects played the role of the stranger to the dog. Three of the four strangers were students of the Wolf Science Centre in Ernstbrunn and the fourth one was the owner of one of the participating dogs (Table 3). A strange person was defined as someone who never had seen the dog before. Some of the human participants walked with two or more different dogs, one time as owner of the dog, another time as friend for another dog. Only one of the participants walked with two different dogs as owner (Table 3).

DOGS	OWNER (O)	FRIEND (F)	STRANGER (S)
Faye (f)	Of = Fw	Ff	Sf_1
Winnie (w)	Ow	Fw = Of	Sf_1
Ultimo (u)	Ou	Fu	Sf_1
Mena (m)	Om	Fm	Sf_2
Merlin (mer)	Omer	Fmer	Sf_2
Alika (a)	Oa	Fa	Sf_4 = Oi = Oc =Fh
Hancoc (h)	Oh = Fi	Fh = Oi =Oc =Sa_4	Sf_1
Idefix (i)	Oi = Fh =Oc =Sa_4	Fi = Oh	Sf_1
Chloe (c)	Oc = Oi = Fh= Sa_4	Fc	Sf_2
Becky (b)	Ob = Fl	Fb = Ow	Sf_2
Luke (l)	Ol = Fb	Fl =Ob	Sf_2
Dakota (d)	Od = Flun	Fd = Olun	Sf_2
Luna (lun)	Olun = Fd	Flun = Od	Sf_2
Tiffany (t)	Ot	Ft	Sf_2
Miley (mi)	Omi	Fmi	Sf_3
Forest (fo)	Ofo	Ffo = Fn = Os	Sf_3

| Shila (s) | Os =Ffo = Fn | Fs = On | Sf_3 |
| Nanuk (n) | On = Fs | Fn = Ffo = Os | Sf_3 |

Table 3: Dyads: 18 dogs; 28 different walkers: 7 walkers act as owner for one dog and as friend for another dog, 1 walker act onetime as Owner, and two times as friend; 1 walker act two times as owner, one time as friend and one time as stranger.

In order to test the cooperative behaviour of human-dog dyads, a standardized walk was designed. This standardized walk was located at the game park in Ernstbrunn at two different sites, to balance the potential influence of local conditions. Besides, all variables that might influence the walk performance were protocolled. This procedure was used already before, to test the cooperation behaviour of human-wolf dyads (Auer, 2009). For this, the hand raisers of the wolves did three walks with each wolf on three places. None of the animals should have more than one walk per day. A counterbalanced schedule made sure, that each animal got only one walk per day and that none of the animals walked the same track twice in a row. These measures counterbalanced habituation effects.

In my study with pet dogs, conditions were a bit different, due to the fact that the owners do not live near the game park and therefore could not come so often. Each of the pet dogs was scheduled to do two walks on two different tracks with each of the three walkers (owner, familiar person and stranger). The owner of the dog, the friend and the dog came twice to do the walks in Ernstbrunn. For the first appointment, the dog had to do six different walks (two walks with each of the three walkers at two different sides). For the second meeting, the procedure was the same, so in the end each dog had twelve walks in total. Due to logistic straits, six dogs and their owners only made one appointment (six walks in total) (Table 4).

DOGS	Street down (Track1)	House (Track 2)	Walks in Total
Alika	6	6	**12**
Chloe	6	6	**12**
Dakota	6	6	**12**
Faye	6	6	**12**

Hancoc	6	6	**12**
Idefix	6	6	**12**
Luna	6	6	**12**
Mena	6	6	**12**
Merlin	6	6	**12**
Miley	6	6	**12**
Ultimo	6	6	**12**
Winnie	6	6	**12**
Becky	3	3	**6**
Forest	3	3	**6**
Luke	3	3	**6**
Nanuk	3	3	**6**
Shila	3	3	**6**
Tiffani	3	3	**6**

Table 4: Number of walks for each dog: three walkers * two times the same path = six; three walkers * one time the same path = three.

4.2.1 Standardized walk

Each track was 80m long and was marked by four colour painted wooden poles. Two red poles marked the beginning and the end of the walk. In between there was one green and one blue stick. During the walk, the dogs had to do some requested commands. The dyad began to walk at one red stick, when they passed the green stick, they did the exercise "sit", then they went on till they reached the second red wooden stick which marked the end of the walk and then they dyad turned. When they passed the blue stick, the dogs should have done the exercise "down", and then they went on until they reached the first red wooden stick and then they repeated the whole procedure for a second time (Figure 1). Each of the participated walkers received an information sheet with the exact instructions for the procedure (Appendix A). The walkers were asked, not to speak to the camerawomen, not to act in a special way and walk as usual and not to aim at a "perfect" performance. There was no time limit and rewarding with dry food during the whole time of the walk was allowed *ad libitum*.
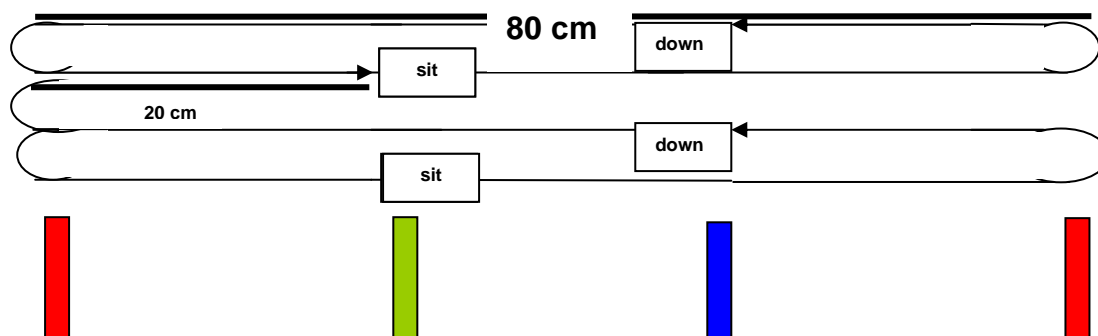
Fig. 1: Outline of the walk. The red colour poles marked the beginning of the walk, the end and where the dyad had to turn. At the green marking, the dog had to do the exercise "sit", at the blue marking it had to do the exercise "lie down". The distance between two markings was 20 cm, the whole distance between the two red markings was 80 cm.

All of the walks were done with the same long leash (ten meters), but the walkers were free to use the leash in any way they wanted.

The dyad was asked to do the exercises "sit" and "down". Basically all of the participating dogs were able to do both exercises. Walkers did verbal or hand commands to complete the exercises, some of them did both. The exercises were considered as successful, as soon as the dog sat down/lied down after the walkers command.

4.2.2 Recording the walk

Each walk was videotaped by me with a Sony handy cam, which was positioned in the middle of the route, two to four meters aside of the track. A dictaphone and a microphone were used by the walker, who had to carry these during the walks for recording the voices. For each walk, the following parameters were protocolled: date, time of the day, the number of the walk, the name of the walker and the name of the dog, which track was used, how the weather was during the walk, if anybody not involved in the study accompanied the walk and comments about special events, which might have happened.

4.2.3 Time period

The walks were done from January to June 2011. Because of the videotaping, walking was only possible in adequate daylight. To avoid disturbance as much as possible, the walks were scheduled at times when the game park was closed (during the winter season, the game park only opened on the weekends from 10 am to 4 pm; during summer season the park was open every day, except Monday from 9 am to 5 pm) or when there was a very low visitor frequency (early in the morning or on weekdays). One of the two tracks was in front of the WSC house, where no visitors were allowed. For this track, we made sure, that no dog or any other factors that might disturb the walk were present during walking.

To provide equal conditions for each subject and to avoid the dogs of getting bored walking always the same track, we varied walking at the two sides and we also varied the order of people walking with the dog. No walker walked two times with the dog in a row and we changed between the two sites as much as possible to avoid walking the same track two times in a row. Sometimes it happened, that two dogs were present on site at the same time (in these cases the owner of one dog was the friend of the other and vice versa). While one dog was walking the other dog was waiting some meters away, not visible for the walking dog.

The walkers, who were not in charge (for example when the owner was walking, the familiar person and the stranger had to wait), stood on one side of the street at the beginning of the walk (red marking). When we recognized, that the dog was distracted by the presence of the people, we asked them to keep some more distance, so that the walking dog was not able to see them any longer.

4.2.4 Additional requests for walkers

The walkers were all asked to fill in a NEO-FFI personality test for exploring walker's personality dimensions (McCrae & Costa, 1987; 1989; Appendix B).

For a better understanding of the evolution and the complexity of human personality, Thurstonewas the first during the 1930ies to suggest 5 categories, in order to describe the personality of dog owners: "Neuroticism", "Extraversion",

"Openness", "Agreeableness" and "Conscientiousness". In 1999, a NEO-Five Factory Inventory (Neo-FFI) was produced by Costa and McCrae based on PCA on a number of attributes/features. This is a well established empirical approach, for exploring major and relevant human personality dimensions. Since then, this inventory is used by many research groups to study human personality of humans (Digman, 1996).

4.3 Observation

The software Adobe Premiere Pro CS5 was used for putting the video files together with the voice files. Behaviour coding was done with THE OBSERVER Video Pro® (Version 5.0; Noldus). For coding, we took the same configuration sheet, Margit Auer created for her study with the wolves (Auer, 2009), for the sake of comparability. The sheet included 10 behavioural classes (Appendix C). For testing the inter-observer reliability a second observer, not included in the study, coded six sample sequences of one minute each. The values of the two observers were compared and the showed over 87% agreements in duration (Cohen's Kappa: 87%) and 90% in frequency (Cohen's Kappa: 90%)

All behaviour coding was conducted by one person (M. Heszle) and therefore an intra-observation was done on six sample sequences of one minute each, before (Cohen's Kappa: 89% in duration and 87% in frequency) and after coding all videos (Cohen's Kappa: 90% in duration and 92% in frequency).

4.4 Data preparation

In total we recorded 180 walks with 54 different dog-human dyads (Eighteen dogs * three different walkers). Each of the dogs did at least two different walks with each of the three different walkers, so we had 108 walks in different conditions. Six of the dogs just did one run, the other twelve dogs came twice to do a second run (the same conditions were set as we used for the first run). Six out of the 180 walks were incomplete. In five out of six walks, the walker broke off the walk because the dog did not want to move on. In one case there was a problem with the camera and only half of the walk was recorded. Only one dog (Nanuk; Table 1)

had two incomplete walks, the other four dogs had only one incomplete walk. For statistical analyses 174 complete walks were used. The data set was prepared with MS Excel 2003. For measuring the walk variables we took the total number of events happened and the total duration in percent.

4.5 Statistical analysis

We calculated a linear mixed effect model to investigate the influence of the walker, his/her personality traits, age and sex of the dog, sex of the walker, number of trial (first or second time of a walk), route, time of day, and weather, on the relative duration of a certain behaviour. The individual dog, its breed and the walker were involved in the model as random factor. Furthermore, the total frequencies of behaviours was analysed with a non-linear mixed effect model using a poisson distribution. In this model the influences of the walker, its personality traits, age and sex of the dog, sex of the walker, number of trial (first or second time of a walk), route, time of day, and weather were analysed, whereas the individual, its breed and the walker were involved in the model as random factor. Some behavioural traits, such as "dog pee", or "walker walk dog", did not occur frequently. Therefore, we were interested in finding factors that supports the incidence of such behavioural traits. Thus, we calculated a non-linear mixed effect model using a binomial distribution. We were using the same factors, described for the other models. To compare whether the personality traits of walkers differ between owner, stranger, and friend a Kruskal-Wallis test was calculated. The models were calculated with the program R 2.11.1 and the Kruskal-Wallis test with the program SPSS 18.0.

The 16 behavioural traits used for the statistical analysis were divided into two groups characterizing two important parameters for describing dyadic walk performance. The first group "cooperative behaviour" includes the use of the leash, the guidance behaviour and the calling behaviour of walkers. The second group describes the orientation towards the walking partner (Table 5).

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Cooperative Behaviour	Orientation behaviour
Strain at leash_initiated by the walker	Walker orient towards the dog tactile
Strain at leash_initiated by the dog	Walker not orientated towards the dog
Leash loose	Dog orientated towards the walker
Guide conflict	Dog explore
Walker stand_initiated by the dog	Dog run/jump
Call come	Distance between the dyad_more than 1 meter
Call name	
Call sit	
Call down	
Excercise sit_not successful	

Table 5 shows the variables used for the analysis, divided into cooperative and orientation behaviour.

5 RESULTS

5.1 The effect of the intensity of contact – differences between the three different walkers

5.1.1 Cooperative behaviour

We found an influence of the walker on the time the leash was strained during the walk (lme: t_{33}=5.981, p=0.006). The duration of walking with a strained leash was longer, when they walked with another person than the owner (lme: $t_{.33}$=-2.673, p=0.011). There was no difference between the strange person and the friend (lme: t_{33}=0.84, p=0.40) in that respect. Moreover the duration of walking with a loose leash was longer when dogs walked with owners than with friends or strangers (lme: t_{34}=5.181, p=<0,001). Dogs initiated more often a strained leash, when they walked with a friend or with a strange person than with the owner (nlme: t_{28}=3.619, p=0.001). No such difference was found between the stranger and the friend (nlme: t_{28}=0.28, p=0.78). The conflict over leadership lasted longer when the dog was with a stranger or a friend than with the owner (Fig. 2). "Sit" was more often successful when the owner issued the command, as compared to the stranger or the friend (nlme: t_{30}=-2.10, p=0.043).
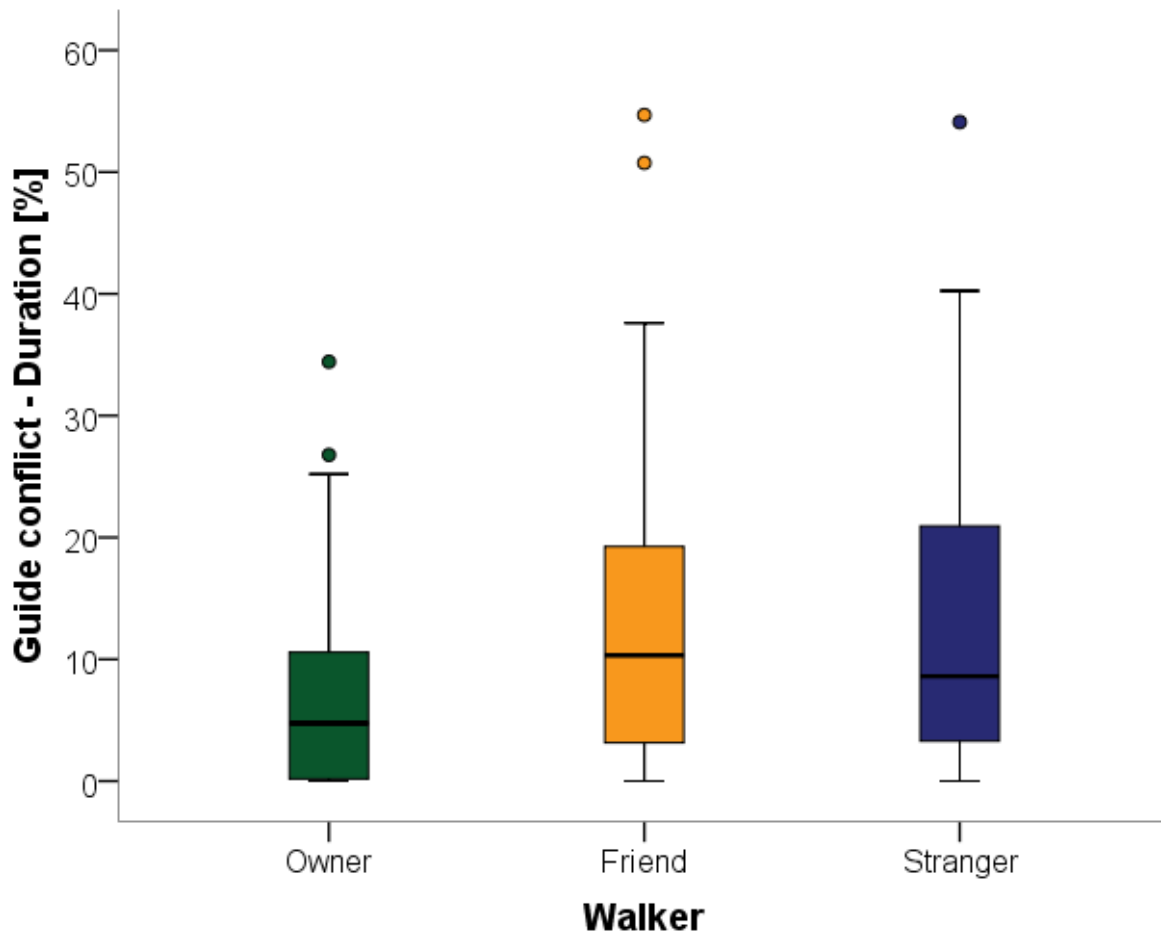
Figure 2 shows the duration of a leadership conflict (total duration in %) for all of the three walkers. The duration of guide conflict for the owner differs significantly in comparison to the friend and the stranger (lme: t_{33}=-2.526, p=0.016).

5.1.2 Orientation towards walking partner

Walkers differed in their tactile orientation (i.e. stroking or patting the dog during the walk) towards the dog (lme: t_{33}=5.091, p=0.012). Actually, the friend was orientated towards the dog the most, then the owner came and the strange person was at least orientated towards the dog in a tactile way (Figure 3). Actually, walking partners were coded "orientated towards the other one", when the head was in the direction of the partner. Actually, the stranger was also not orientated towards the dog for a longer periods of time than the friend or the owner (lme: t_{33}=3.474, p=0.002).
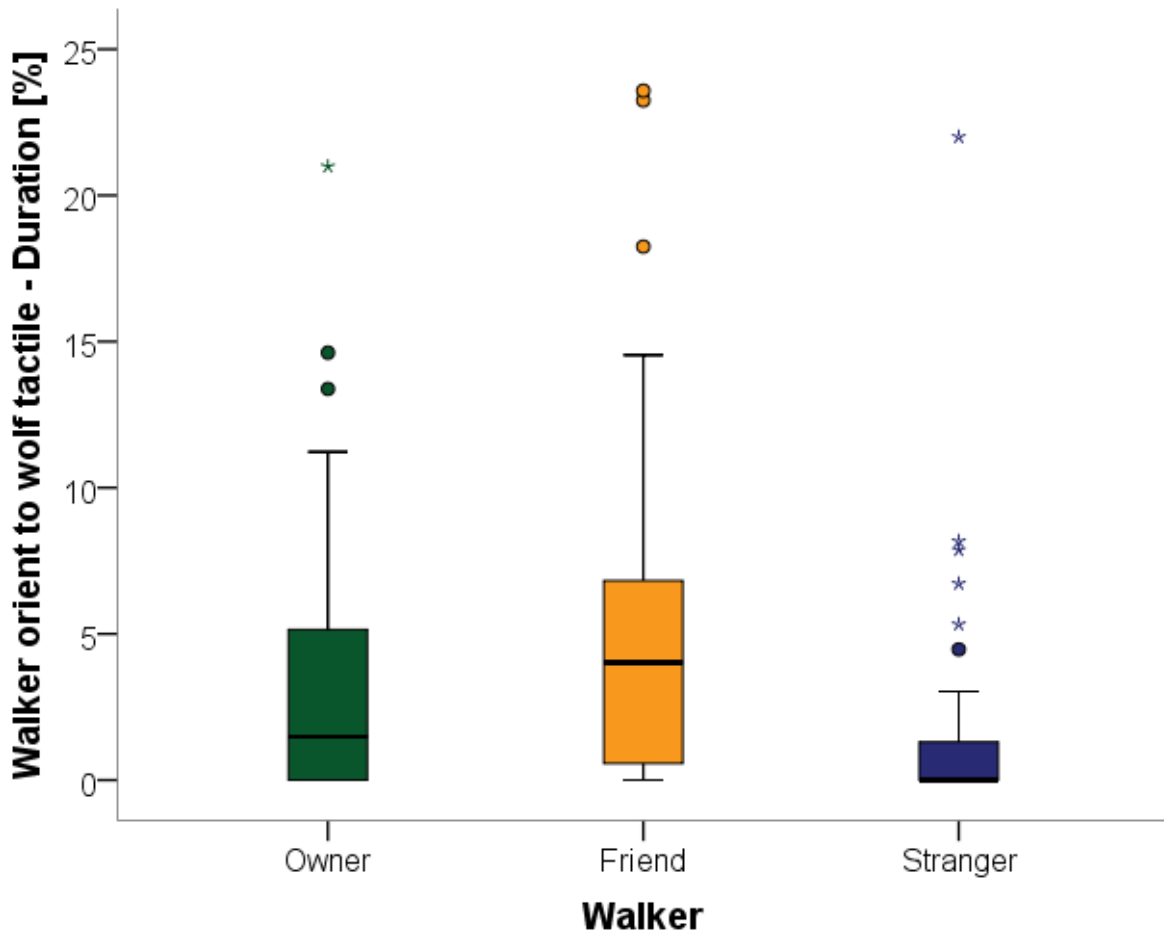
Figure 3 shows the orientation of walkers towards the dog (total duration in %) for all the three walkers. The stranger spent least time orientated towards the dog (lme: t_{33}=-3.189, p=0.003).

5.2 Effects of Owner Personality

We found no differences between the groups in any of the 5 NEO-FFI dimensions (Kruskal-wallis test: Neuroticism: Chi-Quadrat$_2$=0.08, p=0.96; Extraversion: Chi-Quadrat$_2$ = 1.84, p=0.40; Openness: Chi-Quadrat$_2$=0.23, p=0.89; Agreeableness: Chi-Quadrat$_2$=2.46, p=0.29; Conscientiousness: Chi-Quadrat$_2$=2.89, p=0.24).

5.2.1 Cooperative behaviour during the walk

Walkers high in extraversion (NEO-FFI dimension 2) and openness (NEO-FFI dimension 3) as well as walkers low in conscientiousness (NEO-FFI dimension 5) showed low frequencies of leadership conflicts (Figure 4). In the case of neuroticism (NEO-FFI dimension 1), we found no influence on the number of leadership conflicts. Dogs initiated less often a strained leash when they were with

walkers who scored high in extraversion (nlme: extraversion: t_{28}=-3.727, p=< 0.001), high in conscientiousness or agreeableness (conscientiousness: t_{28}=-2.104, p=0.045; agreeableness: t_{28}=2.026, p=0.052) than when with persons low in these dimensions. In contrast dogs who walked with partners high in neuroticism initiated more often a strained leash (nlme: t_{28}=2.910, p=0.007) than with persons low in this dimension. Also the walkers who scored high in neuroticism themselves, initiated more often a strained leash (nlme: t_{31}=3.178, p=0.003) than individuals low in this dimension.

The exercise "sit" was more successfully executed by walkers high in extraversion, in conscientiousness, in agreeableness and in openness (nlme: extraversion: t_{30}=-6.902, p=<0.001; conscientiousness: t_{30}=-5.407, p=<0.001; agreeableness: t_{30}=2.165, p=0.038; openness: t_{30}=-2.618, p=0.014) than by individuals low in these dimensions. Walkers high in extraversion did less often call "sit" (nlme: t_{29}=4.198281, p=<0.001), "come" (nlme: t_{31}=-2.972, p=0.006) or the dog's name (nlme: t_{35}= -2.468, p=0.019). In contrast, the higher people scored in neuroticism the more they called "come" during a walk (Figure 5). Walkers high in openness and in agreeableness did less often call "come" (nlme: openness: t_{31}=-3.290, p=0.003; agreeableness: t_{31}=-2.556, p=0.016) or "sit" (nlme: openness: t_{29}=3.063, p=0.005; agreeableness: t_{29}=2.768, p=0.010).
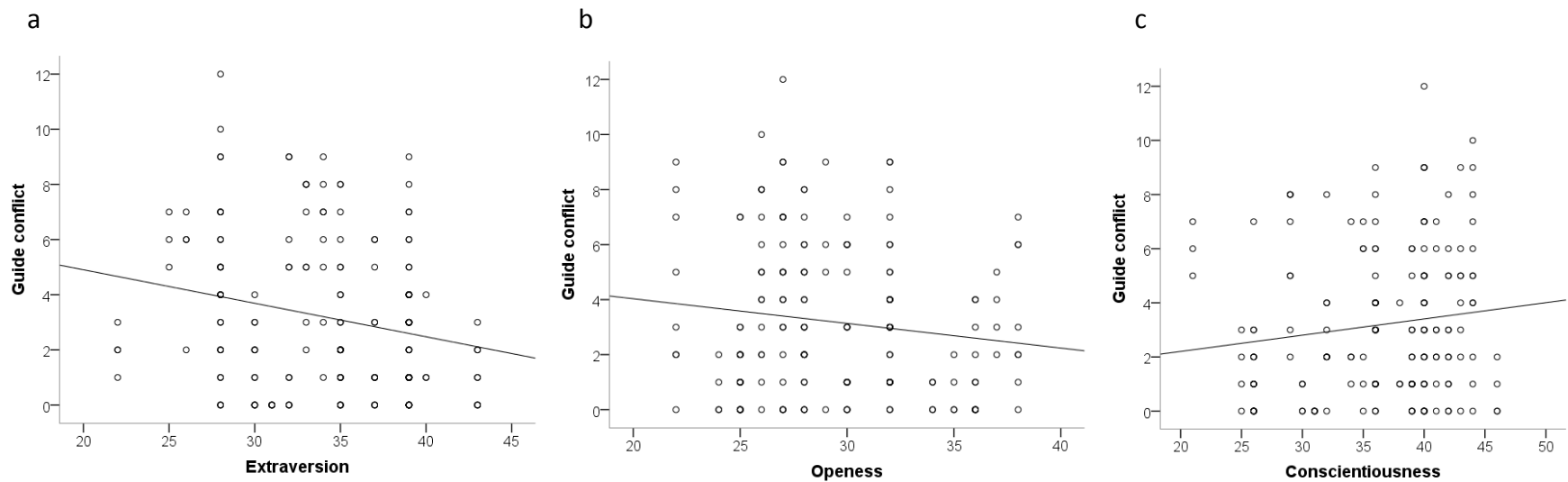
Figure 4 shows the influence of personality on guide conflicts during a walk. a: shows that walkers high in extraversion showed less conflicts (nlme: t_{27}= -2.590, p=0.016); b: walkers high in openness showed also less conflicts (nlme: t_{27}= -2.367, p=0.025); c: walkers high in conscientiousness showed more often conflicts during a walk (nlme:t_{27}=-2.180 p=0.038).

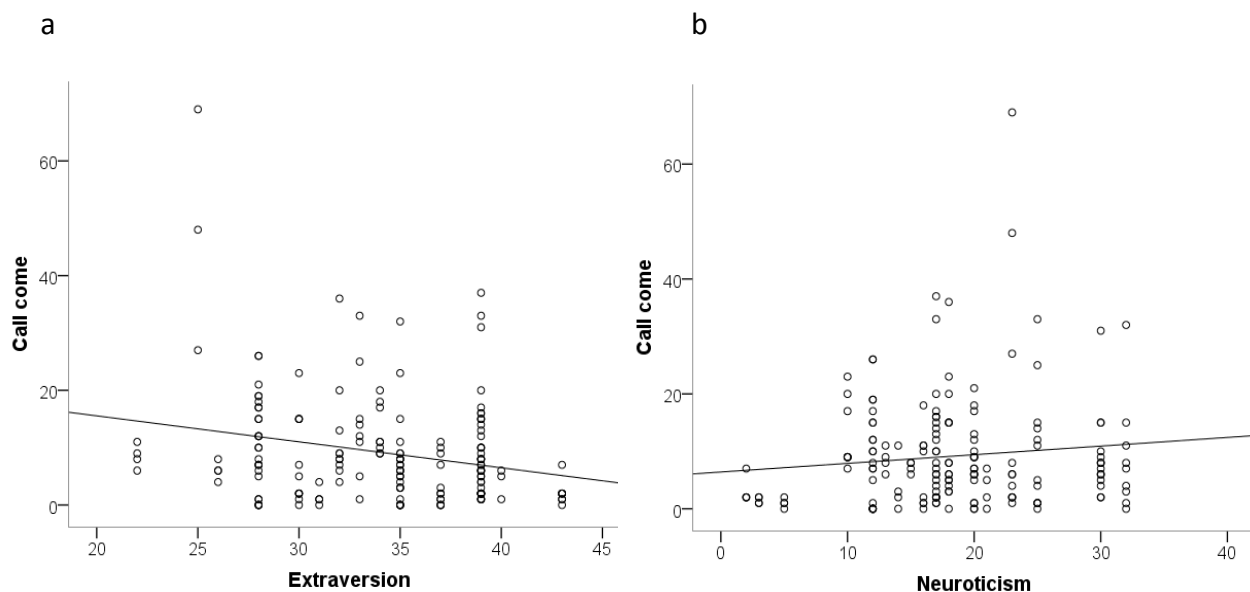a   b

Figure 5 shows the influence of a.): extraversion on the total number of calling "come". The higher the walker scored in extraversion the less often he called come (nlme: t_{31}=-2.972, p=0.006); b.): neuroticism on the total number of calling "come". The higher the walkers scored in neuroticism they more they called "come" (nlme: t_{31}=2.440, p=0.021).

5.2.2 Orientation towards walking partner

Walkers high in agreeableness and in conscientiousness were less often orientated towards the dog in a tactile way (lme: agreeableness: t_{24}=-4.235, p=<0.001; conscientiousness: t_{24}=5.165, p=<0.001), than persons low in these dimensions. Also, walkers high in neuroticism and in extraversion were more often touching the dog (lme: neuroticism: t_{24}=2.986, p=0.006; extraversion: t_{24}=3.249, p=0.003) than walkers low on these dimensions.

5.3 Effects of dog sex and owner gender

5.3.1 Cooperation behaviour and orientation towards the walking partner

5.3.1.1 Effects of dog sex

We found differences in the obedience of female and male dogs in response to the command "down" (nlme: t_{16}=-2.902, p=0.010): When walking with male dogs, walkers had to call less often "down" to succeed, than with female dogs. Moreover,

walkers initiated less often a strained leash when they walked with male dogs than with female dogs (nlme: t_{15}=-3.024, p=0.009). The time, the walker was not orientated towards the dog was shorter for male dogs than for female dogs (lme: t_{15}=-2.311, p=0.035). There was also a difference in the duration of explorative behaviour between female and male dogs (lme: t_{16}=9.799, p=0.007). Male dogs took significantly more time exploring during walks than female dogs did.

5.3.1.2 Effects of walker gender

Male walkers tend to call "sit" more often than female walkers (nlme: t_{29}=1.856, p=0.073). Also, male walkers tended to initiate more often a strained leash (nlme: t_{15}=-3.175, p=0.006) than female walkers did.

We did not find any effects of human gender on the orientation behaviour. We also did not find any interactions between owner's gender and the gender of dogs regarding cooperation behaviour or orientation behaviour.

5.4. Effects of food rewarding

We found no influence of the rate of food rewards on parameters characterizing cooperation (duration of a strained leash, number of initiating a strained leash, unsuccessful exercises, and guided conflicts). We also did not find any evidence, that dogs paid more attention towards the walker, when these had food in their hands.

But we found an influence on the duration of the walker's tactile orientation towards the dog (lme: t_{117}=-2.657, p=0.009) and on the duration walkers were not orientated towards the dog (lme: t_{119}=-1.970, p=0.051). The longer walkers had food in their hands, the shorter was the time, they touched the dog and the shorter was the duration of not being orientated towards the dog.

5.5 Effects of dog's age

We found that the older the dogs, the more often the walkers initiated a strained leash (nlme: t = 2.851, p=0.0121) and at the same time the more they called the dog's name (nlme: t_{16}=-2.735, p=0.015). And the older the dogs, the longer

walkers were not orientated towards the dog (lme: $t_{15}=2.617$, p=0.019). Moreover, the older the dogs, the less often they were orientated towards the walkers (nlme: $t_{15}=17.459$, p=0.001) and the longer they kept a distance of over 1 metre to the walker (lme: $t_{16}=2.962$, p=0.009).

5.6 Effects of second trial

We found no differences between the two trials with respect to the cooperative behaviour of the dyad. But we found a difference in the trials, with respect to the tactile orientation of the walkers towards the dogs. Walkers touched the dogs more in the second trial than in the first one (lme: $t_{117}=2.106$, p=0.037). Furthermore, in the first trial, the dogs ran and jumped much more, than they did in the second one (lme: $t_{117}=5.344$, p=0.023).

	Walker	Personality	Gender	Food rewards	Age	Trial
Strain at leash_initiated by the walker	✔	✔	✔	✖	✔	✖
Strain at leash_initiated by the dog	✔	✔	✖	✖	✖	✖
Leash loose	✔	✖	✖	✖	✖	✖
Guide conflict	✔	✔	✖	✖	✖	✖
Walker stand_initiated by the dog	✔	✖	✖	✖	✖	✖
Call come	✖	✔	✔	✖	✖	✖
Call name	✖	✔	✖	✖	✔	✖
Call sit	✖	✔	✖	✖	✖	✖
Call down	✖	✖	✔	✖	✖	✖
Excercise sit_not successful	✔	✔	✖	✖	✖	✖
Walker orient towards the dog tactile	✔	✔	✖	✖	✖	✔
Walker not orientated towards the dog	✔	✖	✔	✔	✔	✖
Dog orientated towards the walker	✖	✖	✖	✔	✔	✖
Dog explore	✖	✖	✔	✖	✖	✖
Dog run/jump	✖	✖	✖	✖	✖	✔
Distance between the dyad_ more than 1 meter	✖	✖	✖	✖	✔	✖

Table 6 shows whether the behavioural trait was significant for a certain parameter: ✔ ; p= < 0.05 or not significant: ✖: p = > 0.05.

6 DISCUSSION

The aim of this study was to investigate whether and to which extent the intensity of contact, the human-personality and the gender of the human and the animal affects cooperative performance in human-dog dyads. Although the interpretation of our results and the discussion should be done carefully, due to the relatively small sample size we had at our disposal for this study, we were able to build on previous studies and to contribute some interesting findings regarding the major parameters influencing human-dog relationships. In alignment with Auer (2009) our study showed, that familiarity benefits the cooperative behaviour of humans with their animals. In fact, the cooperation style of the dyads differed among the three groups of walkers, according to the amount of time they previously spent with the dogs and the social roles they play in their lives. Considering these results, we found a difference in the performance between the owners and the other walkers but interestingly there were no significant differences between friends and strangers. The findings by Topál et al. (1997) might support theses finding, showing that the more a dog is attached to a certain person, the more it is likely to behave like a member of a social group. Further it also confirms the statement that the development of complex human-animal relationships will depend on the nature and intensity of attachment (Bowlby, 1999). The friend of the dog used to be a good friend of the owner, who knew the dog well and saw it regularly (Table 2). We only found one case where the friend lived in the same household as the dog. To conclude these findings, it might be important for the dog, not only to know the person it walked with, but to be attached to it.

Concerning the orientation behaviour of walkers towards their dogs, strangers spent the shortest time touching the dog, whereas we did not find any difference between owners and friends. Furthermore strangers spent most of the time not looking at the dog, whereas owners and friends both paid more attention to the dog than the stranger. This suggests that the friends try to form some efficient relationship with the animal and therefore try to communicate with the dog and to pay attention to it. But to optimise

cooperative behaviour, this is not enough; in this direction it is important for the dog not only to be familiar with a person, but to be attached to her/him. Although strangers showed a less cooperative performance with the dog than owners, we did not find any indication of fear, avoidance or aggression of dogs towards strangers. This may indicate that dogs cooperate more readily with humans than wolves would do, even if they do not know them (comp. Auer, 2009). But further comparative testing is needed to confirm this idea. Human personality is an important factor influencing the nature of interaction between walkers and dogs. Its effect on dog-human relationship was already examined earlier (Kotrschal, 2009; Topál, 1997; Schöberl, 2009; Wedl, 2010). In fact, we found that the more neurotic an owner was the more tactile orientation he/she showed towards the dog and the more he/she tried to control the walk via a strained leash, this was also found by Aliabadi (2010). We also found that walkers high in extraversion and openness showed fewer leadership conflicts, than for example, walkers high in conscientiousness. The higher a walker scored in extraversion, in conscientiousness and in agreeableness, the less often the dog initiated a strained leash, but the other way for neuroticism. Also, walkers initiated more often a strained leash when high in neuroticism. Considering that dog-human dyads with people high in extraversion perform better in shared activities (Kotrschal et al., 2009), we may suggest that dogs in such dyads do not tend to take control over the walk by initiating a strained leash. These findings also coincide with the results by Margit Auer (2009) who also revealed that wolf walkers high in extraversion used the leash not as often as a tool for enforcement and they tended to guide less during a walk.

Neurotic owners have a close attachment to their dogs and therefore, they touch their dogs a lot (Auer, 2009; Aliabadi 2010). In our study also, people high in neuroticism touched their dogs more often than people low in this dimension, or people who scored high in agreeableness or in conscientiousness. Aliabadi (2010) found that owners high in neuroticism talked more in order to control the cooperative task. This we did not find, however, walkers high in neuroticism uttered "come" more often than walkers high in extraversion, openness or agreeableness did. This may support earlier findings that people high in neuroticism see their dogs as social

supporters rather than as buddies in shared activities (Kotrschal et al., 2009) and therefore, such walkers showed less control over their dog's despite their attempt to keep acoustic contact. Along these lines, walkers high in extraversion used the command "sit" sparingly and still were pretty more successful in making the dog comply. In contrast with Kotrschal et al. (2009) we did not find any interaction between gender of owners and dogs regarding cooperation behaviour or orientation behaviour. However, interpretation of our gender results suffers from small sample size and the fact, that we only had six male, but twelve female dogs and twenty-two female but only six male walkers in our study. In alignment with Aliabadi (2010), we found out that male owners exerted their control more by holding their dogs and therefore initiated a strained leash more often, than female walkers did. But in contrast to Aliabadi (2010) we found that walkers initiated a strained leash less often when walking with a male than a female dog. The command "sit" was uttered less often when walking with a male dog and the time, a walker was not orientated towards the dog was shorter for male dogs. Looking at these results, they might suggest, that male dogs cooperated more readily with the walker than female dogs did, but once again further studies with a bigger sample size would be necessary to prove these findings. Our results did not show any surprising outcomes concerning the influence of food rewards on a cooperative task. But we found an influence of food rewards on the duration of walkers touching the dog and on the duration walkers were not orientated towards the dog. The longer a walker had food in his hands, the shorter he was orientated towards the dog tactile and the shorter was the time period, he was not orientated towards the dog. This may suggest that walkers with food in their hands weren't able to touch the dog, but were focused on a good performance and therefore, tried to be more orientated towards the dog. However, we did not find any correlation between the rate of food reward and parameters characterizing the cooperative behaviour. Moreover, we did not find any hints that dogs paid more attention towards walkers who longer held food in their hands. Unlike in Margit Auer's study (2009), where she investigated the cooperative behaviour of human-wolf dyads, the walkers in the current study did not stringently need food for completing the walk and the exercises. The wolves from the Wolf Science

Centre in Ernstbrunn, used for the study of Margit Auer, are trained to cooperate with humans by being rewarded with food. Therefore the food reward is a more integrative part of their cooperative action (Auer, 2009).

Our results also revealed that the older a dog was, the more often the walker initiated a strained leash and the more often the walker called the dog's name and the less often they were orientated towards the walker. This suggests a decrease of cooperative behaviour in older dogs.

Twelve out of eighteen dogs were able to participate two times. As to the cooperative behaviour of the dog-human dyad, we found no differences between the two trials. But we did find that in the first trial, the dogs ran and jumped much more, than they did in the second one. This may not be surprising, due to the fact, that in the first trial, everything was new for them, but in the second trial they were already acquainted with the situation and therefore they were not interested anymore in running and exploring the area. But this is a clear indication that dogs in such walking projects show quick and distinct serial effects. Also the walker touched the dog more in the second trial, than in the first one. Hence both may have been more relaxed in the second walk, or the walker responded to the more relaxed behaviour of the dog. In any case, he/she was able to focus more on the dog during the second walk.

To conclude, our hypotheses and expectations on which this project was based were met. The cooperative interactions in a human-dog dyad indeed depend on the attachment and the intensity of contact between human and dog, on the personality of the owner and on human gender and dog sex. My findings may also provide the base for a better understanding of human-dog relationships and may help trainers to focus on a more systemic, i.e. dyadic approach in individual owner-dog training.

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8 APPENDICES

8.1 Appendix A: Handout for doing standardized 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.
  ✓ The order and place (look after coloured poles) of the practices have to be considered (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) Also the spoken words are important for the analysis. Thus each wolf-walker gets a dictaphone and a small microphone with a short introduction about the handling. Afterwards we leash the wolves. From the enclosure to the beginning of the walk it takes about 10 minutes. I will antedate with the camera to be timely at my position. The red pole marks the beginning of the standardised walk. (**Important**: Switch on the recorder!). You walk until the green pole. There you do the first practice "sit". You walk on, pass the blue poles and turn at the red pole. Back at the blue pole you do the second practices "down" and walk on. Pass the green pole and turn at the red pole. Now you repeat this once again: do the practice three "sit" at the green pole, walk on, pass the blue and turn at the red pole. At the blue pole you do the

practice four "down" and walk on pass the green pole and when you pass the red pole the standardised walk is finished.

One cycle needs about 7 to 10 minutes.

6) 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.

7) Further

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

8.2 Appendix B: 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, wenn Sie der Aussage auf keinen Fall zustimmen oder sie für völlig unzutreffend halten. .... ◯◯◯◯◯
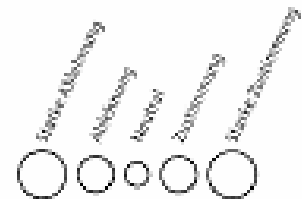
Ablehnung, wenn Sie der Aussage eher nicht zustimmen oder sie für unzutreffend halten. .... ◯◯◯◯◯

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.	○	○	○	○	○

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. .... ○ ○ ○ ○ ○

Scale headers (rotated): 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					

8.3 Appendix C: Configuration

Behavioral   Class   1:

leash

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
strain at leash	ls	walker or dog strains at the leash	State	initiator	direction
leash tight soft	lt	walker keeps leash tight without pulling	State		
leash loose	ll	walker keeps leash loose and it droops	State		
leash oos	lo	leash is out of sight	State		
leash unspecifie	lq	leash is not defined	State		

Behavioral   Class   2:

phases

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
walk/no exercise	pw	the walk starts when walker and dog 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. dog is sitting on command)	State		
exercise sit	ps	do exercise sit; start when walker speak the command or show the hand signal (hand up); end when dog does the exercise successful (as soon as the dog is sitting) or when	State	exercise success	

		walker break off			
exercise down	pd	do exercise down; start when walker speak the command or show the hand signal (hand down); end when dog does the exercise successful (as soon as the dog lies) or when walker break off; sometimes the walker starts this exercise with the exercise "sit"	State	exercise success	
exercise turn	pt	about-face at the red mark; start when walker initiate by turning, passing the red mark or calling the dog; end when both walk new direction	State		
extra exercises	px	walker does some extra exercises during the walk; start and end see exercise sit1	State	kind of exercise	exercise success
call close	pc	walker call the dog close for doing the exercises sit1, sit2, down1 or down2.	State		
meet stranger	pm	event occurs when walker or dog show the first reaction on strange park visitors (single or in a group),	Event		

		cars or other strange things.			
walk break off	pf	break off the walk	Event	brake off	
phases oos	po	walker and dog are out of sight	State		
phas unspecified	pq	phases is not defined	State		

Behavioral Class 3: postu/loc walker

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
stand still	cs	walker stands at one place and do not move, crouch, sit or lie; duration at least one second; inclusive scurry at the same spot	State	initiator	
crouch/lie/sit	cc	walker crouches, knees get strongly bend up or walker reclines on surface	State		
walk/go	cw	walker walks forwards, backwards or sidewards inclusive pauses between the steps of maximum one second	State	initiator	
run	cr	walker moves faster than walking; like jogging	State	initiator	
loco walker oos	co	walker is out of sight, not visible	State		
loco walker unsp	cq	posture or locomotion of the	State		

		walker is not defined			

Behavioral Class 4: posture/loc dog

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
stand	ms	dog stands at one place and do not sit, lie, explore or play; duration at least one second; inclusive scurry at the same spot	State	tail	
sit	mi	dog is sitting down on the surface and does not explore or play - except during sitting on command	State	command	
lie	ml	dog lie on the surface, not wallowing, exploring or playing - except during lie on command	State	command	
walk	mw	dogwalks slowly forward, sideward or backward; inclusive pauses between the steps of maximum one second and does not explore or play	State	tail	
run/trot/jump	mr	Dog move faster than walk and does not explore or play	State		

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
explore	me	dog plays with objects (no interaction with walker), in the snow is sniffing or wallowing in something, eating or chewing, not during lie or sit on command	State		
play with walker	ma	dog plays and interact with walker; dog at least shows interest for the manipulated object by the walker; not when lying or sitting on command	State		
pee	mp	urinate with its hind leg on the ground; not especially on an object	Event		
defecate	mf	evacuate solid waste	Event		
locomotion oos	mo	dog is out of sight, not visible	State		
loco dog unspec	mq	posture or locomotion of the dog is not defined	State		

Behavioral Class 5: orientati walker

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
or not to dog	on	the walkers head is not orientated to the dogs body	State		

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
orient to dog	of	the walkers head is orientated to the dogs body	State	kind walker orie	
walker orien oos	oo	the walkers head orientation is out of sight	State		
walker orie unsp	oq	orientation of the walker is not defined	State		

Behavioral Class 6: orientation dog

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
or not to walker	rn	The dogs head is not oriented to the walkers body	State		
orient to walker	rk	the dogs head is oriented to the walkers body	State		
dog orient oos	ro	the dogs head orientation is out of sight	State		
dog orient unsp	rq	the dogs orientation is not defined	State		

Behavioral Class 7: vocalisation walker

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
call dogs name	va	walker calls the dogs name	Event		
call sit	vs	walker calls "sit" as command	Event		
call down	vd	walker calls "down" as command	Event		
call come	vc	walker calls "come"	Event		
call foot	vt	walker calls "foot"	Event		

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
speak with dog	vf	walker speaks to dog; any kind of vokalisatoin (eg. whistle ...); with pauses in between not longer than one second	State		
speak with person	vp	walker speaks to persons or to him/herselfe; any kind of vokalisation (eg. whistle...); with pauses in between not longer than one second	State		
do not speak	vn	walker dose not speak anything	State		
do not hear	vh	the voice recording is too quiet too decide if the walker speaks or not	State		

Behavioral Class 8
leadership

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
guide walker	gk	dog walk/run behind or lateral the walker or does the exercises the walker wants to do (even standing next to the walker without showing interest for going on)	State		

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
guide dog route	gr	dog walks in front of the walker along the route	State		
gui dog leave r	gf	dog walks in front of the walker and the walker follows and leave the route	State		
guide conflict	gc	walker wants to go on along the route but the dog dose not come with him/her (waiting for the dog) or walker stops and dog wants to go on (calling the dog close)	State		
guidance oos	go	dog and/or walker are/is out of sight so that it is not possible to decide guidance	State		
guidance unspeci	gq	guidance is not defined	State		

**Behavioral Class 9:
distance**

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
less 1m	dl	distance between walker and dog is not more than one meter; so that the dog can easily be touched by the walker	State		
between 1m 3m	db	distance between walker and dog is	State		

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
		between one and three meters			
more than 3m	dm	distance between walker and dog is more than three meters; the walker is not possible to touch the dog	State		
distance oos	do	dog and/or walker is out of sight and its not possible to decide the distance	State		

Behavioral Class 10: feeding

Behavior Name	Code	Description	Type	Modifier 1	Modifier 2
food in hand	fh	walker has some dry food in his/her hand or just grab for some and the hand is in the pocket	State		
give food	fg	walker gives the dog dry food	State	take food	
no food in hand	fn	walker has no dry food in his/her hand	State		
feeding oos	fo	it is not visible if the walker has some dry food in his/her hand	State		
feeding unspecif	fq	feeding is not defined	State		

9 ACKNOWLEDGMENTS

CURRICULUM VITAE

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EDUCATION AND TRAINING

Since 10/2009 Master's study of Behavior, Neurobiology and cognition, University of Vienna

10/2006 – 09/2009 Bachelor of Science in Biology, University of Salzburg for nature and science

09/2002 – 07/2006 Federal higher economical institute for culture management; Steyr

09/2009 Internship at the KLF (Konrad Lorenz Forschungszentrum) in Grünau

WORK EXPERIENCE

Since 07-09/2004 Bildungszentrum St. Magdalena/ Linz (Receptionist)

08/2003 culture festival Gmunden/OÖ

07/2002– 09/2002 Animal Shelter; Steyr/Gleink

LANGUAGE SKILLS

	Understanding		Spoken Language		Writing
	Hearing	Reading	Interaction	Production	
English	C1	C1	B2	B2	B2
Italian	B1	B1	A2	A2	A2
French	A2	B1	A2	A2	A2

A2 Pre-Intermediate Level

B1 Intermediate Level

B2 Independent User

C1 Advanced Level

COMPUTER SKILLS

European computer driving license (ECDL)

Very good command of Microsoft OfficeTM tools (WordTM, ExcelTM and Power PointTM)

Basic knowledge of graphic design applications (PhotoshopTM); SPSS

SOCIAL SKILLS:

2000 – 2005 Youth leader in my hometown (St. Valentin)

INTERNATIONAL EXPERIENCES

English language course in Cornwall/England (08/2001)

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AUSBILDUNG

Seit 10/2009 Masterstudium Verhaltens- Neuro- und Kognitionsbiologie an der Universität Wien

10/2006 – 09/2009 Bachelorstudium der Biologie an der Universität Salzburg

09/2002 – 07/2006 HLW für Kultur und Kongressmanagement in Steyr

ERFAHRUNGEN und PRAKTIKA

Seit 07-09/2004 Bildungszentrum St. Magdalena/ Linz (als Rezeptionistin)

08/2003 Kulturfestival in Gmunden/OÖ

07/2002– 09/2002 Tierheim in Gleink/Steyr

09/2009 Praktikum am Konrad Lorenz Forschungsinstitut in Grünau

SPRACHKENNTNISSE

	Verstehen		**Sprechen**		**Schreiben**
	Hören	Lesen	Interaktion	Produktion	
Englisch	C1	C1	B2	B2	B2
Italienisch	B1	B1	A2	A2	A2
Französisch	A2	B1	A2	A2	A2

A2 Pre-Intermediate Level

B1 Intermediate Level

B2 Independent User

C1 Advanced Level

COMPUTER KENNTNISSE

Europäischer Computerführerschein (ECDL)

Sehr gutes Verständnis von Microsoft OfficeTM (WordTM, ExcelTM und
Power PointTM)

Basiswissen für das Statistikprogramm SPSS und für die Software
PhotoshopTM

SOZIALE KENNTNISSE

2000 – 2005 Jugendleiterin

INTERNATIONAL EXPERIENCES

 Englischsprachkurs in Cornwall/England (08/2001)