# The triangle of dog training:
# Association between the trainer and owner-dog interaction

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**Abstract**

Welfare issues in dogs are typically linked to their relationship with humans. A problematic owner-dog relationship, for example, can negatively influence the dog's affective state, especially due to the close bond between dogs and humans. Dog training is thought to support harmonious owner-dog interactions and a good relationship. However, not all dog trainings are effective. The aim of this study was to investigate a possible association between trainer behaviour and the owner-dog interaction during dog training. Behaviours of the trainer, owner and dog were analyzed using video recordings of training sessions. The analyses of the trainers were made using Video Interaction Guidance, a commonly used observation- and feedback method. Trainers' behaviours were categorized into didactics, organization and interaction. The analyses of the owners were based on communication towards the dog and that of the dogs on behaviours indicative of a positive or negative affective state. Furthermore, the owner's perception of the trainer was analyzed using the Questionnaire on Teacher Interaction, a worldwide used questionnaire that maps interpersonal behaviour according to Leary's Model. Results from statistical analyses showed two associations between behaviours of the trainer and owner-dog interactions. Trainers labelled as silent, were directly associated with owners labelled as kind to their dog and with dogs that were relaxed and obedient. Trainers labelled as indifferent, were associated with owners labelled as unkind to their dog and with dogs that were stressed and disobedient. Thus, owner-dog interactions that are not harmonious are more frequent during training sessions of trainers that act indifferent. This supports the idea that the trainer's attitude may influence the way owners and dogs interact. Surprisingly, no association was found between the owner's perception of the trainer and the owner-dog interaction. As a second way to analyze dog trainings, the methodology technography was used. This methodology investigated the use of skills from a social descriptive perspective and found three conclusions. Firstly, when aiming at harmonious owner-dog interactions, bodily demonstrations that are verbally explained as well are more effective than verbal explanation alone. Secondly, sufficient communication towards the owner is necessary to prevent giving the impression of being indifferent. Thirdly, the actual training situation is often different from the planned protocol and this results in tension. In the end, technography illustrated the importance of the trainer's bodily demonstrations, communication towards the owner and flexibility of the protocol. Concluding, this study showed that the trainer plays an important role during dog training and might be able to improve the owner-dog interaction.

Keywords: Dog training, Animal welfare, Human animal interaction, Education, Video Interaction Guidance, Teacher interaction, Technography

## 1. Introduction

Dogs are popular pet animals. The Netherlands currently has around 1.5 million dogs (Hogeschool HAS Den Bosch, 2011), with around 20% of the Dutch households owning a dog. In some cases, the owner-dog relationship is not optimal, causing animal welfare problems. Welfare problems for dogs can additionally cause societal issues, for example by excessive barking and aggression. One way of improving dog welfare is by improving the owner-dog relationship via dog training. To what degree dog training leads to the desired result of an improved owner-dog interaction and an enjoyable owner-dog relationship, likely depends on the trainer. However, the role of the trainer in the effect of dog training on the owner-dog relationship is largely unknown. Here the role of the trainer on owner-dog interactions is studied and the aim is to establish which training session factors contribute to an optimal owner-dog interaction during training. In this study, it is investigated if and how a dog trainer influences the interaction between owner and dog during training. The latter is assumed to affect the owner-dog relationship.

Dogs (*Canus familiaris)* originated from the gray wolf (*Canis lupus)* and were the first domesticated species. It is thought that (self) domestication started with some wolves losing their fear of humans and starting to live in proximity of humans (Coppinger and Coppinger, 2001). The major domestication step, when the wolf changed into a dog, happened around 15,000 years ago (Larson et al., 2012). It altered the wolf-like features into traits useful for living with humans (Miklósi and Topál, 2013). The second phase of domestication included a human guided selection process for docility, resulting in pronounced juvenile and social behaviour that made dogs suitable as companion animals (Stafford, 2006). During domestication, dogs have developed skills to communicate with humans. Dogs use humans' posture, eye contact and movements in their communication. They are able to gain information from their owner's face, indicating sensitivity to human facial expression (Racca et al., 2012). This way of communication is associated with a close emotional bond between owner and dog and of all domesticated animals, humans tend to have the strongest relationships with dogs. The close emotional bond is combined with a willingness of dogs to help humans, motivated by the will to work together even without a direct reward (Kaminski et al., 2011). The clearer the communication of a human towards a dog, the more helpful the dog will be. When trying to make a dog open a door, the dog will be more successful when a human gazes and points towards the key of the door, when compared to only giving commands. Ambiguous communication of the owner towards the dog creates incomprehension for the dog. This suggests that if a dog does not follow a command, it could be that the dog does not recognize the goal (Bräuer et al., 2013).

The relationship and interaction between owner and dog is assumingly important for a dog's welfare. Associations are shown between owner personality and the level of dog salivary cortisol. Extrovert owners were found to have dogs which had higher baseline cortisol values than dogs of neurotic owners (Kotrschal et al., 2009). However, what this means for a dog's welfare is not evident. Still, a disturbed owner-dog relationship assumingly contributes to welfare issues that occur in dogs (Jagoe and Serpell, 1996; Hiby et al., 2004; 2006; Houpt et al., 2007; Rooney et al., 2009; Stafford, 2012; Kwan and Bain, 2013). To prevent these issues, owner-dog interactions and relationships should be improved.

Animal welfare can be described using the framework of Fraser et al. (1997) (see Figure 1), comprising basic health and functioning, natural living and affective state. Today welfare is not only

about reducing negative affect, but about increasing positive affect as well (Farm Animal Welfare Council, 2009). Basic health and functioning is about the physical state of the dog. Natural living describes to what degree companion dogs are able to perform natural behaviours. Affective state describes motivations and feelings or emotions, i.e. subjective experiences. It is about suffering or in contrasts being comfortable, content or having pleasure (Fraser et al., 1997). The owner-dog relationship is well studied (Dwyer et al., 2006; Zilcha-Mano et al., 2011; McGreevy et al., 2012; Miklósi and Topál, 2013) and can influence welfare via all three aforementioned aspects. For example, the relationship can influence the owner's commitment for regularly walking the dog. Since by nature dogs require physical exercise, regular walking affects natural living but also basic health and functioning (Morrison et al., 2013). Also, being outdoors allows dogs to be active and explore, which leads to positive affect. Natural living and good health promote good welfare by facilitating positive affect and the latter may be considered the most determining aspect of welfare. Therefore, the focus of this study will be on the effect of the owner-dog interaction on the dog's affective state.

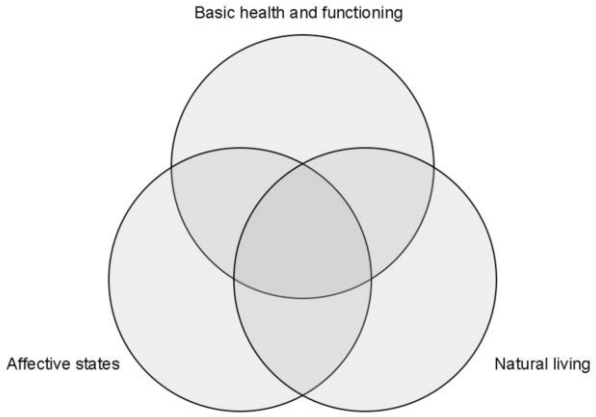


**Figure 1.** Three concepts defining animal welfare: basic health and functioning, natural living and affective state.
Source: Fraser (2008)

The relationship between owner and dog can affect the dog's affective state in several ways. Owners that enjoy a positive relationship with their dog will be less inclined to surrender their dog to a shelter (Curb et al., 2013; Kwan and Bain, 2013). Having a positive relationship will lead to more shared activities, since the owner is confident in taking a well-mannered and sociable dog along (Bennett and Rohlf, 2007). Besides that, when owners feel confident about their dog and its behaviour, they will be more likely to spend time and money on them. This will result in better welfare for the dog, since the dogs are more valued (Stafford, 2012). The other way around, time spent with the dog is a relevant variable to dog problem behaviour. Owners that spend more time with their dog, have dogs with less problem behaviour (Kobelt et al., 2003). This suggests that sharing activities can improve the owner-dog relationship. The owner-dog relationship can influence the dog's affective state in a negative way as evident from the high number of relinquished dogs. Approximately 25,000 dogs in the Netherlands are annually surrendered to shelters (Dierenbescherming, 2013). The most frequent reason for relinquishment is behavioural problems (Mondelli et al., 2004; Greenebaum, 2010; Kwan and Bain, 2013), which may either in part result from suboptimal owner-dog relationships and / or cause this. Kenneled dogs are likely to experience stress (Hiby et al., 2006; Dalla Villa et al., 2013), and the high number of relinquished dogs is

indicative of a significant welfare problem. Behavioural problems in itself are indicators of poor welfare, since chronic stress, meaning poor welfare, is known to cause behavioural problems (Beerda et al., 1999; Stafford, 2006), or abnormal behaviour. The high number of relinquished dogs shows that the owner-dog relationship is often not enjoyable for both owner and dog.

Direct influences of the relationship on the affective state of the dog arise from the way they interact and communicate. Dogs are able to use humans for social referencing, underlining the dogs' focus and dependency on humans. Dogs look at humans when presented with an insoluble task, indicating an appeal to human information. Besides that, the message received by social referencing is influenced by the tone of voice and facial expression. Dogs showed less fear of a strange object when owners behaved and talked in a positive way, compared to owners that behaved and talked in a negative way (Merola et al., 2012). Several 'Ainsworth's Strange Situation' experiments showed that presence of the owner leads to reduced stress in dogs when in a strange situation, which implies a dog's attachment to its owner (Palestrini et al., 2005; Palmer and Custance, 2008). Dogs working in the army showed less signs of impaired welfare when their handler spent more time with them (Lefebvre et al., 2007), indicating an owner effect on the dog's affective state. Grooming can be an important part of the interaction between owner and dog and it reduces the dog's heart rate (McGreevy et al., 2005). The relationship and interaction between owner and dog are based on owner's knowledge of learning theory and dog ethology (McGreevy et al., 2012). When the owner is able to improve the clarity and effectiveness of their interaction, this will improve the relationship. A factor that might support the owner-dog interaction is training.

**Dog training**

Nowadays many different training methods and techniques exist. Most pet dogs receive some rudimentary training (Hiby et al., 2004). Dog training might help to improve the interaction between owner and dog (Jagoe and Serpell, 1996; Kobelt et al., 2003; Bennett and Rohlf, 2007). Trainers are not only supposed to learn dogs certain behaviours, they also aim to educate owners. The goal of training is therefore directed to owners as well, which often surprises owners (Greenebaum, 2010). Dog training is generally considered as a requirement for a good relationship between owner and dog, resulting in better welfare for both, though scientific evidence for this is far from decisive. In some of the relevant studies neither a clear definition of training nor behaviour is stated. Typically, the duration and frequency of training are not mentioned and on top of that, problem behaviour as opposed to unwanted behaviour is often not specified. When linking the effect of training to behaviour, the kind of behaviour has to be clear. Voith et al. (1992) studied associations between four factors that are of interest to us, i.e. behavioural problems, spoiling the dog, anthropomorphism and obedience training. The results showed that dogs that followed obedience training did not show less behavioural problems. The study used self-reported information of the owners and suggests that obedience training does not necessarily result in a problem behaviour-free dog. Kutsumi et al. (2013) found that puppy training improves the dogs' responses to strangers and later on such dogs remained friendly to strangers. Besides this, by training pups, their response to commands improved. The dogs were evaluated using a behaviour test and the C-BARQ questionnaire. The study did not demonstrate effects of training on other behavioural problems, such as dog directed aggression. Another study showed that training increases calmness, trainability, boldness and social contact (Kubinyi et al., 2009). Higher scores for these personality traits were associated with less problem behaviour. Overall and Dunham (2002) studied obsessive-compulsive disorder (OCD) in dogs. They found that OCD is not

associated with a lack of training but suggest that genetics plays a significant role. Kwan and Bain (2013) studied differences between two groups of owners. One group of owners relinquished their dog to a certain shelter and the other group of owners used the same shelter when they went on holiday, but brought the dog back home afterwards. They found that relinquished dogs had attended training as often as the non-relinquished dogs, indicating that training does not reduce the risk of relinquishment. However, another study found that training did have a positive impact on the interaction between owner and dog, resulting in a reduced risk of relinquishment (Kobelt et al., 2003). This study also found that dogs obeyed commands better if they had attended trainings, compared to dogs that had not (Kobelt et al., 2003). Bennett and Rohlf (2007) used a questionnaire to study the relationship between training and problem behaviours and found that trained dogs showed less problem behaviours, supporting that engagement in training prevents problem behaviours. Concluding, there are several relevant studies with partly contradicting results. Possibly, not all trainings are equally effective in improving interactions and the relationship between owner and dog. Practice has learned that not all owners and dogs that attended training have a good relationship and to further clarify the effect of training on the owner-dog relationship, the role of the trainer on owner-dog interactions during training is studied.

**Video Interaction Guidance**

The trainer can influence many aspects of the training, for example the type and level of the exercises, but also the maximum number of dogs per training. Experience and knowledge of the trainer will influence the training outcome as well. When taking a closer look at the way of teaching, Video Interaction Guidance can be a useful tool. Video interaction guidance (VIG) is a method developed for enhancing feedback on communication between families and professionals (Fukkink and Tavecchio, 2010). It can also be used for in-depth studies of behaviour (Fukkink et al., 2011). It can be used in any situation to structure observations and make them more objective, resulting in useful feedback (Hayes et al., 2011; Tooten et al., 2012). Video fragments are taken in a daily context and specific behaviours are analyzed using specific protocols. The observed behaviours are specified as 'micro-behaviours' and are the smallest behavioural units that can be observed (Fukkink and Tavecchio, 2010), analogous to behaviour elements. When observing a teacher, micro-behaviours can be categorized into three categories, i.e. didactics, organization and interaction. The division between didactics, organization and interaction is commonly used (Stevens, 1997) and can be used to study a dog trainer as well. The categories help to clarify micro-behaviours and can explain their meanings. The category of micro-behaviour 'didactics' is describes the content of training and methods used. The category 'organization' tries to create the right conditions for learning. Time management, a schedule and structuring the training are aspects of the organization of the trainer. The category 'interaction' contains the interpersonal behaviour of the trainer to the owners (Heijkant et al., 2005). The category 'interaction' distinguishes five different aspects, i.e. being attentive, encouraging initiatives, receiving initiatives, attuned interaction and guiding (Heijkant and Wegen, 2000). These five aspects are the principles of attuned interaction and guidance (Kennedy, 2011). Although the use of the principles is demonstrated in secondary schools, all principles can be present in dog trainings as well to support the learning process. Being attentive includes looking at and listening carefully to the owner, resulting in understanding. The second aspect is encouraging initiatives, for example smiling and encouraging nodding. The third aspect, receiving initiatives, is about showing that the owner has been noticed, for example by returning eye contact and nodding. The fourth aspect is attuned interaction, by making and ending eye contact. The last concept is guiding, for example giving

help or instructions (Kennedy, 2011). The micro behaviours of the trainer will result in a certain owners' perception of the trainer. It is shown that students' perception of the teacher will influence the cognitive and affective outcomes of teaching (Brekelmans et al., 2002). When students perceived interpersonal teacher behaviour that was positive, their attitudes were found to be more positive and their achievement to be higher (Den Brok et al., 2004; Koul and Fisher, 2005). The perception can be described using Leary's model for Interpersonal Relations (Leary, 1957). This model is based on two dimensions, i.e. influence and proximity. The dimension of influence ranges on a scale from dominance to submission and the dimension of proximity ranges from opposition to cooperation. Wubbels et al. (1985) were the first to apply the model to the context of education. Although it is not shown in dog training yet, the learning process of dog owners likely is influenced in a similar way.

The relationship between owner and dog is important to dog welfare and suboptimal owner-dog interactions can result in welfare issues. Owner-dog interactions, and with that the relationship, may be improved by dog training. However, earlier scientific studies and laymen reports suggest that dog training does not always lead to the desired result of enjoyable interactions. To unravel how training can affect the owner-dog interaction, this study focuses on the role of the trainer (see Figure 2). To investigate this, micro-behaviours of the trainer are counted, together with behaviours of owners and dogs. There is existing knowledge about training dogs and about effective education, but the two are not often combined. Here, the owner's and trainer's perception of the trainer's interpersonal behaviour is analyzed. It is expected that there will be an association between certain trainer's micro-behaviours and owner-dog interactions. Sensitivity and responsivity are determining concepts for the success of education (Fukkink and Tavecchio, 2010). For that reason it is hypothesized that trainers scoring high on didactics, organization and interaction are associated with frequent and positive interactions between owner and dog. Verbally stimulating teachers will support their students (Fukkink et al., 2011), so the same is hypothesized for the interaction between owners and their dogs. The owner's perception is hypothesized to be an important dimension of the result of the training. Since it is shown that the student's perception of the classroom environment, including their perception of the teacher, is important for their performance (Gilbert et al., 2013), the same is hypothesized for dog training. Lastly, the methodology technography is introduced to investigate the association between trainers and the owner-dog interaction during dog training. The methodology technography is qualitative and descriptive, which is expected to highlight certain processes in training and explain some results from the statistical analysis.

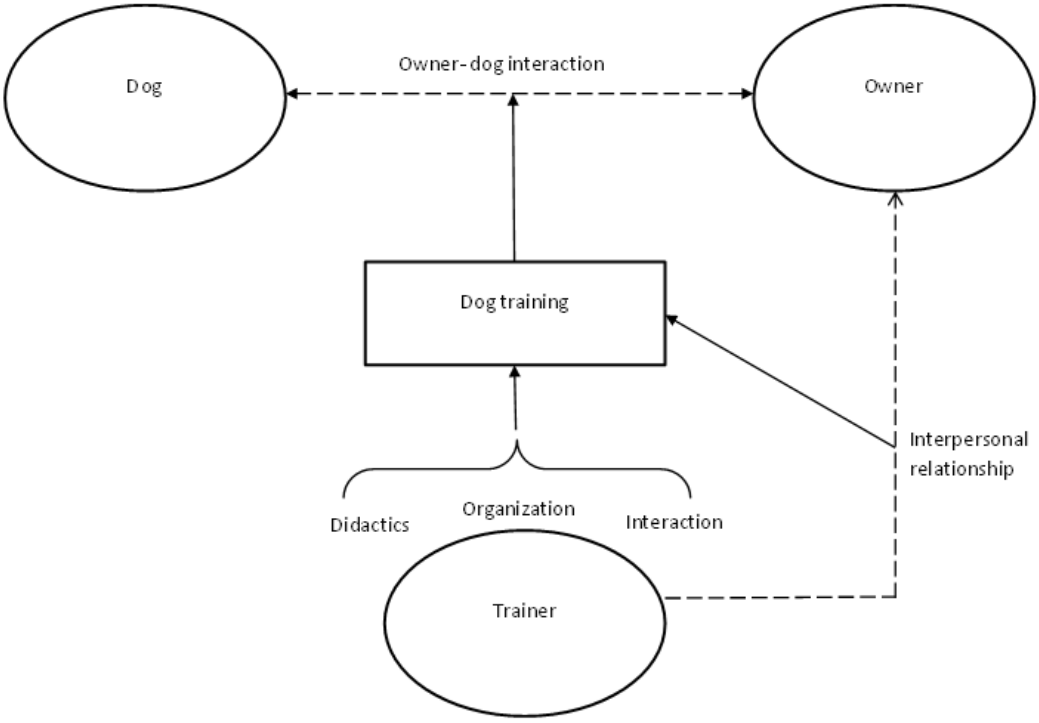


**Figure 2.** The triangle surrounding dog training: dog, owner and trainer. The continuous arrows indicate an effect and the dotted arrows indicate a connection. The interaction between owner and dog is influenced by training. The interpersonal relationship between owner and trainer influences the training. The trainer uses didactics, organization and interaction to guide the training.

## 2. Material and method

During visits to dog training schools, video recordings were made using a Sony Handycam model HDR-CX115E. Since the aim of the study was to investigate the association between trainers and owner-dog interaction, the goal was to film as many dog-owner-trainer combinations as possible, with a minimum of eight different combinations. Per training, at least one owner-dog combination was filmed. The requirements for using a specific dog-owner-trainer combination were that at least one owner-trainer interaction and at least one owner-dog interaction were filmed. Owner-trainer interactions without the accompanying owner-dog interactions were not used and vice versa. Owners filled out a questionnaire on their perception of the trainer. Trainers filled out the same questionnaire on how they believe the owners perceive them. After being observed and filling out the questionnaire, a small present was offered to the owners and to the trainers. The owners received a bag filled with dog snacks and the trainers received a bag filled with chocolate.

### *2.1. Subjects*

Twenty-seven different dog training schools in were contacted by e-mail (see appendix 12). All trainings schools were located in the south of the Netherlands and were active in dog training for companion dogs. The training methods of the schools were not taken into account when choosing to contact them, since this was not in the scope of the research. Out of 27 schools, twenty-one answered and nine agreed to take part in the research. In the months June, July and August of 2013, nine schools were visited during sixteen trainings. On these nine schools, twenty-one trainers, of

which five males and sixteen females, filled out the questionnaire and nineteen trainers were observed. Ninety-three dog owners, of which 22 males and 71 females, filled out the questionnaire and 78 owner-dog combinations were observed (see Table 1). Dog training schools, trainers and dog owners were coded to remain anonymous. After the study was completed, all dog schools that participated received an e-mail to thank them for their assistance and to inform them about the results (see appendix 13).

**Table 1.**
The number of trainers, owners and dogs that participated in the study, categorized for being filmed and for filling out the questionnaire.

| Dog training school | Trainers-group observed | Trainers-owner observed | Owner-dog observed | Trainers questionnaire | Owners questionnaire |
|---|---|---|---|---|---|
| A | 1 | 3 | 3 | 2 | 3 |
| B | 2 | 3 | 3 | 2 | 3 |
| C | 1 | 3 | 3 | 1 | 3 |
| D | 1 | 4 | 5 | 1 | 7 |
| E | 1 | 4 | 4 | 1 | 5 |
| F | 1 | 7 | 7 | 1 | 7 |
| G | 3 | 5 | 5 | 3 | 6 |
| H | 6 | 31 | 29 | 6 | 30 |
| I | 2 | 8 | 9 | 3 | 10 |
| J | 1 | 7 | 4 | 1 | 9 |

*2.2. Behavioural observations and analyses*

Video recordings were made during one hour lasting dog trainings. Three types of video fragments were made, i.e. the trainer towards the group of owners, the trainer towards an individual owner and the interaction between owner and dog. Before starting the recordings, permission of all trainers and owners was asked. Permission of the trainer was asked earlier via e-mail (see appendix 12) or via telephone contact. Permission of the owners was asked before the training or during the start of the training. This was done by the trainer or by the researcher. One owner did not want to be filmed. The aforementioned three types of fragments together resulted in approximately fifteen minutes of video fragments per training. This is a commonly used duration to analyze video fragments in education (Fukkink et al., 2011). For analyzing the three types of video fragments, four protocols were used (see Table 2).

**Table 2.**
Video fragments and associated protocols.

| Video fragment | Protocol |
|---|---|
| Trainer towards group of owners | 1. Trainer towards group of owners |
| Trainer towards individual owner | 2. Trainer towards individual owner |
| Interaction owner- dog | 3. Owner towards dog |
| | 4. Dog towards owner |

*Trainer towards group of owners*

The behaviour elements of the trainer towards the group of owners were filmed in a video fragment that focused on the trainer. When possible, the trainer was filmed during the first two to five minutes

of the training. By using the first two to five minutes of the training, approximately the same fragments were filmed during the different trainings. Filming the start of the training was not always possible, since first permission of the owners for filming had to be asked. Sometimes this happened after the introduction of the trainer. When permission for filming was asked after the introduction, another fragment of the training was chosen to observe the behaviour of the trainer towards the group of owners. In all recordings used for analyses the trainer was addressing several owners at the same time. The behaviour recording method used was focal sampling continuous recording, i.e. scoring the pre-determined behaviours of interest for a set time interval. The frequency of behaviours was scored (events) and continuing behaviours were scored as events as well every four seconds. For analyzing the behaviour elements of the trainer towards the group of owners, components of Video Interaction Guidance (VIG) were used (see Table 3). Behaviour elements were categorized in the behavioural categories 'didactics', 'organization' and 'interaction'. The goal of this protocol was to investigate the trainer's behaviour towards the group of owners.

**Table 3.**

Protocol 1. Behaviour of the trainer towards the group of owners. Behaviour elements are categorized in three categories didactics, organization and interaction. Depending on the type of behaviour elements, the measurement method is counting the frequency or counting the duration in seconds.

| Behavioural category | Behaviour element | Measurement method (frequency/ duration (s)) |
|---|---|---|
| *Didactics* | Making differentiation in exercise for different combinations | frequency |
| | Giving step-by-step instruction | duration |
| | Asking if instruction is clear | frequency |
| *Organization* | Instruction to individual owner | duration |
| | Instruction to group of owners | duration |
| | Dividing owners in space | frequency |
| *Interaction* | Non-training related talk about dog | duration |
| | Non-training related talk about other | duration |
| | Asking question | frequency |
| | Answering question | frequency |
| | Smiling | frequency |
| | Giving compliment | frequency |

*Trainer towards individual owner*

The behaviour elements of the trainer towards an individual owner were filmed in a fragment that focused on the trainer during an interaction with an owner. A video fragment of trainer-owner interaction started when the trainer and owner made contact, for example by looking at each other. A fragment of interaction ended when the interaction stopped, for example by the trainer giving a compliment and walking away. As many as possible different trainer-owner combinations were filmed per training, ranging from one to eight combinations. The behaviour recording method used was as described. Four alternative behaviour measurement methods were used in protocol 2, i.e. *other combinations are waiting*, *other combinations are working*, *distance to owner* and *turn*. *Other combinations are waiting* and *other combinations are working* were scored by multiplying the duration of the behaviours in seconds with the number of combinations involved. *Distance to owner* was scored by making a guess of the distance between the trainer and the owner. The distance was scored in three categories, i.e. *close* as 2, *away* as 1 and *far away* as 0. *Turn* was scored by counting the shown elements of an attuned interaction, i.e. a start, a reaction and an ending. When all three

aspects were present, it was scored as '3'. When either start or ending and a reaction were present, it was scored as '2'. When only a start or ending was present, it was scored as '1'. When neither start nor ending was present, it was scored as '0'. For analyzing the behaviour elements of the trainer towards the individual owner, components of VIG were used (see Table 4). Behaviour elements were categorized in the behavioural categories 'didactics', 'organization' and 'interaction'. The goal of this protocol was to investigate the trainer's behaviour towards the individual owner.

**Table 4.**

Protocol 2. Behaviour of the trainer towards the individual owner. Behaviour elements are categorized in three categories didactics, organization and interaction. Interaction is divided into four parts, i.e. being attentive, encouraging initiatives, receiving initiatives and attuned interaction. Depending on the type of behaviour element, the measurement method is counting the frequency, counting the duration in seconds or other.

| Behavioural category | | Behaviour element | Measurement method (frequency/ duration (s)) |
|---|---|---|---|
| *Didactics* | | Asking if instruction is clear | frequency |
| | | Saying what not to do | frequency |
| | | Giving instruction | duration |
| *Organization* | | Other combinations are waiting | other |
| | | Other combinations are working | other |
| | | Distance to owner | other |
| | | Short remark to other combination | frequency |
| *Interaction* | *Being attentive* | Turn towards direction of owner | frequency |
| | | Moving to proximity of owner | frequency |
| | | Showing signs of listening to owner | frequency |
| | | Looking towards owner | duration |
| | | Non-training talk about dog | duration |
| | | Non-training talk about other | duration |
| | | Crossing arms | duration |
| | | Saying owners name | frequency |
| | *Encouraging initiatives* | Smiling to owner | frequency |
| | | Repeating owner | frequency |
| | | Encouraging | frequency |
| | *Receiving initiatives* | Giving a compliment to owner | frequency |
| | *Attuned interaction* | Turn | other |
| | | Asking question to owner | frequency |
| | | Answering question | frequency |
| | | Controlling unwanted initiatives owner | frequency |
| | | Handling dog | duration |

*Owner towards dog*

The behaviour elements of the owner towards their dog were filmed in a fragment that focused on the owner and dog. The requirement for the fragment was that the owner and dog were in interaction with each other. A fragment of interaction started when the owner and dog made contact, for example by looking at each other. A fragment of interaction ended when the interaction stopped, for example by giving a treat and ending the exercise. As many as possible different owner-dog combinations were filmed per training, ranging from one to nine combinations. The fragment used

for analyzing the owner towards the dog, was the same fragment that was used for analyzing the dog towards the owner. The behaviour recording method used was as described. The protocol used to analyze the behaviour elements of the owner towards the dog (see Table 5) was mainly based on the learning theory as described by McGreevy and Boakes (2007). Learning theory represents the four categories of operant conditioning. Besides stress signals and other, the categories positive correction, negative correction, positive reinforcement and negative reinforcement were used. The goal of this protocol was to investigate the owner's behaviour towards the dog.

**Table 5.**

Protocol 3. Behaviour of the owner towards dog. Behaviour elements are categorized in the six categories other, positive correction, negative correction, positive reinforcement, negative reinforcement and stress signals. Depending on the type of behaviour element, the measurement method is counting the frequency or counting the duration in seconds.

| Behavioural class | Behaviour element | Measurement method (frequency/ duration (s)) |
|---|---|---|
| *Other* | Saying dog's name | frequency |
| | Looking towards the dog | duration |
| | Giving command | frequency |
| *Positive correction* | Pulling on the leash softly | frequency |
| | Pulling on the leash hard-handed | frequency |
| | Verbal: softly | frequency |
| | Verbal: shouting | frequency |
| | Kicking | frequency |
| | Hitting | frequency |
| *Negative correction* | Looking away from dog | duration |
| | Walking away from dog | duration |
| *Positive reinforcement* | Stroking | frequency |
| | Click and treat | frequency |
| | Treat | frequency |
| | Verbal compliment | frequency |
| *Negative reinforcement* | Releasing leash | frequency |
| *Stress signals* | Wobbling | duration |
| | Scratching | duration |

*Dog towards owner*

The behaviour elements of the dog towards the owner were filmed in a fragment focusing on the owner and dog. The requirement for the fragment was that the owner and dog were in interaction with each other. A fragment of interaction started when the owner and dog made contact, for example by looking at each other. A fragment of interaction ended when the interaction stopped, for example by receiving a treat and the end of the exercise. As many as possible different owner-dog combinations were filmed per training, ranging from one to nine combinations. The fragment used for analyzing the dog towards the owner, was the same fragment that was used for analyzing the owner towards the dog. The behaviour recording method used was as described. The protocol used to analyze the behaviour elements of the dog towards the owner (see Table 6) was designed to assess the dogs' affective states and welfare (see Figure 1). Besides other, the behavioural categories acute stress and positive affective state were used. The goal of this protocol was to register the dog's behaviour towards the owner. For a complete description of the behaviours, see Beerda et al. (1998) and Frank et al. (2007).

**Table 6.**

Protocol 4. Behaviour of the dog towards the owner. Behaviour elements are categorized in the three categories other, acute stress and positive affective state. Depending on the type of behaviour element, the measurement method is counting the frequency or counting the duration in seconds.

| Behavioural class | Behaviour element | Measurement method (frequency/ duration (s)) |
|---|---|---|
| *Other* | Looking towards owner | duration |
| | Obeying given command | frequency |
| | Not obeying given command | frequency |
| *Acute stress* | Yawning | frequency |
| | Paw lifting | frequency |
| | Tongue flicking/ mouth licking/ oral behaviour | frequency |
| | Vocalizing: bark | frequency |
| | Vocalizing: low pitched growling | frequency |
| | Vocalizing: high pitched whining | frequency |
| | Lying down (not on command) | frequency |
| | Sniffing | duration |
| | Standing/ jumping against owner | frequency |
| | Physical contact (head butt/ nudge/ nuzzle/ paw/ leaning) | frequency |
| | Wagging tail | duration |
| | Standing: tail low | frequency |
| | Body shaking | frequency |
| | Rolling over | frequency |
| | Scratching | frequency |
| | Auto grooming | duration |
| | Stretching | frequency |
| | Trembling | duration |
| | Lowered posture | duration |
| | Slow avoidance from owner | duration |
| | Fast avoidance from owner | duration |
| *Positive affective state* | Standing: tail high | duration |
| | Play bow | frequency |

### *2.3. Questionnaire*

After each dog training, the owners and trainer filled out a questionnaire. Permission and cooperation for the questionnaire was asked before the training started. In total 91 owners and twenty-one trainers filled out the questionnaire. The questionnaire was mainly based on the 'Questionnaire on Teacher Interaction' (QTI). QTI is a questionnaire used to analyze the students' perception of their teacher. It is developed by Wubbels et al. (1985) and it uses Leary's Model (Leary, 1957) to structure the students' perception of the teachers. The questionnaire is used worldwide and has many times proven to be valid and reliable in different teaching environments (Fisher et al., 1995; Telli et al., 2007; Kokkinos et al., 2009). It places the teachers' interpersonal behaviour according to two scales. One scale analyses "influence" and ranges from dominance to submission and the other scale analyses "proximity" and ranges from opposition to cooperation. The QTI contains 48 items that have to be scored ranging from 'never' to 'always'. Omitted or invalid responses are not scored, by

leaving the cell open. The outcome of the QTI is a particular score for Leary's Model, i.e. "influence" and "proximity". The score is divided over eight sectors, describing different aspects of interpersonal behaviour as combinations of the scales influence and proximity. The sectors are leadership, helpful/ friendly, understanding, student responsibility and freedom, uncertain, dissatisfied, admonishing and strict. The QTI contains six items per sector. The eight sectors are placed in Leary's Model (see Figure 3). Per sector, the teacher receives a score, i.e. the sum of the answers for the six items belonging to that sector.

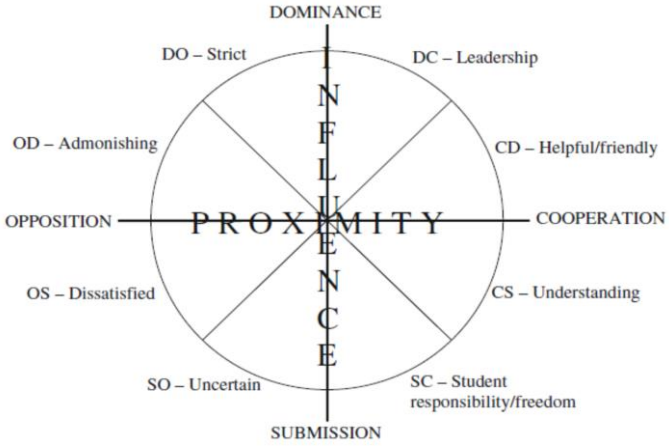


**Figure 3**. Model of interpersonal behaviour, based on Leary's model. During interaction between people, one's behaviour can be placed somewhere in the model. The model uses two scales, i.e. influence and proximity. The trainers' and owners' perception of the trainer's position in the model was analyzed using the Questionnaire on Teacher Interaction.
Source: Kokkinos et al. 2009

The QTI was adapted to the environment of dog training and seven other items were added (see appendix 1 and 2). After a test version was tested with 2 trainers and 6 owners, small adjustments were made in the questionnaire. The items were scored on a scale ranging from 'never' to 'always', where 'never' corresponded with 0 and 'always' corresponded with 4. The possible and actual scores per sector ranged from 0 to 24. The owners and trainers in the video fragments were linked to the filled-out questionnaires using codes. The goal for using the questionnaire was to analyze the owners' perception of the micro behaviours and communication styles of the trainer. By letting the trainers fill out the questionnaire about themselves as well, it was possible to compare both perceptions and look for similarities and differences. Another comparison was made between on the one hand the owners' and trainers' perceptions and on the other hand the perception of the researcher. After observing a training, the trainer was scored on all eight sectors of Leary's Model, i.e. leadership, helpful/ friendly, understanding, student responsibility and freedom, uncertain, dissatisfied, admonishing and strict by one grade, ranging on a gradual scale from zero to ten.

*2.4. Data processing*

The data set consisted of the results of protocols 1, 2, 3, 4, the questionnaire of the owners, the questionnaire of the trainers and the researcher's perception of the trainers using Leary's Model.

*Behavioural observations*

Data of all four protocols were not grouped. For the protocols trainer towards group and trainer towards individual owner (protocol 1 and 2), the parameters could have been grouped according to

the VIG categories didactics, organization and interaction. For protocol owner towards dog and dog towards owner (protocol 3 and 4) this could have been done according to the categories of operant conditioning and the categories representing the dog's affective state, respectively. However, it was chosen to use statistical tests for this. The frequencies and durations were converted into rate per minute using the duration of the fragment. Parameters with low scores were eliminated or grouped and parameters that could not have been measured accurately were eliminated as well. In the protocol trainer towards the group, the parameter *making differentiation in exercise* was eliminated due to low score. The number of dogs was eliminated as well. It might have been a useful indicator of the organization of the trainer, but during the summer months it was not because of the low number of dogs present due to vacations. The parameters *non-training talk about dog* and *non-training talk about other* were grouped under the name *talk* because separated the scores were low and unvarying. For the same reasons, in the protocol trainer towards an individual owner the parameter *controlling unwanted initiatives* was eliminated, and the parameters *non-training talk about dog* and *non-training talk about other* were grouped under the name *talk2*. The three parameters *distance*, *other combinations are waiting* and *other combinations are working* were eliminated because they could not be measured accurately. In the protocol owner towards dog, the parameters *hitting*, *kicking, walking away from the dog, release leash, wobbling* and *scratching* were eliminated due to low scores. The parameters *pulling on the leash softly* and *pulling on the leash hard-handed* were grouped under the name *pulling*; *verbal shouting* and *verbal soft* were grouped as *verbal correction*; *click and treat* and *treat1* were grouped as *treat2*. The parameter *looking away from dog* was eliminated because it could not be measured accurately. In the protocol dog towards owner, the parameters *rolling over, scratching, auto grooming, vocalizing low pitched growling, play bow, lowered posture* and *stretching* were eliminated due to low scores. The parameters *vocalizing bark* and *vocalizing high pitched whining* were grouped under the name *vocal*. The parameters *slow avoidance from owner* and *trembling* were eliminated.

*Questionnaire*

The items of the QTI of both trainers and owners were clustered according to the eight sectors of Leary's Model that describe different aspects of interpersonal behaviour. Seven questions that were not part of the original QTI, were not clustered. The researcher's perception of the trainers consisted out of eight scores of the Leary's Model sectors and these were not grouped. In reflection, only the QTI filled out by the owners represented a part of the trainers' influence on the owner-dog interaction. For this reason, the QTI filled out by the trainers and the researcher's perception of the trainers were omitted.

*Data set*

A data set was made that combined the four protocols and the QTI filled out by the owners. Per trainer-owner-dog interaction, one record was made that included protocols 1, 2, 3, 4 and the QTI. This resulted in 67 records. Since the protocol trainer towards group of owners (protocol 1) contained fifteen records, one filled-out protocol 1 was linked to multiple trainer-owner-dog interactions.

*2.5. Statistical analysis*

GenStat Seventh Edition version 7.2.0.208 was used for statistical analysis. Principal Components Analyses (PCA) was performed on the protocols trainer towards individual owner, owner towards dog en dog towards owner (protocol 2, 3 and 4) separately to reduce data and to investigate associations

between parameters (Jolliffe, 1986). Per protocol, correlations in sets of parameters were investigated, resulting in several component scores. This was done according to the procedures stated by Van Reenen et al. (2004). The component scores were composed out of original scores of multiple parameters, using the component loadings as weighting factors thus giving most weight to the most important parameter for the given component. The component determining parameters, having high absolute loadings, co-vary in the same or in the opposite direction (as indicated by the signs of the loadings). The loadings of the most important parameters received the highest score; the minimum level was set at |0.4|. The corresponding percentage of variation is the part of variation in the data set that is explained by the component score. The percentage of variation was set at a minimum of 10% for components to be considered relevant. Another PCA was performed to investigate associations between the component scores of protocols 2, 3 and 4. This was done both with and without the two most important (on forehand assumed) parameters that were not present in the component scores, i.e. *saying what not to do* from the protocol trainer towards individual owner (protocol 2) and *obeying command* from the protocol dog towards owner (protocol 4). The Spearman Rank Correlation test was used on the combination of the component scores of protocols 2, 3 and 4. With this test, it was aimed to investigate associations between the component scores, per set of two component scores. If the p-value of a correlation ≤0.05, the association between parameters was seen as significant. Since the protocol trainer towards group of owners (protocol 1) was only used for fifteen records, a PCA could not be done validly. For this reason, associations between characteristics of the trainer and parameters of owner and dog were tested in an explorative way by using an Analysis of Variance (ANOVA) test. The two parameters that were thought to be most important were used. The effect of the trainer on the owner and dog was investigated by using the two parameters of protocol 1 as independent variables when running the one-way ANOVA test. Owner and dog characteristics were expressed as variates. The outcomes of the questionnaire were scores for eight sectors and for seven questions. A PCA was performed on all fifteen parameters to reduce data and to investigate associations between parameters. Finally, a PCA was performed on the components of protocol 2, 3, 4 and the questionnaire. In this test, nineteen parameters were tested on 67 records, which represent 28% of the records.

## 3. Results

The effects of dog trainers on owner-dog interactions during training sessions were investigated by analyzing the behaviour of the trainer towards the group of dog-owners (protocol 1), the trainer towards individual owners (protocol 2), the owner towards its dog (protocol 3) and the dog towards its owner (protocol 4). The results on the behaviour analyses are followed by those from the questionnaires on the owner's perception of their trainer.

### *3.1. Behavioural observations*

Table 7 gives an overview of the mean scores for parameters used in the statistical analysis. Trainers towards both the group of owners and towards individual owners gave many instructions and asked little questions. Owners gave many commands and little corrections. Dogs obeyed given commands more often than that they did not obey. Scores for parameters that were not used in the statistical analysis can be found in appendix 3.

**Table 7.**

The effects of dog trainers on owner-dog interactions during training sessions were investigated by analyzing the behaviour of the trainer towards the group of dog-owners (protocol 1), the trainer towards individual owners (protocol 2), the owner towards its dog (protocol 3) and the dog towards its owner (protocol 4). Presented are the arithmetical means (± standard deviation) for behaviour elements from the protocols used in statistical analysis. Some of the behaviour elements are grouped and are in italics. The number of records (unique combinations of owner and dog) were 15 for protocol 1 (trainer towards the group of dog-owners) and 67 for the other protocols. Scores are expressed as rate per minute.

| | Mean | SD |
|---|---|---|
| Protocol 1. Trainer towards the group of dog-owners | | |
| Giving step-by-step instruction | 1.12 | 1.09 |
| Asking if instruction is clear | 0.21 | 0.34 |
| Instruction to individual owner | 2.10 | 1.88 |
| Instruction to group of owners | 3.31 | 2.75 |
| Instruction | 5.41 | 2.51 |
| Dividing owners in space | 0.71 | 0.92 |
| *Non-training related talk about dog* | *0.57* | *0.84* |
| *Non-training related talk about other* | *0.11* | *0.27* |
| Talk | 0.67 | 0.96 |
| Asking question | 0.51 | 0.66 |
| Answering question | 0.33 | 0.66 |
| Smiling | 0.90 | 0.76 |
| Giving compliment | 1.45 | 1.82 |
| Protocol 2. Trainer towards individual owner | | |
| Turn towards direction of owner | 1.78 | 1.41 |
| Moving to proximity of owner | 1.22 | 1.54 |
| Showing signs of listening to owner | 0.25 | 0.65 |
| Looking towards owner | 11.62 | 4.13 |
| *Non-training talk about dog* | *0.48* | *1.91* |
| *Non-training related talk about other* | *0.16* | *0.72* |
| Talk2 | 0.63 | 2.00 |
| Crossing arms | 1.38 | 3.63 |
| Saying owners name | 0.55 | 1.00 |
| Smiling to owner | 1.54 | 2.60 |
| Encouraging ‘Yes’ or ‘Ok’ | 0.91 | 1.06 |
| Giving a compliment to owner | 2.53 | 4.49 |
| Asking question to owner | 0.32 | 0.71 |
| Answering question | 0.33 | 0.77 |
| Handling dog | 1.13 | 2.99 |
| Asking if instruction is clear | 0.17 | 0.57 |
| Short remark to other combination | 0.76 | 1.69 |
| Saying what not to do | 0.60 | 0.95 |
| Giving instruction | 6.52 | 6.02 |
| Making a start with a turn, reacting on owner and ending turn | 3.19 | 3.70 |
| Protocol 3. Owner towards dog | | |
| *Pulling on the leash softly* | *2.77* | *3.23* |
| *Pulling on the leash hard-handed* | *0.63* | *2.46* |
| Pulling | 3.40 | 3.84 |

| | | |
|---|---|---|
| *Verbal: shouting* | *0.09* | *0.29* |
| *Verbal: soft* | *0.44* | *0.81* |
| Verbal correction | 0.53 | 0.83 |
| Giving command | 6.51 | 4.33 |
| Stroking | 0.70 | 1.64 |
| *Click and treat* | *0.60* | *1.55* |
| *Treat1* | *1.38* | *1.76* |
| Treat2 | 1.98 | 2.00 |
| Verbal compliment | 2.79 | 3.37 |
| Saying dog's name | 2.02 | 2.38 |
| Looking towards the dog | 12.42 | 5.26 |
| Protocol 4. Dog towards owner | | |
| Yawning | 0.05 | 0.20 |
| Paw lifting | 1.19 | 2.86 |
| Tongue flicking/ oral | 1.04 | 2.23 |
| Sniffing | 1.99 | 2.34 |
| *Vocalizing: bark* | *1.39* | *9.39* |
| *Vocalizing: high pitched whining* | *0.17* | *0.73* |
| Vocal | 1.56 | 9.42 |
| Looking towards the owner | 7.52 | 4.20 |
| Physical contact (head butt/ nudge/ nuzzle/ paw/ leaning) | 1.02 | 2.13 |
| Fast avoidance from owner | 0.57 | 1.21 |
| Obeying given command | 3.91 | 3.38 |
| Not obeying given command | 2.39 | 3.29 |
| Standing/ jumping against owner | 1.29 | 2.86 |
| Standing: tail high | 0.94 | 2.42 |
| Standing: tail low | 0.61 | 2.14 |
| Wagging tail | 4.37 | 4.98 |
| Lying down not on command | 0.46 | 1.43 |

The 3 PCAs performed on the parameters of the protocols separately (trainer towards the individual owner, owner towards dog and dog towards owner) resulted in seven components (see Table 8 for an overview). Protocol 2 (trainers' behaviour towards an individual owner) resulted in two PCA component scores. The first component score was named indifferent. Trainers with relative high positive PCA component scores, scored low on behaviours like *giving compliments* and *being in the owner's proximity*, meaning they acted indifferent. In contrast, trainers with negative component scores seemed to be interested and involved. The second component score was named silent. Trainers with a relative high positive component score, scored low on behaviours like *asking* or *answering questions* and *giving instructions*, meaning they were quiet. In contrast, trainers with positive component scores seemed to talk much. Protocol 3 (owners' behaviour towards dog) resulted in two PCA component scores. The first component was named active. Owners with a relative high positive component score, scored high on behaviours like *pulling on the leash* and *giving commands*, meaning they acted active. In contrast, owners with negative component scores seemed to act inactive. The second component was named unkind. Owners with a relative high positive component score, scored low on behaviours like *stroking* and *giving treats*, meaning they acted unkind. In contrast, owners with negative component scores seemed to act kind. Protocol 4 (dogs'

behaviour towards owner) resulted in three PCA component scores. The first component score was named relaxed. Dogs with a relative high positive component score, scored low on behaviours like *paw lifting* and *tongue flicking*, meaning they acted stressed. In contrast, dogs with a negative component scores seemed to act relaxed. The second component score was named disobedient. Dogs with a relative high positive component score, scored high on behaviours liking *jumping against the owner* and *not obeying the command*, meaning they acted disobedient. In contrast, dogs with a negative component scores seemed to act obedient. The last component score was named distracted. Dogs with a relative high positive component score, scored high on behaviours like *not obeying* and *tail low*, meaning they acted distracted from the owner. In contrast, dogs with negative component scores seemed to be concentrated on the owner.

**Table 8.**

Seven component scores resulting from a PCA on the separate protocols of trainer towards the individual owner, owner towards dog and dog towards owner (protocol 2, 3 and 4). The component scores are named according to the behaviours they reflect. The percentage of variance explained by the component is shown between brackets. Presented are the arithmetical means (± standard deviation) for behaviour elements from the protocols used in statistical analysis. Behaviours with absolute loadings ≥ 0.4 are shown. The number of records (unique combinations of owner and dog) is 67.

| Actor | Component | Mean | SD | Behaviour | Loading |
|---|---|---|---|---|---|
| Trainer | Indifferent (18.4%) | 0.00 | 1.81 | Towards | -0.86 |
| | | | | Proximity | -0.70 |
| | | | | Smile | -0.42 |
| | | | | Compliment | -0.74 |
| | | | | Instruction | -0.45 |
| | | | | Turn | -0.87 |
| Trainer | Silent (15.8%) | 0.00 | 1.67 | Asking question | -0.77 |
| | | | | Answering question | -0.80 |
| | | | | Short remark | -0.56 |
| | | | | Giving instruction | -0.72 |
| Owner | Active (22.5%) | 0.00 | 1.33 | Pulling leash | 0.60 |
| | | | | Giving command | 0.73 |
| | | | | Giving treat | -0.53 |
| | | | | Verbal compliment | 0.45 |
| | | | | Saying dog's name | 0.58 |
| Owner | Unkind (21.6%) | 0.00 | 1.30 | Stroking | -0.76 |
| | | | | Giving treat | -0.66 |
| | | | | Verbal compliment | -0.67 |
| Dog | Relaxed (19.9%) | 0.00 | 1.71 | Paw lifting | -0.86 |
| | | | | Tongue flicking/ oral | -0.81 |
| | | | | Verbal | -0.87 |
| | | | | Fast avoidance owner | -0.61 |
| Dog | Disobedient (14.4%) | 0.00 | 1.46 | Physical contact | 0.70 |
| | | | | Not obeying | 0.49 |
| | | | | Jumping | 0.80 |
| | | | | Tail high | 0.55 |
| Dog | Distracted (12.3%) | 0.00 | 1.35 | Looking towards owner | -0.57 |
| | | | | Not obeying | 0.64 |
| | | | | Tail low | 0.76 |

In order to investigate the association between trainers and the owner-dog interaction during dog training, a PCA was done that combined the seven component scores of the protocols trainer towards the individual owner, owner towards dog and dog towards owner with two extra parameter scores, which resulted in one useful PCA component (see Table 9, and for all results see appendix 5). The two extra parameters were not part of the component scores and were thought to be important. These were trainers *saying what not to do*, from protocol 2, and dogs *obeying commands*, from protocol 4. The found associations indicated that trainers labelled as silent trained owners labelled as kind to the dog and dogs labelled as relaxed and obedient. Inversely, talkative trainers were associated with owners that were unkind to their dogs, with the latter being tense and disobedient.
The results from a PCA on component scores from the protocols 2, 3 and 4 only are presented in appendix 4, and are not used further.

**Table 9.**
Component score resulting from a PCA on the component scores of the protocols trainer towards the individual owner, owner towards dog and dog towards owner and two extra parameters (*saying what not to do* from the protocol trainer towards individual owner and *obeying commands from the protocol dog towards owner*) together. Behaviours with absolute loadings ≥ 0.4 are shown, together with the original protocol.

| Explained variance (%) | Original component/ Behaviour | Protocol | Loading |
|---|---|---|---|
| 24.0 | Silent | 2 | 0.48 |
| | Unkind | 3 | -0.73 |
| | Relaxed | 4 | 0.58 |
| | Disobedient | 4 | -0.51 |
| | obey | 4 | 0.79 |

The scores for the seven PCA components of the protocols trainer towards the individual owner, owner towards dog and dog towards owner (protocols 2, 3 and 4) were analysed as well using a Spearman Rank correlation test. This test analyses the components pairwise. Four correlations proved to be significant. Table 10 gives an overview of the correlations between the components. The components active (owner) and relaxed (dog) were positively related (Spearman rho=0.38; p=0.002; N=67), meaning that dogs of owners that interacted intensively with the dog (e.g. giving many commands and compliments) show few signs of stress. The component unkind (owner) was positively correlated with indifferent (trainer), disobedient (dog) and distracted (dog). The correlation between unkind (owner) and indifferent (trainer), Spearman rho=0.26; p=0.04; N=67, indicates that trainers scoring low on *towards, proximity, smile, compliment, instruction* and *turn* were associated with owners scoring low on *stroke, treat* and *verbal compliment*. The correlation (Spearman rho=0.41; p=0.00; N=67) between the components unkind (owner) and disobedient (dog) indicates that owners scoring low on *stroke, treat* and *verbal compliment* were associated with dogs scoring high on *physical contact, not obeying, jumping against owner* and *tail high*. Lastly, the component unkind (owner) was positively related with distracted (dog) (Spearman rho=0.29; p=0.02; N=67). This indicates that owners scoring low on *stroke, treat* and *verbal compliment* were associated with dogs scoring low on *looking towards owners* and scoring high on *not obeying* and *tail low*.

**Table 10.**

Correlation coefficients of the PCA components from protocols trainer towards the individual owner, owner towards dog and dog towards owner (protocol 2, 3 and 4), resulting from Spearman Rank correlation test. The highlighted cells present significant correlations with $p < 0.05$.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Indifferent | 1 | | | | | | |
| Silent | 0.083 | 1 | | | | | |
| Active | -0.060 | 0.155 | 1 | | | | |
| Unkind | 0.255 | 0.031 | 0.161 | 1 | | | |
| Relaxed | -0.062 | -0.083 | 0.380 | -0.066 | 1 | | |
| Disobedient | 0.084 | -0.218 | -0.006 | 0.414 | 0.228 | 1 | |
| Distracted | 0.153 | 0.109 | 0.206 | 0.290 | -0.115 | -0.132 | 1 |
| | Indifferent | Silent | Active | Unkind | Relaxed | Disobedient | Distracted |

To analyse whether the two chosen trainer parameters *smile* and *giving compliment* from protocol 1 (trainer towards group of owners) had an effect on the interaction between owner and the dog, an ANOVA test was performed (see appendix 6). ANOVA revealed an association between trainers that smiled often and owners that were active. ANOVA revealed as well that dogs that are relaxed and active were associated with trainers that gave many compliments to the owners. However, the effects on owner and dog were not associated, so the effects did not provide information on the interaction between owner and dog.

Concluding, two main results were found in the behavioural observations. Firstly, trainers labelled as silent were associated with owners labelled as kind to the dog and with dogs labelled as relaxed and not disobedient. Secondly, owners labelled as unkind to the dog were associated with trainers labelled as indifferent and with dogs labelled as disobedient and distracted.

### *3.2. Questionnaire*

The questionnaire used was intended to analyse the owners' perception of the trainers and the trainers' perception of themselves. They were asked to score 55 items about their trainer/ themselves, ranging on a scale from zero to four (corresponding with never to always), indicating whether they thought the item was applicable. Forty-eight of the items were categorised into eight sectors, i.e. leadership, helpful/ friendly, understanding, student responsibility and freedom, uncertain, dissatisfied, admonishing and strict. Every sector contained six items, making the possible score range from zero to 24. The remaining seven items were not categorized into sectors. Table 11 gives an overview of the arithmetical means ± standard deviation of the sectors and items used in statistical analyses. Items that were not used in the statistical analysis can be found in appendix 3.

**Table 11.**

Questionnaires filled out by the owners are shown, categorised into eight sectors and four remaining items, used in statistical analyses. The remaining items are stated below the table and in appendix 1. Arithmetical means ± standard deviations are shown for 67 owners. The mean scores can range from zero to 24.

| QTI owner | Mean | SD |
|---|---|---|
| Leadership | 21.20 | 2.76 |
| Helpful/friendly | 21.35 | 3.46 |
| Understanding | 20.60 | 3.39 |
| Student Responsibility/freedom | 10.35 | 3.68 |
| Uncertain | 1.10 | 1.65 |
| Dissatisfied | 1.55 | 1.99 |

| | | |
|---|---|---|
| Admonishing | 3.47 | 2.00 |
| Strict | 7.65 | 2.97 |
| Q49: First name[1] | 3.07 | 1.30 |
| Q50: Understand[2] | 3.48 | 0.65 |
| Q52: Wait[3] | 1.34 | 0.91 |
| Q55: Audible[4] | 3.82 | 0.43 |

[1] The trainer addresses me with my first name
[2] I understand the exercises
[3] I have to wait between the exercises
[4] The trainer is well audible

The PCA performed on the eight sectors and seven remaining items with 67 records resulted in one useful component. The theory behind the Questionnaire on Teacher Interaction was used while obtaining the results, so all eight sectors remained in the analysis, even though some of the sectors' loadings were <0.4 (see Table 12). From the seven additional items, three items were eliminated from the analysis, i.e. Q51, Q53 and Q54 and these can be found in appendix 1.

**Table 12.**
The most important component score resulting from a PCA on the eight sectors and on the seven remaining items from the questionnaire on the owners' perception of the trainer. The eight sectors are derived from the Questionnaire on Teacher Interaction and the remaining items are study specific. All eight sectors are shown and remained to be used in the results. From the seven additional items, those with absolute loadings ≥ 0.4 are shown and used in the results. The remaining items are stated below the table and can be found in appendix 1.

| Explained variance (%) | Sector/ item | Loading |
|---|---|---|
| 27.65 | Leadership1 | -0.821 |
| | Helpful_friendly1 | -0.824 |
| | Understanding1 | -0.701 |
| | StudentResponsibility_freedom1 | -0.544 |
| | Uncertain1 | 0.061 |
| | Dissatisfied1 | 0.567 |
| | Admonishing1 | 0.288 |
| | Strict1 | 0.171 |
| | Q49: First name[1] | -0.504 |
| | Q50: Understand[2] | -0.744 |
| | Q52: Wait[3] | 0.452 |
| | Q55: Audible[4] | -0.619 |

[1] The trainer addresses me with my first name
[2] I understand the exercises
[3] I have to wait between the exercises
[4] The trainer is well audible

The goal was to investigate a possible association between the protocols and the questionnaire. An explorative PCA on 67 records on three protocols (components of trainer towards the individual owner, owner towards dog and dog towards owner (protocol 2, 3 and 4)) and the questionnaire (eight sectors and four remaining items) did not result in a component (loading pattern) that could be logically interpreted in terms of associations between behaviour (of the trainer, owner and dog) and the owner's perception of the trainer. The first component was not determined by both behaviours and the questionnaire (see appendix 7). The highest loadings originate only from sectors and items from the questionnaire, instead of a combination of behaviours of trainer, owner and dog and the

questionnaire. Next, another PCA was done. Associations between behaviour of only the trainer towards an individual owner (components from protocol 2) and the questionnaire (eight sectors and four remaining items) were investigated (see appendix 8), but this did not result in a component (loading pattern) that could be logically interpreted in terms of associations between behaviour of the trainer towards an individual owner and the questionnaire. The highest loadings originate only from the questionnaire, instead of a combination of behaviours and the questionnaire. Subsequently, a PCA was done on the behaviour of the owner towards the dog (components of protocol 3) and the questionnaire (eight sectors and four remaining items), but this did not result in a component (loading pattern) that could be logically interpreted in terms of associations between behaviour of the owner towards the dog and the questionnaire (see appendix 9). The highest loadings originate only from the questionnaire, instead of a combination of behaviours and the questionnaire. Lastly, two separate PCA test were done with a reduced version of the questionnaire. The reduced version of the questionnaire included only the five sectors with absolute loadings ≥ 0.4 (see Table 12) and none of the remaining items. Firstly, associations between behaviour of the trainer towards an individual owner (components from protocol 2) and the reduced questionnaire (five sectors and no remaining items) were investigated (see appendix 10), but this did not result in a component (loading pattern) that could be logically interpreted in terms of associations between behaviour of the trainer and the questionnaire. The highest loadings originate only from the questionnaire, instead of a combination of behaviours and the questionnaire. Secondly, associations between behaviour of the owner towards the dog (components from protocol 3) and the reduced questionnaire (five sectors and no remaining items) were investigated (see appendix 11), but this did not result in a component (loading pattern) that could be logically interpreted in terms of associations between behaviour of the owner and the questionnaire. The highest loadings originate only from the questionnaire, instead of a combination of behaviours and the questionnaire. Concluding, no associations were found between on the one hand behaviour of trainer, owner and / or dog and on the other hand the questionnaire. This implies that the interaction between owner and dog is not associated with the owner's perception of the trainer.

*3.3. A possible other methodology of observing: Technography*

The present study investigated the influence of the trainer in dog trainings using ethograms and statistical analysis. This is a commonly used method in the study of animal behaviour, but other methods exist. A second methodology that will be introduced and applied to dog training as a pilot study, is technography. Technography is an interdisciplinary descriptive approach that aims to provide an integration of social and technical processes surrounding a certain technology (Almekinders, 2011; Glover, 2011; Jansen and Vellema, 2011). The concept of technology in this methodology includes more than only modern technical objects. A technology describes the interaction between "*the use of skills, tools, knowledge and techniques in everyday life*" (Jansen and Vellema, 2011). Technography documents the tension between original plans and situated action, since intentions often differ from actual practice (Suchman, 1987). In this study, dog training is the technology that is investigated.

Technography aims to highlight causal processes by integrating social and technical aspects of a technology. It might offer a useful perspective when studying dog training and interaction between trainer, owner and dog, since dog training includes much more aspects than only dog behaviour. Dog training is a complex interaction between technical knowledge and skills, social knowledge and skills, functioning in a group and many more influences. The interdisciplinary approach of technography

might provide additional information on effective trainers because of its integrative nature. The aim of technography in this study is to investigate mechanisms underlying dog training.

A technographic study is composed out of a description of three domains (Jansen and Vellema, 2011). The first domain describes how different tasks are performed and is called 'making'. The second domain is 'distributed cognition'. It describes the knowledge that is being used to make decisions and to perform the tasks and how these different types of knowledge are combined. The last domain is 'construction of rules and routines'. It describes what rules and routines are applied to the performance and it describes rituals and skill-based associations. With these domains in mind, two dog trainings are analysed. The dog trainings and exercises were chosen at random.

*Dog training 1 (13-07-2013 video 22)*

- Making

The training takes place outside and seven dog owners take part in it. When the exercise starts, dog owners and dogs are standing on a straight line (see Figure 4). The dogs are supposed to sit and face their owners, not all dogs however obey. Disobedient dogs are not corrected nor assisted.

**Figure 4.** Positioning: the owners and dogs are standing on a line, opposite to the trainer.

The trainer stands in front of the owners and faces them. The trainer explains the exercise verbally, without addressing the owners/ dogs that are not ready yet for the next exercise. She reminds a particular owner to pay attention to the dog, since it has often proven to be disobedient. All owners/ dogs are supposed to walk forward at the same time, so the trainer addresses the group and not individual owners. During the exercise, the focus is on the group and not on the individual. When dogs are not behaving as they are supposed to, remarks are given such as 'come on'. The remarks are short and provide little information on solving the issue. The exercise consists out of several parts. The protocol of the parts is used as a manual, with little input of actual events. For example, when three dogs pulled on their leash towards each other (see Figure 5), the next part of the exercise is instructed according to the protocol, even though not all dogs were ready for it. The focus is not on the situated action. During the exercise, the trainer remains at distance and does not handle the dogs.

**Figure 5.** The order of the exercise parts is mainly determined by the predefined protocol.

- Distributed cognition

Cognition distribution takes place in a one-way direction. The trainer is the only one talking and the owners perform the exercises, without asking questions or giving feedback. The focus of the instructions is on the group, but some remarks to individual owners are made. In general, little instruction is given. The instructions are abstract, for example 'just keep on walking' and short, for example 'turn to the right'. The trainer does not demonstrate the exercise, so embodied skills are not transferred to the owners. Neither feedback nor compliments from the trainer are given during the exercise. After the exercise has ended, the trainer emphasizes that the dogs should play and feel free. This way, the dogs are supposed to learn that they performed the exercise properly. No differentiation between the dogs is made and compliments are made towards the group.

- Rules and routines

The trainer and some owners wear a sweater of the dog training school. This can be a social symbol of being part of a certain association, in this case the dog training school. It can create a team spirit and since the trainer as well as some of the owners wears the same sweater, it can stimulate a non-hierarchical ambience as well. There is little interaction between the owners and the trainer does not try to stimulate the interaction. The owners remain individuals, instead of creating a group of interested participants. Besides social routines, the exercise shows the use of many practical routines. The protocol has to be previously well reviewed, since all owners follow it even without the trainer mentioning it. For example, the owners spontaneous try to place their dog next to them in the beginning of the exercise. This has to be communicated before as a rule, but does not have to be made explicit anymore.

*Dog training 2 (28-08-2013 video 150)*

- Making

The training takes place outside and seven dog owners take part in it. Two dog trainers guide the training, one of them is the lead trainer. The exercise is individual. The group of owners walk across the entire area and try to make their dog look at them, while continue to walk (see Figure 6).

**Figure 6.** Positioning: the owners, dogs and trainers are walking across the entire area.

The lead trainer holds a protocol of the training in her hands. By calling the name of the dog, she addresses a particular owner. This way of addressing does not work in all cases. A certain owner did not respond initially to the name of this dog, so the trainer had to shout out loud several times. In one case, the trainer walked towards the owner. They were standing close to each other, probably since the trainer wanted to address some positive and negative feedback (see Figure 7). Because of the small distance, the trainer could speak quietly and be discrete.

**Figure 7.** The trainer and owner are standing close to each other to discuss delicate issues.

The trainer examines the exercise 'down' of all seven owners and dogs individually and writes the results on paper. When the dog performs the exercise well, the moment of the trainer's attention lasts shortly. The trainer uses the protocol and ticks off the list. One of the dogs does not go down. The trainer continues to talk to the owner, but does not provide effective support. The owner only repeats the previous actions and the dog still does not go down. After a while, the trainer starts using the situated action instead of the predefined protocol. She addresses the positioning of owner and dog: the owner is looking at the dog's back (see Figure 8). She tells the owner to try and face the dog to enhance the communication between owner and dog. However, she does not give clear instructions on how to accomplish that. It seems that it is unclear to the owner whether he has to

change position, or the dog has to change position. The confusion remains and the dog does not go down, so the trainer advises the owner to end the exercise and start walking again. The trainer remained at a distance and did not demonstrate the exercise.

**Figure 8.** The owner repeats the previous actions without effect.

- Distributed cognition

In some of the cases, the trainer demonstrates to the owner how the exercise has to be done (see Figure 9).

**Figure 9.** Embodied skill is demonstrated by the trainer to make it part of the learning process of the owner.

By doing the exercise together with the owner, the trainer makes the owner part of the action (see Figure 10).

**Figure 10.** The trainer makes the owner part of the action. By walking together backwards while both holding the leash, the dog is focussing on the owner again.

When a dog easily obeys, the trainer does not demonstrate the exercise to the owner. In some cases when the dog does not go down, the trainer does not demonstrate the exercise as well. There are differences in the trainer's instruction between different owners concerning embodied skills and knowledge. When trying to make the dog go down, some owners are slightly bended forward while giving the command. After a short while, they stand up straight again and the dogs perceive this as a signal to get up and sit, instead of continuing to lie down. In some cases, the trainer makes this miscommunication explicit and practices the exercise with the owner, while standing up straight. However, in other cases, this situated action is not made explicit, nor is any explanation provided. The demonstrations of the trainer are sometimes not made explicit as well. When one of the owners was not successful in making the dog lie down, the trainer interfered. She used her body in another way than the owner, and the dog lied down. The trainer did not provide verbal information to the owner on how she made the dog go down, although it might have been easy to explain. The trainer made a hand gesture towards the ground and this was the sign for the dog to lie down (see Figure 11).

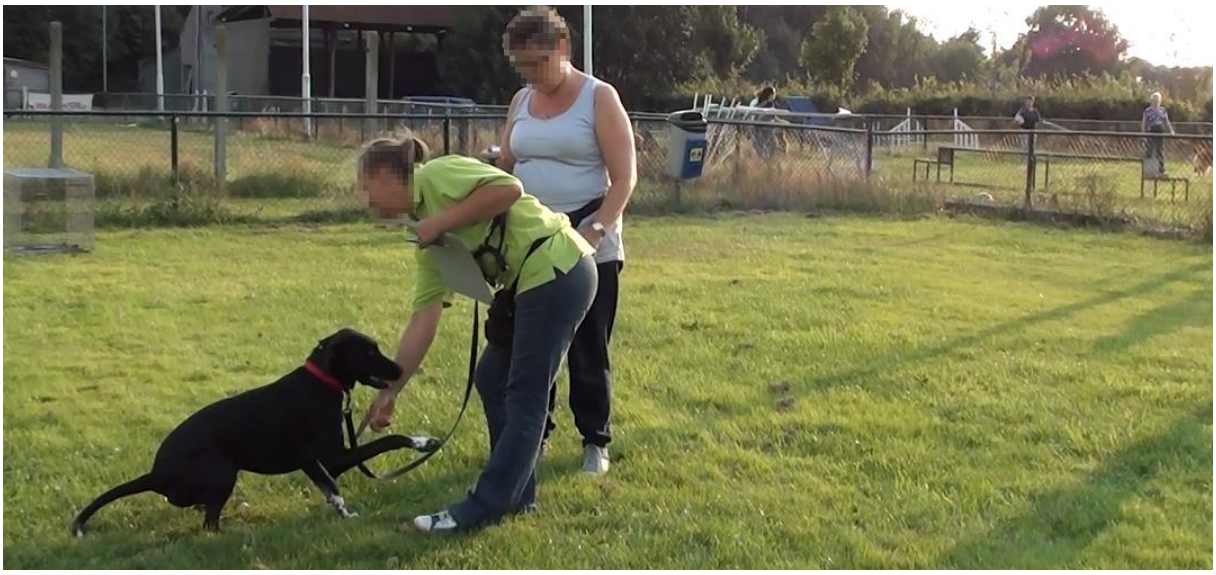

**Figure 11**. The trainer makes a hand gesture towards the ground and the dog lies down. This embodied knowledge is not made explicit.

Another dog performed the exercise well and fast. After the owner gave the dog a treat as a reward, she told the dog to stand up and walk along. However, the dog did not understand the signal from the owner and continued to lie down. The second trainer noticed the confusion for the dog and assisted the owner by making an enthusiastic hop towards the dog while moving her arms away from her body. The dog did understand this signal and got up (see Figure 12). The trainer did not explain the difference in communication towards the dog with the owner.

**Figure 12.** An enthusiastic hop and arm movements are signals the dog understands but are not made explicit towards the owner.

- Rules and routines

One of the two trainers has more experience in dog training and is therefore the lead trainer. This trainer wears a T-shirt of the dog training school. The difference in clothing might emphasize a difference in importance. All the owners are wearing a waist bag. This is an expression of being part of the training method clicker training. In order to use clicker training, a dog snack has to be quickly available. A waist bag provides quick access to the snacks. During the start of clicker training, this is explained as a requisite to train at this dog training school. Another requisite is that choke chains are not used. A regular collar and a harness are the standard. A choke chain is a specific dog collar that is nowadays repelled in some dog trainings. A choke chain is thought to decrease animal welfare. The follow-me collar is approved and often used. However, the opinions on the welfare implications of the follow-me collar are divided.

Concluding, even though technography was only used as a pilot study, three associations were highlighted. Firstly, the descriptions of the distributed cognition of the two trainings showed that bodily demonstrations by trainers are more effective than verbal explanations. When trainers can make their embodied skills and knowledge part of the learning process of the owner, this will probably clarify the trainer's demonstrations and explanations. Embodied skills and knowledge are an important part of the interaction between owner and dog. When this part of the training receives more emphasis, it can promote harmonious owner-dog interactions. This was found as well in the statistical analysis. Secondly, the descriptions of the making and distributed cognition of the two trainings showed care has to be given to and time has to be spend on transferring the message to the owner to support positive owner-dog interaction. Trainers can optimize the trainings by being aware of the sensitivity of owners and responding appropriate to it. Thirdly, the descriptions of the making of the two trainings showed tension is observed between on the one hand the trainer's didactics and organization and on the other hand situated action. A well-considered training, planned to the last detail, can provide an effective frame for the owner to learn. However, the situated action is often different from the protocol, so the trainer has to be able to deviate from the predefined protocol.
The technographic pilot study showed the high importance of the trainer's interaction with the owner above the trainer's didactics and organization. With the acquired knowledge, a new hypothesis can be formulated. It is thought that positive owner-dog interactions are associated with more demonstrations of the trainer.

## 4. Discussion

The present study investigated dog trainings, focussing on associations between trainers and the owner-dog interactions. The different ways in which trainer, owner and dog may influence each other during training are summarized in Figure 2 in the introduction. Next, the present findings are discussed accordingly. The research was done by measuring certain behaviours of trainer, owner and dog and the owner's perception of the trainer. The main outcomes of the behavioural observations confirm that associations between certain behaviours of trainer, owner and dog exist. The owner's perception of the trainer was measured using a commonly used Questionnaire on Teacher Interaction, which contrary to expectations revealed no association between the owners' perception of the trainer and behaviours of owner and dog. Technography was used to further explain the results found by statistical analyses and to understand possible associations between trainers and the owner-dog interaction during dog trainings.

Associations were found between the trainer dimension silent-talkative, the owner dimension acting unkind-kind towards their dog and a dog dimension of stress/disobedient to relaxed/obedient. The more silent trainers were associated with owners being kind to their dogs and the latter being relaxed and obedient. On forehand, it was hypothesized that verbally stimulating trainers would be associated with frequent and positive interactions between owner and dog, since verbally stimulating teachers are associated with better student results (Fukkink and Tavecchio, 2010; Gilbert et al., 2013). However, in this case it was found that trainers labelled as silent were associated with frequent and positive interactions between owner and dog. This result was unexpected, but can be explained for four reasons. Firstly, communication between humans and dogs uses nonverbal cues (Racca et al., 2012). Therefore, it is logical that dog trainers focus on demonstration instead of on spoken language. In the owner-dog interaction the body is used as means to communicate, so it is reasonable to assume that trainers use this way to communicate as well. Secondly, the time owners spend listening to the trainer, is time they cannot interact with their dog. Short and more precise instructions leave more time for owners and dogs to practise. Thirdly, non-harmonious interactions between owner and dog might require more guiding and feedback from the trainer. It is therefore possible that talkative trainers are associated with non-harmonious interaction between owner and dog. Lastly, another explanation is that the hypothesis of an association between talkative trainers and harmonious owner-dog interactions is based on research done on children. There is a knowledge gap on education for adults (Remedios and Richardson, 2013). It could be that children achieve high results due to verbally encouraging teachers, while adults flourish when they receive space and silence to practice. A second association was shown between trainers that acted indifferent, owners acted unkind towards the dog and dogs scoring high on behaviours indicative of stress and disobedience. It was hypothesized that trainers scoring high on sensitivity and responsivity would be associated with frequent and positive interactions between owner and dog (Fukkink and Tavecchio, 2010) and this was indeed the result found.

The owner's perception of the trainer was investigated using the questionnaire. The perception was hypothesized to be associated with behaviour of trainer, owner and / or dog. The owner's perception of the trainer however did not show a significant association with neither behaviour of the trainer, owner or dog (as indicated by a dotted line of interpersonal relationship between trainer and owner in Figure 2). Thus, the owner's perception of the trainer, as described by the questionnaire, was not associated with certain behaviours of the owner and dog. On the one hand, it is possible that this result is actually real, implying that the (owner-perceived) interpersonal relationship between trainer and owner is of little importance for the owner-dog interaction. On the other hand, it is possible that the QTI as used in this study was not suitable for measuring the owner's perception of the trainer. Two possible issues on the suitability of the questionnaire are discussed. Firstly, the questionnaire used was based on the Questionnaire on Teacher Interaction (QTI) that has often proven to be a valid and reliable measure. However, not all items of the questionnaire were equally important in this study. Some items received low scores with little variation. The same has happened more often, for example in the study done by Telli et al. (2007). In the study done by Kokkinos et al. (2009), 273 primary school students filled out the original questionnaire. After analysis of the mean, standard deviation and the Cronbach's α reliability, the items belonging to 'uncertain' and to 'strict' were found to have too low α coefficients (0.36 and 0.40 respectively). Therefore, the items belonging to 'uncertain' were completely removed and the items belonging to 'strict' were partly removed. Removing the items belonging to 'uncertain' and to 'strict' might have increased the suitability of

using the questionnaire in this study as well. Secondly, it might be that the QTI is less appropriate for adults than it is for children. The QTI is developed for children, so might provide less accurate results when used for adults. Children perceive teachers in another way than adults do, so the content and design of the questionnaire might have been inadequate. This can be improved by using a questionnaire that is developed for adult students. The second methodology technography was used to investigate causal processes by integrating social and technical aspects of dog training. Using technography, it was concluded that bodily demonstrations of trainers are important for the learning process of the owner, that trainers have to give care to transferring the message to the owner and that a tension exists between the planned protocol and the actual situation.

The behavioural observation method used has proven to be useful, but remarks can be made to provide a basis for improvement. Two will be mentioned. To distillate the influence of the trainer on the owner-dog interaction, a possible improvement in the research method can be made by distinguishing beginning and advanced owners. Owners that did not owned a dog before, might have other needs towards the trainer. By using only advanced owners, the level of knowledge and skills of the owner will become less important to the results.

Dog behaviours were scored as part of assessing owner-dog interactions. Since other studies have shown the influence of the interaction and relationship on dog welfare, it was hypothesized that dogs with a troubled owner-dog relationship will show signs of stress when interacting with the owner, for example during training. The present findings confirm that a harmonious owner-dog relationship results in low expressions of stress signals in dogs. Dogs of owners that food-rewarded, petted and complimented their dog relatively often during training (i.e. were labelled as kind), showed relatively few signals of stress and arousal, for example paw lifting, tongue flicking, vocalizations, avoidance. However, the causes of signals of stress and arousal are difficult to determine. Stress is a negative affective state that can be categorised into two types, i.e. acute and chronic stress (Beerda et al., 1997). Acute stress, as opposed to chronic stress, is not necessarily indicative of negative welfare, since the stressor is not lasting. Stress resulting from a negative owner-dog relationship is long-lasting and therefore chronic, which unfortunately is difficult to measure (Beerda et al., 1999). In the present study behavioural indicators of acute stress were used. On the one hand, using acute stress behaviours to measure chronic stress might result in misinterpretations of the dog's affective state. For example, animals can show few stress behaviours without an actual reduction in perceived stress (Beerda et al., 1997). On the other hand, several acute stress behaviours are shown to be indicative of chronic stress as well, like lowered posture, restlessness, oral behaviours, yawning and open mouth (Beerda et al., 1998). Many of these behaviours were used here for measuring acute stress. A possible improvement in measuring affective state might be adding physiological parameters. Urinary cortisol to creatine ratio will improve the interpretation of chronic stress (Beerda et al., 2000). Concluding, dogs that showed relatively many signs of acute stress during training may not be chronically stressed or experience poor welfare per se, and inversely the absence of signals of acute stress does not exclude poor welfare. However, it is assumed that the number of stress signals dogs show during training mirrors the level of stress during owner-dog interactions in general and as such reflects the owner-dog relationship, in addition to the perceived training conditions. Given that some dogs showed many signs of acute stress, training may not improve the relationship between owner and such dogs.

Besides difficulties in interpreting, frequent signs of stress can indicate more than a reduced owner-dog relationship. For example, the dog can experience stress because of the presence of other dogs. When dogs are not optimally socialized, being in the proximity of other dogs can be intimidating (Petak, 2013; Riemer et al., 2013). Besides this, stress behaviours might not be caused by a non-harmonious interaction, but by emotional contagion, since dogs are found to be sensitive to humans' emotions. It is shown that dogs reacted submissive when a stranger pretended to cry, which can be indicative of empathic concern (Custance and Mayer, 2012). The dog's stress behaviours might therefore be induced by non-dog related stress of the owner. For example, learning and functioning in a group can be experienced as stressful for owners because of social pressure.

A main goal of dog training is to support a positive owner-dog interaction, and in that way improve the general relationship between owner and dog. The challenge is an important one given the high number of relinquished dogs in the Netherlands, which assumingly reflects suboptimal relationships between owner and dogs. Dog training can aid dog welfare via a more positive affective state (see Figure 1), for example as a resultant of the owner-dog relationship, but also via natural living and basic health and functioning.

*Recommendations for dog training*

An important and unique aspect of this study is that the observations were done in actual dog training situations. Using not-standardized settings has drawbacks, since the situation cannot be controlled, but also provides new insights. Since the insights originate directly from actual trainings, they can have practical implementations as well. However, it must be kept in mind that the causality of the associations is not studied. The present study has showed that positive owner-dog interactions are associated with relative silent trainers. This might imply that owners learn more from bodily demonstrations. To increase the effectiveness of the demonstrations, trainers might verbally emphasize their embodied skills and knowledge more frequent and more accurate, instead of only demonstrating a certain exercise. A second association is found between trainers which acted indifferent and negative owner-dog interactions, so care has to be given to the communication of the trainer with the owner.

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## Appendix 1.

Questionnaire– version owner

1 The trainer talks enthusiastically about dog training.
2 The trainer has confidence in me and my dog.
3 The trainer seems uncertain.
4 The trainer gets angry unexpectedly.
5 The trainer explains things clearly.
6 If I do not agree with the trainer, we can talk about it.
7 The trainer is hesitant.
8 The trainer is quick tempered.
9 The trainer holds our attention.
10 The trainer is willing to explain things again.
11 The trainer acts as if she/he does not know what to do.
12 The trainer is quick to correct owners.
13 The trainer has a clear view of things that happen during the training.
14 If I have something to say, the trainer will listen.
15 The trainer lets us boss her/him around.
16 The trainer is impatient.
17 The trainer is a good leader.
18 The trainer notices when we do not understand.
19 The trainer cannot hold my attention.
20 It is easy to pick a fight with the trainer.
21 The trainer acts confidently.
22 The trainer is patient.
23 It is easy to make the trainer appear unsure.
24 The trainer makes mocking remarks.
25 The trainer helps me with my dog.
26 We can decide some things during the training.
27 The trainer does not trust the owners.
28 The trainer has strict rules.
29 The trainer is friendly.
30 I can influence the trainer.
31 The trainer thinks that we do not know anything about dogs.
32 It has to be silent during the training.
33 The trainer is someone I can depend on.
34 The trainer lets us decide the exercises during the training.
35 The trainer puts me down.
36 The trainer's exercises are hard.
37 The trainer has a sense of humour.
38 The trainer is kind-hearted.
39 The trainer thinks the owners cannot do things well.
40 The trainer's standards are very high.
41 The trainer can take a joke.
42 The trainer gives the owners freedom.
43 The trainer seems dissatisfied.
44 The trainer is strict.

45 The trainer's class is pleasant.
46 The trainer is lenient.
47 The trainer is suspicious.
48 The trainer makes me nervous.
49 The trainer addresses me with my first name.
50 I understand the exercises.
51 After the training, the trainer asks me for a reflection.
52 I have to wait between the exercises.
53 During the break, my dog and I relax.
54 The trainer explains the content of the training beforehand.
55 The trainer is well audible.

## Appendix 2.

Questionnaire– version trainer

1 I talk enthusiastically about dog training.
2 I have confidence in the owners and their dogs.
3 I seem uncertain.
4 I get angry unexpectedly.
5 I explain things clearly.
6 If an owner does not agree with me, we can talk about it.
7 I am hesitant.
8 I am quick tempered.
9 I hold the owner's attention.
10 I am willing to explain things again.
11 I act as if I do not know what to do.
12 I am quick to correct owners.
13 I have a clear view of things that happen during the training.
14 If an owner has something to say, I will listen.
15 I let the owners boss me around.
16 I am impatient.
17 I am a good leader.
18 I notice when owners do not understand.
19 I cannot hold owners' attention.
20 It is easy to pick a fight with me.
21 I act confidently.
22 I am patient.
23 It is easy to make me appear unsure.
24 I make mocking remarks.
25 I help owners with their dogs.
26 The owners can decide some things during the training.
27 I do not trust the owners.
28 I have strict rules.
29 I am friendly.
30 I can be influenced by the owners.
31 I think that owners do not know anything about dogs.
32 It has to be silent during the training.

33 I am someone the owners can depend on.
34 I let the owners decide the exercises during the training.
35 I put the owners down.
36 My exercises are hard.
37 I have a sense of humour.
38 I am kind-hearted.
39 I think the owners cannot do things well.
40 My standards are very high.
41 I can take a joke.
42 I give the owners freedom.
43 I seem dissatisfied.
44 I am strict.
45 My class is pleasant.
46 I am lenient.
47 I am suspicious.
48 I make the owners nervous.
49 I address the owners with their first name.
50 I make the owners understand the exercises.
51 After the training, I ask the owners for a reflection.
52 I make sure the owners do not have to wait between the exercises.
53 During the break, I let the dogs and owners relax.
54 I explain the content of the training beforehand.
55 I am well audible.

## Appendix 3.

Parameters from protocol 2, 3, 4, questionnaire owner, questionnaire trainer and researcher's perception that were not used in the statistical analysis. Mean and SD are shown.

| | Behaviours | Mean | SD |
|---|---|---|---|
| Protocol 2 | Repeating owner | 0.10 | 0.34 |
| | Controlling unwanted initiatives of owners | 0.00 | 0.00 |
| | Other combinations are waiting | 35.08 | 40.86 |
| | Other combinations are working | 14.72 | 23.81 |
| | Distance | 2.29 | 2.62 |
| Protocol 3 | Hitting | 0.00 | 0.02 |
| | Looking away from dog | 0.54 | 3.68 |
| | Walking away from dog | 0.21 | 0.72 |
| | Release leash | 0.20 | 1.04 |
| | Wobbling | 0.08 | 0.44 |
| | Scratching | 0.07 | 0.31 |
| Protocol 4 | Body shake | 0.05 | 0.30 |
| | Rolling over | 0.04 | 0.25 |
| | Scratching | 0.00 | 0.00 |
| | Auto grooming | 0.08 | 0.31 |
| | Vocalizing: low pitched growling | 0.11 | 0.47 |
| | Play bow | 0.13 | 0.84 |
| | Lowered posture | 0.04 | 0.18 |

| | | | |
|---|---|---|---|
| | Slow avoidance from owner | 2.13 | 1.62 |
| | Stretching | 0.08 | 0.66 |
| | Trembling | 0.00 | 0.00 |
| QTI Owner | Q51 | 1.82 | 1.19 |
| | Q53 | 3.25 | 0.96 |
| | Q54 | 2.57 | 1.45 |
| QTI Trainer | Leadership | 19.25 | 3.20 |
| | Helpful/friendly | 19.76 | 2.60 |
| | Understanding | 20.76 | 1.55 |
| | Student Responsibility/freedom | 11.09 | 3.40 |
| | Uncertain | 3.31 | 2.59 |
| | Dissatisfied | 5.58 | 2.95 |
| | Admonishing | 5.00 | 1.80 |
| | Strict | 9.64 | 2.55 |
| | Q49 | 2.84 | 1.27 |
| | Q50 | 3.53 | 0.60 |
| | Q51 | 2.26 | 1.16 |
| | Q52 | 2.32 | 0.86 |
| | Q53 | 3.05 | 0.94 |
| | Q54 | 1.89 | 0.91 |
| | Q55 | 3.21 | 0.69 |
| Researcher's per-ception | Leadership | 6.60 | 1.25 |
| | Helpful/friendly | 6.61 | 1.39 |
| | Understanding | 6.49 | 0.95 |
| | Student Responsibility/freedom | 6.81 | 0.76 |
| | Uncertain | 1.15 | 0.36 |
| | Dissatisfied | 4.43 | 2.27 |
| | Admonishing | 3.79 | 2.40 |
| | Strict | 4.36 | 1.25 |

## Appendix 4.

Five component scores resulting from the PCA on the components of protocol 2, 3 and 4. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 26.68 | 22.8 | 16.72 | 14.08 | 10.82 |
| | | | | | |
| Indifferent | -0.039 | -0.300 | 0.793 | -0.212 | 0.453 |
| Silent | -0.859 | -0.026 | 0.143 | -0.030 | -0.410 |
| Active | -0.485 | 0.529 | -0.409 | 0.122 | 0.415 |
| Unkind | 0.205 | 0.695 | 0.453 | -0.109 | -0.401 |
| Relaxed | -0.870 | -0.103 | 0.237 | 0.269 | 0.049 |
| Disobedient | 0.216 | 0.585 | 0.304 | 0.648 | 0.138 |
| Distracted | -0.218 | 0.625 | -0.017 | -0.649 | 0.174 |

## Appendix 5.

Four component scores resulting from the PCA on the components of protocol 2, 3 and 4 and two extra parameters that were not used.

| | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|
| Percentage variation | 20.15 | 15.34 | 11.79 | 11.07 |
| | | | | |
| Indifferent | 0.102 | 0.743 | -0.141 | 0.056 |
| Silent | -0.652 | 0.353 | 0.209 | -0.102 |
| Active | -0.564 | -0.561 | -0.293 | 0.146 |
| Unkind | -0.457 | 0.040 | 0.129 | -0.018 |
| Relaxed | -0.546 | 0.419 | -0.034 | 0.293 |
| Disobedient | -0.250 | -0.118 | -0.118 | 0.762 |
| Distracted | -0.555 | -0.094 | -0.508 | -0.523 |
| obey | 0.239 | -0.355 | -0.031 | 0.093 |
| not | 0.354 | 0.250 | -0.788 | 0.113 |

## Appendix 6.

One-way ANOVA performed on the effect of trainer characteristics on interaction between owner and dog.

| | | protocol 3 | | protocol 4 | | |
|---|---|---|---|---|---|---|
| | | Active | Unkind | Relaxed | Active | Distracted |
| protocol 1 | smile | 0.003 | 0.922 | 0.209 | 0.264 | 0.73 |
| | compl | 0.07 | 0.912 | 0.05 | 0.035 | 0.092 |

## Appendix 7.

Five component scores resulting from a PCA on the components of protocol 2, 3, 4 and the questionnaire. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 21.7 | 10.56 | 9.34 | 8.67 | 6.82 |
| | | | | | |
| Indifferent | -0.100 | 0.076 | -0.250 | -0.006 | 0.520 |
| Silent | 0.166 | 0.812 | -0.115 | 0.043 | 0.240 |
| Active | 0.290 | 0.454 | 0.255 | 0.059 | -0.548 |
| Unkind | -0.057 | 0.009 | 0.830 | 0.128 | 0.290 |
| Relaxed | 0.193 | 0.735 | -0.258 | 0.010 | 0.202 |
| Active | 0.034 | -0.203 | 0.549 | 0.137 | -0.041 |
| Distracted | 0.014 | 0.321 | 0.505 | -0.273 | -0.158 |
| Leadership1 | 0.810 | -0.082 | 0.032 | 0.042 | 0.140 |
| Helpful_friendly1 | 0.842 | -0.060 | 0.012 | 0.205 | -0.110 |
| Understanding1 | 0.709 | -0.148 | -0.117 | 0.356 | -0.113 |
| StudentResponsibility_freedom1 | 0.520 | -0.357 | -0.030 | -0.100 | 0.284 |
| Uncertain1 | -0.049 | -0.187 | -0.484 | 0.491 | -0.269 |
| Dissatisfied1 | -0.560 | 0.139 | -0.133 | -0.176 | -0.378 |
| Admonishing1 | -0.271 | -0.017 | 0.150 | 0.587 | 0.188 |
| Strict1 | -0.172 | 0.211 | 0.073 | 0.576 | -0.269 |
| Q49 | 0.509 | 0.186 | 0.148 | 0.329 | 0.047 |
| Q50 | 0.743 | -0.029 | -0.049 | -0.005 | -0.024 |
| Q52 | -0.453 | 0.290 | 0.007 | 0.408 | 0.243 |

| | | | | | |
|---|---|---|---|---|---|
| Q55 | 0.621 | 0.271 | -0.042 | -0.359 | -0.083 |

## Appendix 8.

Five component scores resulting from a PCA on the components of protocol 2 and the questionnaire. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 28.84 | 11.42 | 10.19 | 8.45 | 7.59 |
| | | | | | |
| Indifferent | -0.091 | -0.042 | 0.110 | -0.525 | 0.762 |
| Silent | 0.110 | -0.190 | 0.597 | 0.383 | 0.175 |
| Leadership1 | 0.821 | -0.057 | 0.061 | -0.056 | 0.151 |
| Helpful_friendly1 | 0.843 | -0.213 | -0.011 | -0.090 | -0.147 |
| Understanding1 | 0.716 | -0.339 | -0.127 | -0.254 | -0.143 |
| StudentResponsibility_freedom1 | 0.547 | 0.175 | -0.512 | 0.222 | 0.197 |
| Uncertain1 | -0.053 | -0.469 | -0.479 | -0.323 | -0.041 |
| Dissatisfied1 | -0.575 | 0.141 | 0.133 | -0.292 | -0.337 |
| Admonishing1 | -0.275 | -0.517 | -0.357 | 0.463 | 0.094 |
| Strict1 | -0.183 | -0.652 | 0.294 | -0.327 | -0.286 |
| Q49 | 0.501 | -0.367 | 0.238 | 0.309 | -0.095 |
| Q50 | 0.739 | -0.018 | -0.021 | -0.113 | 0.089 |
| Q52 | -0.464 | -0.480 | 0.219 | 0.098 | 0.350 |
| Q55 | 0.605 | 0.263 | 0.459 | -0.084 | -0.056 |

## Appendix 9.

Five component scores resulting from a PCA on the components of protocol 3 and the questionnaire. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 29.1 | 11.6 | 10.33 | 9.76 | 6.88 |
| | | | | | |
| Active | 0.257 | -0.215 | -0.103 | -0.469 | -0.624 |
| Unkind | -0.054 | -0.303 | -0.716 | 0.325 | -0.017 |
| Leadership1 | 0.819 | -0.062 | -0.094 | 0.049 | 0.187 |
| Helpful_friendly1 | 0.846 | -0.222 | 0.028 | -0.067 | 0.077 |
| Understanding1 | 0.719 | -0.309 | 0.209 | -0.050 | 0.201 |
| StudentResponsibility_freedom1 | 0.534 | 0.206 | 0.197 | 0.575 | -0.096 |
| Uncertain1 | -0.040 | -0.300 | 0.833 | -0.037 | -0.018 |
| Dissatisfied1 | -0.563 | 0.142 | 0.066 | -0.419 | -0.228 |
| Admonishing1 | -0.279 | -0.538 | 0.116 | 0.475 | -0.439 |
| Strict1 | -0.178 | -0.658 | -0.012 | -0.390 | 0.348 |
| Q49 | 0.496 | -0.391 | -0.180 | -0.015 | -0.220 |
| Q50 | 0.747 | 0.001 | 0.078 | -0.059 | -0.187 |
| Q52 | -0.463 | -0.495 | -0.144 | 0.022 | 0.186 |
| Q55 | 0.609 | 0.254 | -0.245 | -0.376 | -0.011 |

## Appendix 10.

Five component scores resulting from a PCA on the components of protocol 2 and the reduced questionnaire. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 41.17 | 14.81 | 14.34 | 11.62 | 9.33 |
| | | | | | |
| Indifferent | 0.110 | 0.557 | 0.814 | 0.051 | -0.077 |
| Silent | -0.065 | 0.793 | -0.560 | 0.094 | -0.213 |
| Leadership1 | -0.832 | 0.174 | 0.093 | -0.120 | 0.252 |
| Helpful_friendly1 | -0.859 | -0.038 | -0.052 | -0.286 | -0.069 |
| Understanding1 | -0.788 | -0.014 | 0.076 | -0.400 | -0.216 |
| StudentResponsibility_freedom1 | -0.592 | -0.245 | 0.098 | 0.558 | -0.508 |
| Dissatisfied1 | 0.681 | -0.078 | 0.036 | -0.484 | -0.478 |

## Appendix 11.

Five component scores resulting from a PCA on the components of protocol 3 and the reduced questionnaire. None of the components were used.

| | load[1] | load[2] | load[3] | load[4] | load[5] |
|---|---|---|---|---|---|
| Percentage variation | 41.47 | 15.85 | 14.53 | 9.82 | 9.5 |
| | | | | | |
| Active | -0.218 | -0.829 | -0.254 | -0.423 | 0.135 |
| Unkind | -0.013 | 0.248 | -0.947 | 0.138 | 0.146 |
| Leadership1 | -0.835 | -0.031 | -0.009 | 0.103 | -0.314 |
| Helpful_friendly1 | -0.865 | -0.173 | -0.001 | 0.192 | 0.077 |
| Understanding1 | -0.793 | -0.156 | 0.079 | 0.394 | 0.170 |
| StudentResponsibility_freedom1 | -0.576 | 0.446 | 0.179 | -0.343 | 0.553 |
| Dissatisfied1 | 0.671 | -0.327 | 0.133 | 0.411 | 0.431 |

Appendix 12.

E-mail for dog schools to ask for assistance in the study

Bergen op Zoom, 1 juli 2013

Beste,

Via uw website heb ik dit e-mail adres gevonden. Ik ben Suzy Deurinck en schrijf momenteel een master scriptie voor mijn opleiding Dierwetenschappen aan de Wageningen Universiteit. Hiervoor doe ik onderzoek naar het trainen van honden. Om deze reden zou ik graag op uw hondenschool video-opnames maken en enquêtes laten invullen.

Met mijn eigen hond heb ik ervaren hoe bijzonder het trainingsproces is. Naarmate ik me er meer in verdiepte, leerde ik steeds meer over het gedrag van mijn hond. De manier en de snelheid waarop eigenaren leren en de band met hun hond verbeteren door training, fascineert mij. Daarom doe ik nu dit onderzoek.

Om dit goed te kunnen observeren, maak ik korte video-opnames van trainingssessies. Ik wil mijn opnames op redelijk korte termijn maken. Dit is ongeveer in de periode van midden juli tot eind augustus. Ik wil me vooral richten op de oefening 'af' of 'af en blijf'. De fragmenten worden gebruikt om bepaalde communicatiesignalen van eigenaar, hond en instructeur te tellen.

Mijn vraag aan u is of ik een keer langs mag komen om te filmen. Hiervoor heb ik echter ook toestemming nodig van de hondeneigenaren. De instructeur kan dit bij aanvang van de les klassikaal vragen, of ik kan het zelf doen. Verder heb ik twee enquêtes, één voor hondeneigenaren en één voor instructeurs. Hopelijk wil iedereen deze na de les invullen. Alle informatie en al het filmmateriaal zijn vertrouwelijk en worden enkel in mijn eigen database gebruikt.

Graag hoor ik van u wat de mogelijkheden zijn. Wegens de planning van mijn scriptie hoor ik graag van u voor 14 juli. Ik zal in ieder geval in de loop van de week telefonisch contact met u opnemen.

Hopelijk kan ik binnenkort langs komen. Bij voorbaat mijn hartelijke dank.
Vriendelijke groeten,

Suzy Deurinck
Student Dierwetenschappen, Wageningen Universiteit

Appendix 13.

E-mail for dog schools to thank for assistance and to inform dog schools about results

Bergen op Zoom, 1 april 2014

Beste [hondenschool],

Afgelopen zomer heeft uw hondenschool meegewerkt aan mijn afstudeeronderzoek voor de studie Dierwetenschappen aan de Wageningen Universiteit. Ondertussen heb ik mijn onderzoek afgerond. Zonder uw medewerking was mijn onderzoek niet mogelijk geweest. Hiervoor wil ik u hartelijk bedanken. Met veel plezier en interesse heb ik de video-opnames gemaakt en bekeken. Ik heb er veel van geleerd. Bovendien wil ik u via deze e-mail op de hoogte stellen van mijn bevindingen.

Ik ben op verschillende hondenscholen geweest en heb veel verschillende lessen gezien. Hierbij heb ik gelet op de manier waarop de instructeur de interactie tussen eigenaar en hond kon beïnvloeden. Als onderzoeker heb ik geen waardeoordeel geveld; dat kan immers enkel door de instructeur, hond en eigenaar worden gedaan. Tijdens mijn onderzoek zijn drie aspecten mij opgevallen. Als hondenschool of als instructeur kunt u zelf de les beoordelen door naar deze drie aspecten te kijken.

Het eerste aspect dat naar voren kwam, is dat een les effectiever wordt wanneer een instructeur de oefeningen voordoet. Tijdens het voordoen helpt het als de instructeur precies vertelt wat hij/zij doet en uitleg geeft over het effect hiervan. Vele handelingen worden onbewust gedaan, dus hier zal actief over nagedacht moeten worden. Het zal echter de hondeneigenaar wel enorm helpen in het begrijpen.

Het tweede aspect dat naar voren kwam, is het belang van een duidelijke en vriendelijke communicatie richting de eigenaar. De sleutel tot de hond is immers de eigenaar. Een treffend voorbeeld is het benoemen van de hondeneigenaren met hun eigen naam. Eigenaren vinden het prettig om op die manier persoonlijk contact met de instructeur te hebben.

Het laatste dat naar voren gekomen is, is dat het uiteindelijke doel van hondentraining tijdens de les voor ogen gehouden moet worden. Dit doel is om voor een prettige en ontspannen interactie tussen hond en eigenaar te zorgen. Dagen verlopen haast nooit zoals ze gepland zijn, lessen op hondenscholen dus ook niet. Een planning is belangrijk, maar het gaat niet om het uitvoeren van alle geplande oefeningen. Het is een goede zaak om het doel van hondentraining voor ogen te houden.

Ik hoop dat mijn bevindingen duidelijk en werkbaar zijn en dat ze bovendien overeenkomen met wat er in de praktijk werkt. Nogmaals bedankt voor de medewerking.

Vriendelijke groeten,

Suzy Deurinck
Student Dierwetenschappen, Wageningen Universiteit