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MASTERARBEIT

Titel der Masterarbeit

„Repeatability of dogs' playfulness across time and contexts – is it really a personality trait?"

verfasst von

Claudia Manuela Rosam BSc

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"A dog's got personality and personality goes a long way"

JULES WINNFIELD,
Gangster from the movie Pulp fiction (1994)

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1 ABSTRACT

Personality can be described as a dispositional factor that regularly and persistently determines behaviour in many different types of situations and plays a role in the individual variation of behaviour within a species. Although personality has been investigated in various different species the single traits which have been found to make up personality differ in their description even within the same species. The aim of the present study was to examine the canine personality trait "Playfulness" for its consistency over time and contexts; to validate this trait, according to current predictions for personality in humans and also in non-human animals, and additionally to determine if a particular personality type of the owner is linked with higher or lower playfulness in the dog. Due to the fact that previous studies have argued that the owner has a considerable influence on the dog's behaviour, a Playing test was conducted once with the owner present and once with the owner absent, to investigate the stability of playfulness across contexts. To examine stability over time, a second test the Personality test was used and comparable parts of this test were correlated with the dog's behaviour during the Playing test. Furthermore the human NEOFFI questionnaire was used to investigate if the traits "Extraversion" and "Neuroticism" of the owners were linked to the playing behaviour of the dogs during the Playing test. The results showed strong evidence for consistency across contexts as well as some evidence for a temporal stability of the trait "Playfulness". No correlations between the owner personality traits, and the playing behaviour of the dog could be found either for "Extraversion" or for "Neuroticism". Due to the lack of such correlations, future studies should also take the human-dog bond into consideration, when looking for any effects of the owner on the behaviour of the dog. Previous studies have found that this factor could have an influence on dogs' behaviour when comparing owner present and owner absent conditions. The results from this study confirm that the trait "Playfulness" is consistent across time and contexts, which leads to the validation of "Playfulness" as a dog personality trait.

(Keywords: personality, dog, playfulness, owner present / absent, NEOFFI)

2 INTRODUCTION

Within a species, there is some regularity in individual variation of behaviour. Although, like any phenotypic trait, individual behaviour and characteristics that describe and account for consistent patterns of feeling, thinking and behaving are the result of an interaction between genes and environment, some individuals are more similar to each other than to others (Miklosi, 2009; Pervin and John, 1997). This view is based on the observation that individuals behave consistently across similar or different situations (Svartberg and Forkman, 2002, Wilson et al, 1994). This seems to underlie personality types and traits. In animal ethology, there are two synonyms, temperament and personality, which are used interchangeably by many authors (Miklosi, 2009). For a long time the study of personality was exclusively addressed to humans, because it is closely related to the assessment of feelings, thoughts and beliefs (Matthews & Deary 1998), which is unobservable in the study of non-human animals. However, besides feelings and thoughts, personality also includes one variable that is possible to measure in animals, namely behaviour. Personality traits can be described as dispositional factors that regularly and persistently determine behaviour in many different types of situations. According to Svartberg, (2003) personality types in dogs can be deduced from individual behaviour in different situations, and/or over periods of time, and personality traits can be suggested on the basis of correlations between behavioural reactions. Since other authors such as Costa and McCrae (1992) and Ley et al. (2008) agree on a similar definition, this finding is also used as the foundation for the present study. Costa and McCrae (1992) and Ley et al. (2008) defined personality as an individual's distinctive pattern of behaviour that is consistent across time and situations, and is seen as an interactive product of genetic, cognitive and environmental factors (Ley at al., 2008). Benus et al. (1991) and Wilson et al. (1994) also wrote about individual behavioural differences in animals, that are consistent over time or across situations, which are useful in the understanding of the evolution of behaviour as well as in applied animal behaviour (Slabbert and Odendaal, 1999).

Although the authors of many studies agree on the function and meaning of personality factors, the traits described vary between studies. As an example of human personality traits, Draper (1995) refers to studies (Digman, 1990; Tupes and Crital, 1992) that did a reduction of the essential structure of personality to obtain a five factor model: "Surgency", "Agreeableness", "Conscientiousness", "Emotional stability" and "Openness". Buss (1991)

argued that these factors have their origin in natural selection pressures related to the ancient problems of mating and food procurement. So for example "Agreeableness" in humans and the related concept of aggression are argued to come from hunting, gathering and hoarding coalitions of relatives (Draper, 1995). Other studies (Digman, 1990; Goldberg, 1990; Costa and McCrae, 1992) used all five factors and called the five major human personality dimensions the ''Big Five'', which includes "Extraversion" (associated with sociability and activity), "Neuroticism" (anxiety and moodiness), "Conscientiousness" (competence and self-discipline), "Agreeableness" (trust and compliance), and "Openness" (fantasy and ideas) (Svartberg and Forkman, 2002).

Gosling and John (1999) have attempted to apply the human "Big Five" model to nonhuman animals. They found (by using data mostly from exploratory analyses) support for the "Big Five" factors "Extraversion", "Neuroticism", and "Agreeableness", which are, according to the authors, those factors that showed the strongest cross-species generality, in 12 different species. Another study that presented evidence for "Extraversion" and "Neuroticism" in open field tests in rats is by Garcia-Sevilla (1984). In recent decades, personality traits have been investigated in a wide range of non-human animals, including mammals like chimpanzees (King and Figuerdo, 1997), cats (Wedl et al., 2010), hyenas (Gosling, 1998), rodents (Koolhaas et al., 1999), as well as birds (e.g. Groothuis and Carere, 2005), fish (e.g. Martins et al., 2012; Moretz et al., 2007; Harris et al. 2010; Schürch and Heg, 2010; Witsenburg et al., 2010) and invertebrates like octopus and squid (e.g. Mather and Anderson 1993; Sinn and Moltschaniwskyj, 2005; Sinn et al. 2008). Also, the study of personality in dogs has become of increasing interest in the last years and several different authors and working groups published different studies concerning dog personality, such as Svartberg, 2002; Svartberg and Forkman, 2002; Svartberg, 2003; Svartberg, 2005; Svartberg, 2006; Ley et al., 2008; Jones and Gosling, 2005, Draper, 1995; Gosling et al., 2003; Kubinyi et al., 2009 and Hsu and Serpell 2003.

The domestic dog (*Canis familiaris*) is a result of selection pressures during domestication, which formed a considerable diversity in morphology and behaviour. This, together with the dog's status in our society, makes the dog an interesting model for studies of animal behaviour (Svartberg and Forkman, 2002). Humans are in frequent interactions with different species. Among these interactions the perhaps most widely studied one is the human-dog interaction (Serpell, 1995). Kis et al. (2012) investigated evidence for the current interest in

dog behaviour, like the popularity of dogs in our society, their specialised skills for reacting to human social and communicative behaviour (like following human pointing gestures or human gaze, and also imitation of human actions (Huber et al., 2009; Range et al., 2007)) to perform problem solving tasks (Horn et al., 2012) and their attachment bond to their owners (Topál et al., 1998).

Generating a method based on objective measuring and classification of personality traits opens new opportunities to learn more about dogs in general and develop methods to measure behavioural tendencies of individual dogs (Ley et al., 2008). For example, personality testing creates a way to choose dogs for specific purposes, like selecting puppies for different fields of work, (activities like obedience, field-trial or as a guide dog), or allows the possibility to find apposite homes for foster and shelter dogs through personality matching. Behaviour and personality does not often play a role in the decision to buy a puppy, but may cause a problem later on, especially when the personality of the chosen puppy does not suit the personality of its owner (Beaver, 2009).

Gosling and John (1999) showed in their review indications for the traits “Extraversion”, “Neuroticism”, “Agreeableness and Openness / Conscientiousness” in dogs. They found that the personality factor “Extraversion”, especially when it had a high score in the positive direction, is positively correlating to playfulness, interest in chase, exploratory behaviour and sociability towards strangers, and negatively to avoidance behaviour. Still there are some discrepancies about the number and the descriptions of the canine personality dimensions (Ley et al. 2008). While Jones and Gosling (2005) found seven traits including “Activity”, “Submissiveness”, “Sociability”, “Fearfulness”, “Reactivity”, “Responsiveness to training” and “Aggression”, Draper (1995) named four traits and called them “Reactivity”, “Aggressiveness”, “Trainability” and “Investigation”. In another study, Svartberg and Forkman (2002) describe five personality traits, called ‘‘Playfulness’’, ‘‘Curiosity/ Fearlessness’’, ‘‘Chase-proneness’’, ‘‘Sociability’’ and ‘‘Aggressiveness’’. The same authors revealed additionally to their five investigated traits, a broad factor that is comparable to the shyness–boldness axis previously found in both humans and animals, and to a human supertrait, which is a combination of “Extraversion” and “Neuroticism”.

The dog personality trait “Playfulness” described in Svartberg and Forkman (2002) appeared in several others studies as well. Social playfulness, as part of the trait ‘‘Playfulness’’ could

also be found in a study on vervet monkeys (McGuire et al., 1994). Digman (1990) and Draper (1995) named playfulness as a part of their suggested dog personality trait "Investigation" and showed that playfulness as also excitability (part of their trait "Reactivity" correlated with the dog's responsiveness to environment, especially with social stimulation). Another study by Ley et al. (2008), also described a component which contained items similar to the trait "Playfulness" in Svartberg and Forkman (2002). Previous studies showed that shy dogs are generally cautious, timid and evasive in novel situations - both in social and in non-social situations, while bolder individuals are more spontaneous, social, and exploratory (Svartberg and Forkman, 2002). However, few studies to date have investigated the stability of personality traits across contexts. Studies like Svartberg (2006) and Beaver (2009) showed that playfulness, the tendency to chase moving objects, sociability, and boldness are traits that remain stable. Follow-up studies on how these traits predicted later behaviours had some surprising results. Beaver (2009) summed up several studies and revealed that chase proneness in dogs correlated to a human-directed play interest as well as to non-social fear, rather than to predatory behaviour. Furthermore, playfulness corresponded to the puppy's interest in playing with people. Additional, Rooney and Bradshaw (2003) argued that "how dogs play reflects general attributes of their personality and relationship with their owner". Play behaviour reflects relationship patterns in children, squirrel monkeys, and rats and, as shown in Rooney and Bradshaw (2003), also in dog–human relationships, which leads the authors to suggest "that play has the potential, with further research, to be used as a probe in the assessment of dog–human relationships".

There are several studies (Svartberg, 2006; Beaver, 2009), which found evidence for consistency of playfulness in dogs, but there has been none so far that could really prove both predictions, stability over time and contexts, together. Furthermore according to Kotrschal et al. (2009) who argued that the owner (with his or her personality) has a considerable influence on the dog's behaviour, one could predict that a dog might behave very differently in the presence or the absence of its owner. For example, a very playful dog may appear not playful at all if in the presence of an owner of a particular personality type, but may turn out to be very playful when the owner is absent. These two findings lead me to the main question of the present study, which is to investigate if the suggested dog personality trait "Playfulness" (Svartberg and Forkman, 2002) is actually a personality trait, by searching for evidence for its stability across time and contexts.

The approach to answer this question is to use a Playing test with two different situations, once with the owner present and once with the owner absent, plus a separate test also containing playing situations at least two week earlier. To investigate whether dog's playfulness is stable over time and across contexts, I conducted a Personality test that included two playfulness subtests followed at least two weeks up to several months later by a short Playing test, once with the owner absent and once with the owner present. The fact that the dog-owner bond is in many ways similar to the infant-parent bond (Prato-Previde et al, 2003), where the child feels only sufficiently secure after the reunion of its attachment figure, together with studies like Topal et al. (1998) who also found evidence that dogs explored and played more in the presence of the owner versus a stranger, are the main reasons which lead me to test dogs once in the presence and once in the absent of their owners, to determine if playfulness is stable across this context or is biased by the fact of the attachment bond. As a prediction for the present study I would expect that, if "Playfulness" is a personality trait, a dog that is more willing to play with the experimenter in the owner present (OP) condition should also be more willing to play in the owner absent (OA) condition. Additionally, I predict that dogs that have a higher motivation to play in one test also show a higher motivation to play in a later test, which also contains playing situations.

As an additional question I will investigate if a particular personality type of the owner is linked with higher or lower playfulness of the dog, and if possible differences between OA and OP conditions depend on personality types of the dog's owner. According to Kotrschal et al. (2009) who revealed that the higher owners score in "Extraversion" - the more these owners appreciate shared activities; I predict that dogs whose owners have a high score in extraversion will show a higher playfulness score. Furthermore, Kotrschal et al. (2009) also found that owners scoring high in "Neuroticism" showed a stronger attachment to their dog; therefore I would predict that dogs of highly neurotic owners will show a larger difference between the OP and OA conditions than dogs of less neurotic owners.

3 METHODS

3.1 SUBJECTS

For my study I used one dog breed, the Border Collie, to exclude potentially confounding effects caused by breed specific differences in traits (Svartberg, 2006), such as emotionality and aggressiveness, the tendency to approach and withdraw in novel situations and playfulness propensity, as well as in predatory behaviour and agonistic signalling. Another reason for choosing this breed was the fact that many Border Collies live in Vienna and were available for testing, which allowed me to get a sufficiently large sample size.

The sample size consisted of 52 Border Collies from the age of one to nine years, with 24 females and 28 males (cf. Appendix, Table A). The dog owners included 38 women and 7 men (7 of the women participated with two dogs).

3.2 GENERAL PROCEDURE

The testing took place at the Clever Dog Lab of the Messerli Research Institute, University of Veterinary Medicine, Vienna, Austria. The study was approved by the Ethical- and Animal-Welfare commission of the University of Veterinary Medicine, Vienna in accordance with GSP guidelines and national legislation. All dog owners participated voluntarily in this study and filled out a consent form before the experiment.

3.2.1 PERSONALITY TEST

For the Personality test I used the “Personality Test Vienna” established by Borbala Turcsan (Department of Ethology, Eötvös Loránd University, Hungary), consisting of 15 subtests. This test is context-specific and contains objective coding consisting of frequencies, presence/absence, latencies and durations, as well as subjective coding. The test battery contains a ball play task and a separation task which includes a tug-of-war playing sequence. I

decided to pick out these two subtests for the comparison with the additional Playing test, because both of them consist of a playing situation as part of the test.

Separation task

In the separation task, which is test number seven in the battery, first, the dog is alone in the testing room for one minute. After this minute, the experimenter enters the room, places herself one step next to the door and ignores the dog (stands still, without eye contact to the dog) for 5 seconds. After this, she greets the dog (also for about 5 seconds). Then the experimenter walks up to a shelf next to the door, where a tug is hidden, and plays with the dog for 30 seconds. This play is most likely to be a tug of war game, but depending on the preference of the dog, could also be a throw and fetch game. After these 30 seconds, the experimenter stops the play, puts the tug back in its original place and leaves the room again, without the dog. Afterwards the dog is again alone in the room for about 5 seconds until the owner returns and repeats exactly the same sequence as the experimenter performed previously.

Ball play task

The ball play task (test number 14 in the battery), consists of a throw and fetch game with a tennis ball. Both owner and experimenter are in the room with the dog (Figure 1). The owner participates actively in this task, while the experimenter is standing still passively next to the door. First the owner walks up to a clearly defined space marked with an **O** (= position of the owner) and starts throwing the ball for the first time. The owner is allowed to encourage the dog to run after and fetch the ball. After the dog has brought back the ball, or alternatively if not, after the owner has taken back the ball, the owner then throws the ball two more times from the same place, still encouraging the dog to fetch the ball if necessary. After the third time the ball leaves the owners hand, the owner immediately stops encouraging and ignores the dog for 15 seconds. Afterwards the owner takes the ball, walks up to the windowsill, puts down the ball and walks around the room. This is to see how the dog reacts after the playing stops, and to determine if the dog performs gaze alternations between the ball and the owner, and how often the gaze alternations occur.

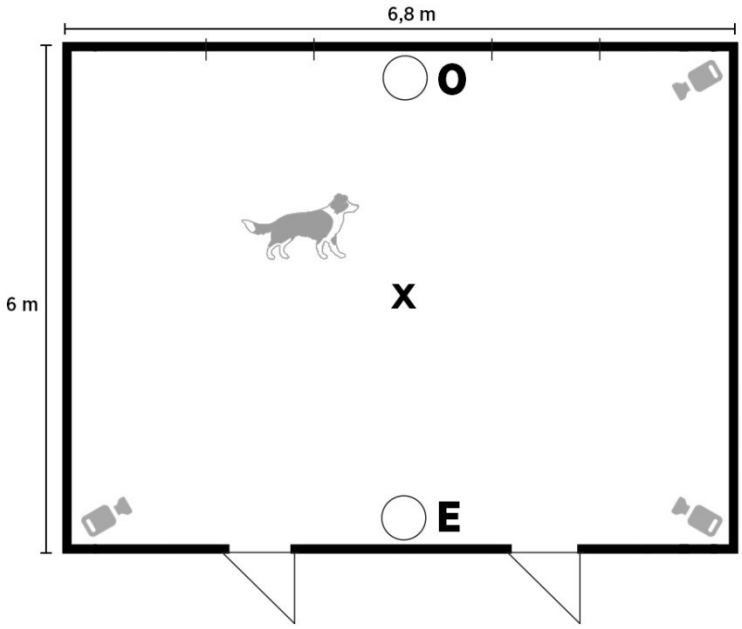

Fig. 1: Room layout during the Ball Play Task of the Personality Test, **X** – middle point, **O** – position of the owner, **E** – position of the experimenter

The Ball play task, as part of the Personality test battery always took place at least two weeks before the additional Playing test.

3.2.2 PLAYING TEST

The sequence of the Playing test can be seen in Figure 2. To create the same conditions for each dog (as some of them already knew me from earlier tests (like the Personality test) but not all of them, as there were three different people who carried out the Personality test), I conducted a short training session for each dog, to get them to a similar level of familiarity with me as the experimenter. The test itself contained two pre-phases and two test phases; one with the owner absent (OA) and one with the owner present (OP). The order of the OP and the OA conditions was counterbalanced across the subjects (cf. Appendix, Table A).

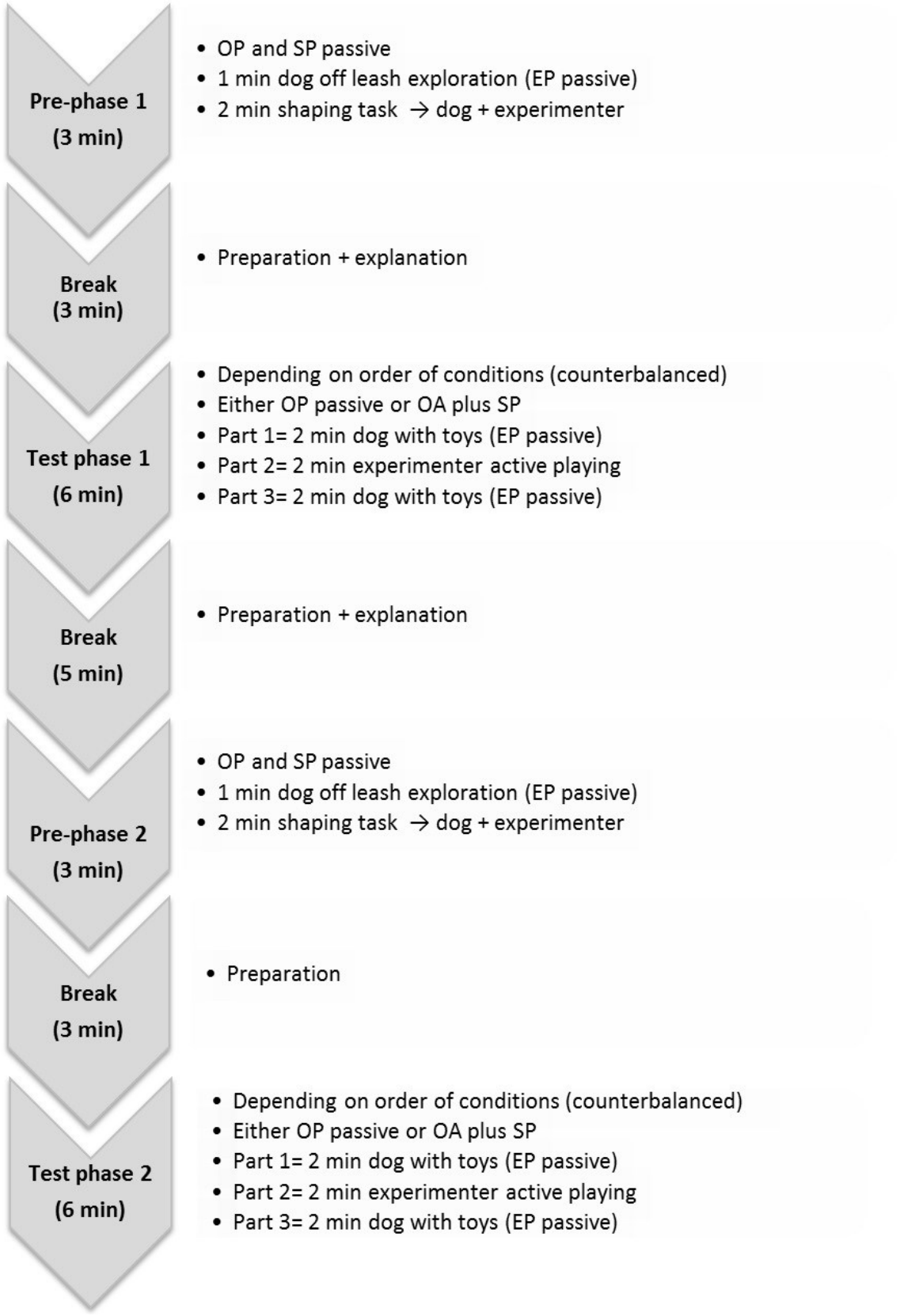

Fig. 2: Sequence of Playing test (OP = owner present, OA = owner absent, EP = experimenter present, SP = stranger present)

The test started with the first pre-phase, where the experimenter gave the owner beforehand an explanation of what will happen, and where the owner has to sit and then received the dog on the leash. Afterwards, the experimenter entered the room with the dog through one door, while the owner and a strange person (unknown to the dog) entered the room through the other door, at the same time. The owner and the stranger walked straight to their chairs and took a seat. The owner and the stranger were asked to ignore the dog and fill in a questionnaire or look through a magazine. The two chairs were in a clearly defined space. The experimenter waited next to her door, held the dog until owner and stranger were sitting and then let the dog run free and explore the room for 1 minute. Meanwhile the experimenter also took a seat on a chair (Figure 3). After one minute the experimenter stood up, called the dog and started a training session for two minutes. This session was an easy task to put the dog immediately into a positive working mode. The experimenter carried out a trick for treat session, using verbal praise (like “well done”, “fine”, and “good”) and small pieces of Royal Canin dry dog food. The experimenter walked around the room, called the dog and depending on its training level (which the experimenter asked the owner beforehand) and how bold the dog was, encouraged the dog to perform simple tricks like sit, lie down, give paw, sit up and beg, recall, heelwork and slalom through the experimenter’s legs. With a shy dog, the experimenter simply threw dry food and let the dog take it from the ground, or attracted the dog with food to come closer and then feed the dog from the hand while she was praising and encouraging the dog. After two minutes the experimenter stopped, gave a sign to the owner and the stranger, called the dog, held it by the collar or harness, and then left the room with the dog, while at the same time, the owner and stranger also left the room via their door.

The pre-phase was followed by a break outside of about three minutes. Meanwhile the experimenter explained the next step to the owner, and the dog was allowed to drink and rest. During the break the experimenter entered the room via her door, placed four different toys in a line on the ground of the testing room, and removed one of the chairs where the owner and the stranger were sitting before. The toys (in a sequence order from left to right) consisted of a tug (similar to the toy in the separation task of the Personality test battery), a netting ball, a stuffed toy animal (both were different from any toy used in the Personality test; without sound and ability to move) and a tennis ball (similar to the ball play task in the Personality test battery).

After the break the first test phase began with either the OP or the OA condition, and lasted six minutes. The test phase itself was subdivided in three parts, each lasted two minutes (Figure 2). The experimenter entered the room with the dog held by the collar or harness and again, waited holding the dog next to the door. In the OP condition, the owner also entered the room at the same time via the owner's door, sat down, and carried on filling out a questionnaire or read a magazine. Importantly, all owners had to ignore their dog and avoid eye contact even when the dog walked up to them and tried to solicit play (for example by placing a toy on their lap). The experimenter let the dog run free and sat down on her chair next to the toys (Figure 3). For the next two minutes the dog was allowed to play with the toys on its' own, while the experimenter was passive and ignored the dog. Here I was interested to see whether the dog plays on its own, or asks the experimenter, the owner, or the stranger to play, or does not play and is not interested in the toys at all. The experimenter then actively played with the dog for the following two minutes and encouraged it to play verbally using "look", "get it", "where is it". The experimenter tried to play with the dog with each toy for 30 seconds. Even if the dog did not show much interest the experimenter continued to encourage playing behaviour until the 30 seconds were over. First, the experimenter started to play with the tug. Thereafter, the experimenter encouraged the dog to play for 30 seconds each with the other three toys, (the net ball, the stuffed animal and, finally, the tennis ball). After this active play session the experimenter again sat passively on her chair for two more minutes and ignored the dog. The experimenter then stood up, gave a sign to the owner, called or caught the dog and left the room together with the dog, the same time the owner also left the room (via the other door). For the OA condition, the procedure was identical to the OP condition except that the stranger took the role of the owner.

After the first test phase a break of five minutes followed, before the pre-phase and the test phase were repeated for the second condition (OA or OP).

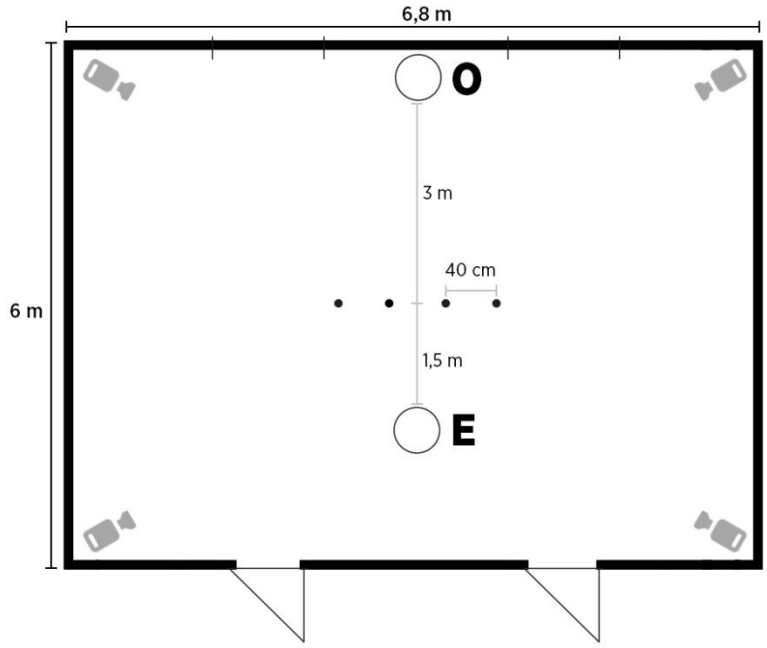

Fig. 3: Room layout during test phase of Playing test, • – position of the toys, **O** – chair owner, **E** – chair experimenter, left door – owner's door, right door – experimenter's door

3.2.3 ASSESSMENT OF OWNER PERSONALITY

To address the question of whether differences in playfulness between the owner present and the owner absent condition are dependent on particular personality types of the dog's owner, and respectively if a particular personality type of the owner is linked with high playfulness in the dog, I investigated the personality of the human subjects. I used the "Big Five" factors (or Five Factor Model (NEOFFI)) questionnaire from contemporary psychology. The theory behind this test was based on the "Big Five" factors, and the questionnaire used for this study was created by Borkenau and Ostendorf (2008). Asking questions about emotional states and feelings in different situations, stronger or weaker characteristics in the "Big Five" factors (which are "Openness", "Conscientiousness", "Extraversion", "Agreeableness" and "Neuroticism") can be found and used to describe human personality.

3.3 CODING

Table 1: Name, type and definition of all abbreviated variables used for coding of the Personality and the Playing test

Test	Variables	Definition	Type
Personality Separation	play_E	Describes playing intensity of the dog with the experimenter and the tug. 0= no play; 1= dog mouthed tug sometimes but did not play or may play after a while but needed some encouragement from the experimenter; 2= dog mouthed toy and brought it back sometimes and pulled at the tug occasionally; 3= playing more than 90% of the time	Ordinal from 0-3
Personality Ball play	Playfulness	Describes playing intensity of the dog during the test with its owner. 0= dog did not play with its owner; 1= dog followed the tennis ball sometimes and may take the ball into its mouth but then loses interest; 2= dog followed toy most of the time and played on its own or retrieved the thrown ball back to its owner	Ordinal from 0-2
Personality Ball play	Ball encourage	Describes how long the dog encouraged his owner to start playing again after the owner had thrown the ball for the third time, and the dog had taken the ball into its mouth. 1= dog stopped encouraging (= looking at the owner, spitting out the ball within 1.5 meters from the owner, facing the owner) its owner within 5 seconds; 2= dog stopped encouraging before 10 seconds; 3= before 15 seconds; 4= after 15 seconds	Ordinal from 1-4
Personality Ball play	Gaze alternation	Describes the frequency of looking from the ball to the owner or vice versa (from the owner to the ball) within 15 seconds after the owner placed the ball on the windowsill.	Frequency
Playing test	Solitary play	Describes how long the dog spent playing on its own; appears in part 1 and 3 of test phases	Duration
Playing test	Social play	Describes how long the dog spent playing with the experimenter; appears in part 2 of test phases	Duration
Playing test	Ask for play	Describes how long the dog spent encouraging either experimenter (AskE) or owner/stranger (AskOS) to play	Duration
Playing test	Total time	Time of part 1 and 3 of test phases; the maximum reachable time is therefore 240 sec.; for the analysis the proportion of this time was used by calculating 240/actual used time * 100	Duration

Detailed variable explanation for assessment of consistency over contexts

Solitary play describes the time the dog spent playing in the test phase in part 1 and part 3, when the experimenter was passive. The coding of Solitary play started for the first time when the dog moved a toy with its mouth or paw (the toys were still in their original positions, where the experimenter placed them before). This variable does not include the time the dog spent just sniffing or looking at the toy without picking it up (investigation of the toy). For every bout, Solitary play started from the frame where the playing "intention" of the dog was discernible (e.g.: lifted paw, open mouth) and was continued while the toy was in its mouth, moved with the paw or the dog followed the toy's movement with its head. The dog must be within two meters of the toy and unbroken eye contact must be maintained. As soon as eye contact was disrupted (the dog dropped the ball and looked away) the coding of Solitary play was terminated and did not begin again, until the dog looked at the toy again, with a clear playing intention. This coding can sometimes be tricky in Border Collies, because they often like to play by throwing the ball away from themselves and then "hunting it down" again. Solitary play was stopped if the dog dropped the toy and/or broke eye contact with it and if the toy was more than two meters away from the dog.

Social play describes the time the dog spent actively playing with the experimenter in the test phase part 2. Social play started when the toy was in the stranger's hand, and the dog approached the toy with its nose or paw to a distance of at least 5 centimeters. Therefore unlike Solitary play, Social play was recorded before the dog got in contact with the toy. For toys that were not in the experimenter's hand, Social play was coded from the frame where the playing "intention" was obvious (e.g., lifted paw, open mouth). When the toy was in the experimenter's hand, I continued coding Social play while the dog was orientating towards the ball and following it with its eyes. For toys that were not in the experimenter's hand, I continued coding play while the toy was in the mouth, moved with the paw, or the dog followed the movement of the toy with its head or had unbroken eye contact over a distance of up to 2 meters (same as in the Solitary play). Social play stopped if the dog dropped the toy and/or broke eye contact with it, or if the toy was more than two meters away from the dog.

The variable **Ask for play** describes the time the dog asked either the experimenter (=AskE) or the owner/stranger (=AskOS) for play. Ask for play was coded when 1) the dog brought the toy into contact with, or to within 10 centimeters of the person, 2) the dog placed the toy

or carried the toy within one meter of the person and then touched the person, or looked at the person's face, 3) the dog carried out gaze alternation/s between the toy and the person or vice versa. If the toy was already within one meter of the person and the dog touched the toy, (or if the dog already had the toy in its mouth), and then afterwards touched the person, or looked at the person's face was sufficient to start coding Ask for play. When the toy was already within one meter of the person, one event of Gaze alternation between the toy and the person or vice versa was also sufficient to start coding Ask for play. Ask for play coding was terminated when 1) the dog stopped looking at either the toy or the person's face, 2) the dog dropped the toy if the dog was carrying it, 3) as soon as the toy was more than one meter from the person and 4) as soon as the person picked up the toy (in experimenter active phase).

3.4 ANALYSIS OF THE DATA

The videos were coded with the Solomon Coder beta 12.09.04 (programmed © András Péter), the statistical tests were calculated with SPSS 20 and were considered significant if $p < 0.05$, except for the calculation of the human NEOFFI traits which were compared to the dogs playing behaviour, where I made a sequential Bonferroni correction for multiple testing.

3.4.1 TEMPORAL STABILITY OF PLAYFULNESS

To determine whether playfulness was stable across the two tests, I compared different variables from the Personality test with variables from the Playing test. I used two different non-parametric paired sample tests, namely the Mann–Whitney U test (for two independent samples) and the Kruskal–Wallis one-way analysis of variance (for more than two independent samples), after the variables were tested and found to be not normally distributed. Variables from the Personality test where the owner was present were correlated with variables from the OP condition of the Playing test, and variables from the Personality test where the owner was absent were correlated with variables from the OA condition of the Playing test.

To examine the repeatability of playfulness when the owner was absent, I compared play_E (Tab. 2) from the Personality test with Social play from the owner absent condition from the

Playing test. Before analyzing I summed the four coded categories into two categories (cat 1= ordinal from 0-2; N= 13 and cat 2= ordinal 3; N= 39), as the total sample size for the ordinal values between 0 and 2 was small.

Furthermore, it was planned to compare the variable Playfulness (Tab. 2) from the Personality test with the total time of Solitary play (OP) from the Playing test. But since there was such low variation in the variable Playfulness in the Ball play task (category 0 = 0 dogs; category 1= 2 dogs and category 2 = 50 dogs) this calculation was not possible, and was therefore discarded.

For the comparison between the Personality and the Playing test, I compared the variable Ball encourage (Tab. 2), and Gaze alternation (Tab. 2), with the variable AskOS from the Playing test. To analyze the Ball encourage variable and obtain an approximately even distribution of the sample across categories, the coding categories 2 and 3 were combined. To analyze the variable Gaze alternation, I summed the total number of the dogs' gazes between the owner and the toy into two categories; category 1: dogs that showed no Gaze alternation (N= 29) and category 2: dogs that showed one or more events of Gaze alternation (N= 23).

3.4.2 CONSISTENCY ACROSS CONTEXTS

To analyse the question if dogs' playfulness was consistent between the owner absent and the owner present conditions, I used non-parametric tests, due to non-normal data. The Spearman's rank correlation coefficient was used to examine whether there was a correlation of the variables Solitary play, Social play and Ask for play, between the owner absent and owner present conditions. The Wilcoxon signed-rank test was used to check if there were differences in the playfulness (proportion of time playing) between the OP and the OA conditions.

3.4.3 LINK BETWEEN DOG PLAY BEHAVIOUR AND OWNER PERSONALITY

I investigated whether possible differences between the OA and the OP conditions were dependent on personality types of the dog's owner, and respectively if a particular personality

type of the owner was linked with higher or lower playfulness of the dog. I analysed the NEOFFI questionnaires from the owners and calculated a correlation between the owner personality factor “Extraversion” and the total time of Social play from the OP as well as from the OA conditions. Furthermore I did the same calculation also for the total time of Ask for play, which contained duration of AskE plus AskOS and the duration of Solitary play in the owner present and owner absent conditions. I used a Pearson correlations rank test to analyse the variables, after testing for a Gaussian distribution.

Finally, to test my prediction that dogs of highly neurotic owners show a larger difference in their playing behaviour between the owner present and the owner absent conditions, I calculated the difference between the conditions by computing the total Solitary playing time (part 1 plus part 3) in the OP condition minus the total Solitary playing time in the OA condition, and then correlated the resulting variable to the human NEOFFI factor “Neuroticism” of the owner. These calculations were also made for the difference between Social play in the OP and the OA condition, as well as for the total time of Ask for play (AskE plus AskOS). The Spearman's rank correlation coefficient was used due to non-normality of data.

3.4.4 DIFFERENCE BETWEEN ORDER OF CONDITIONS

To determine whether the order that conditions were presented had an effect on dog’s behaviour, I conducted a comparison of the total mean time of Solitary play in all dogs in group 1 (OP/OA) and group 2 (OA/OP). Therefore I used a Wilcoxon signed-rank test.

4 RESULTS

4.1 TEMPORAL STABILITY OF PLAYFULNESS

When comparing the variable Social play in the owner absent condition in the Playing test, with the variable play_E (Tab. 2) in the separation test of the Personality test, a significant difference was revealed (Mann-Whitney U test, N=52, U= -3.319, p= 0.001) (Fig. 4). Dogs which spent greater than 90% of the time playing with the experimenter in the Personality test spent significantly longer playing with the experimenter in the Playing test, than dogs which spent less than 90% of the time playing with the experimenter in the Personality test.

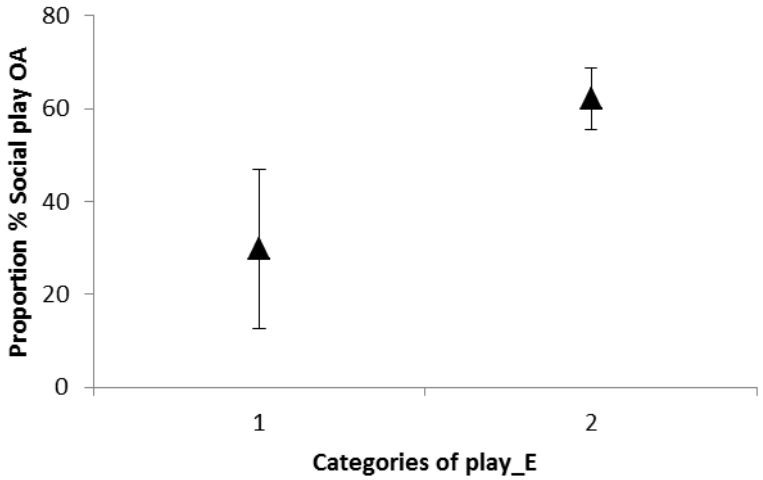

Fig. 4: Proportion of the variable Social play (Tab. 2) in the owner absent (OA) condition in percentage of time versus the two categories of the variable play_E (Tab. 2) (1= less than 90% of the time play; 2= play more than 90%). Show are mean ± s.e.m.

For the variable Ball encourage (Tab. 2) a sample size of 51 dogs was used, as for one dog this variable could not be coded. When testing whether the variable AskOS (Tab. 2) (total time of OP) differed between the three categories of the Ball encourage variable, no significant difference (Kruskal–Wallis, N= 51, χ^2=1.575, p= 0.455) was found (Fig. 5). When calculating a correlation rank by Spearman between these two variables also no significant correlation could be found (N= 51, p= 0.219, r_s= 0.175).

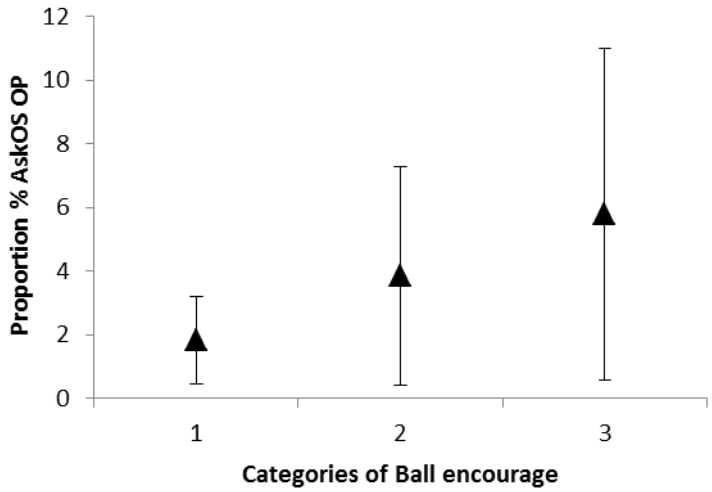

Fig. 5: Proportion of the variable AskOS (Tab. 2) in the owner present (OP) condition in percentages of time versus the three categories of the variable Ball encourage (Tab. 2) (1= stop encouraging before 5 sec.; 2= stop before 15sec.; 3= stop after 15 sec.). Shown are mean ± s.e.m.

I found no significant difference between dogs which used gaze alternation and dogs which used no gaze alternation, and the total time of AskOS (in the OP condition) (Mann-Whitney U test, N= 52, U= -0.792, p= 0.428).

4.2 CONSISTENCY OVER CONTEXTS

Percentage of time spent in Solitary play in the owner absent condition (OA) was positively correlated with percentage of time spent in Solitary play in the owner present condition (OP) (Spearman rank correlation coefficient, N= 52, $p< 0.001$, $r_s= 0.648$, Fig. 6). A Wilcoxon test revealed that there was also a significant difference between the two conditions (N= 52, U= -2.740, p= 0. 006). Surprisingly, the significant difference was only achieved from the high significance found between OP and OA in part 3 (U= -3.242, p= 0.001) in contrast to part 1 (U= -1.134, p= 0.257). Nevertheless the correlation between OP and OA was present in both part 1, and part 3 (part 1: $p< 0.001$, $r_s= 0.696$; part 3: $p< 0.001$, $r_s= 0.586$).

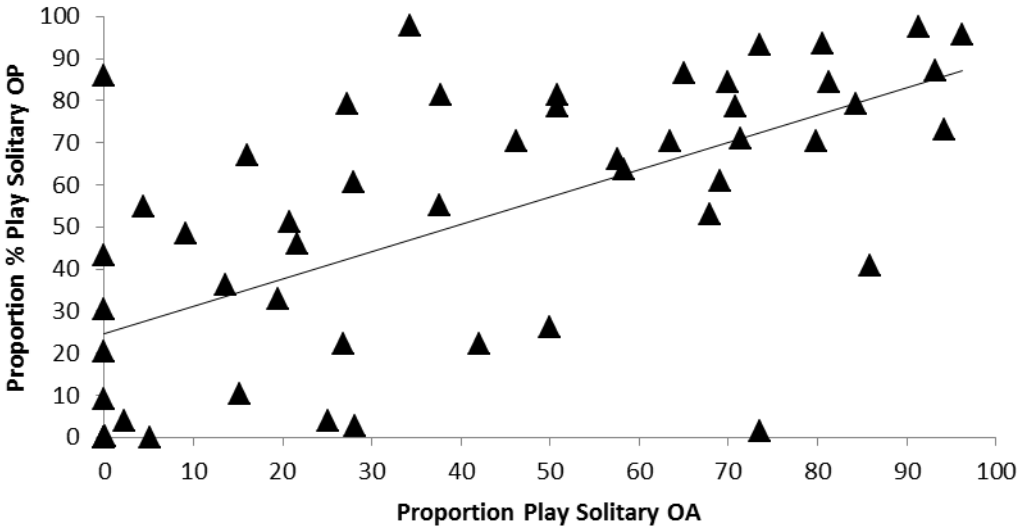

Fig. 6: Relationship of the total time in percentages of the variable Solitary play (Tab. 2) between the owner present (OP) and the owner absent (OA) condition

For the variable Social play in the OP condition also a strong correlation to the variable in the OA condition was found (N=52, $p< 0.001$, $r_s= 0.691$). When testing for differences between the two conditions no significant result (U= -0.114, p= 0.196) was found.

For the variable Ask for play I was able to use different predictions, as asking the experimenter and asking the owner/stranger were coded separately. By calculating the total time of AskE between OP and OA condition a highly significant positive correlation (N= 52, $p< 0.001$, $r_s= 0.617$) was found (Fig. 7), while there was no significant difference (U= -1.564, p= 0.118) between the two conditions. For the variable AskOS the correlation of p= 0.557 and $r_s= 0.083$) was only a non-significant tendency to the same direction (Fig. 8). Also no significant difference between the two conditions could be found (p= 0.557).

Furthermore I also tested whether there was a correlation between the total time of AskE and AskOS in the OP and in the OA conditions. For the calculation of the different variables a correlation between AskE and AskOS was found for the OP condition (N= 52, p= 0.003, $r_s=$ 0.401) and for the OA condition (p= 0.004, $r_s= 0.391$); while there was a significant difference between the two variables in OP (N= 52, U= -6.031, $p< 0.001$) and in OA (U= -3.221, $p<$ 0.001) (Fig. 9). To investigate overall if the dogs asked more for play in the owner present or in the owner absent condition also a calculation of the total time of AskE plus AskOS in the OP condition versus the total time of AskE plus Ask OS in the OA condition was done. This

showed a positive correlation of ($p < 0.001$, $r_s = 0.559$) and no significant difference between the two conditions was found (N= 52, U= -1.158, p= 0. 247).

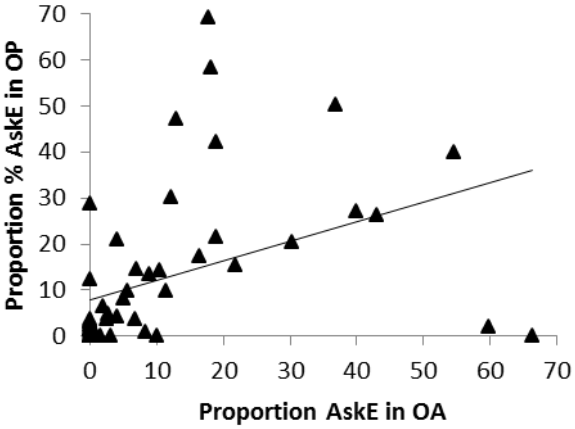

Fig. 7: Relationship between the total time in percentages of the variable AskE (Tab. 2) in OP (= owner present) and OA (= owner absent) condition

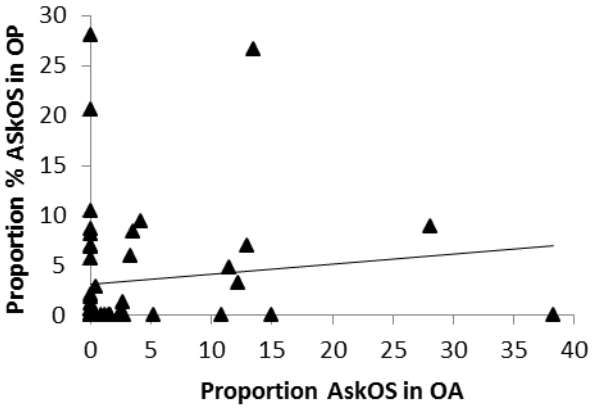

Fig. 8: Relationship between the total time in percentages of the variable AskOS (Tab. 2) in OP (= owner present) and OA (= owner absent)

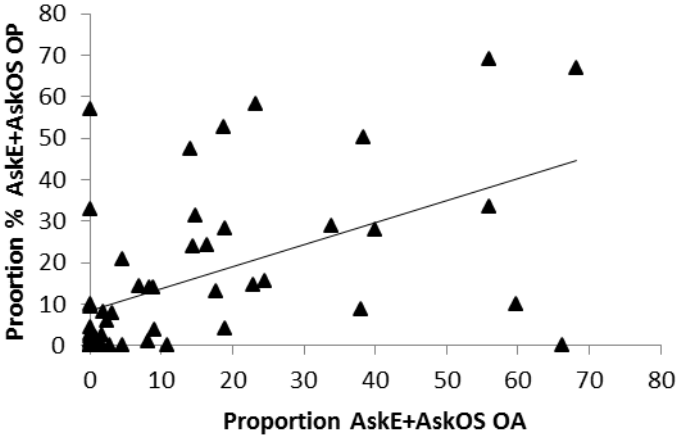

Fig. 9: Relationship between the total time in percentages of the variables AskE plus AskOS in OP (= owner present) and OA (= owner absent) condition

4.3 DIFFERENCE BETWEEN ORDER OF CONDITIONS

The calculation of the order of conditions the dogs were presented with (either owner present or owner absent first) showed no significant difference between the two different orders of presentation (Fig. 10). The mean difference of solitary playing time between owner present and owner absent from dogs in group 1 was 50.8 seconds, which was higher than the

difference in group 2 with 0.18 seconds. As similar results were also gained by using the variable Social play or Ask for play, I decided to use only Solitary play, to test for the effects of condition order. Interestingly, although the result was not significant, there was a decrease in the playing time for the dogs in group 1 (OP/OA) which could be due to physical fatigue and in some cases a loss of interest in the toys.

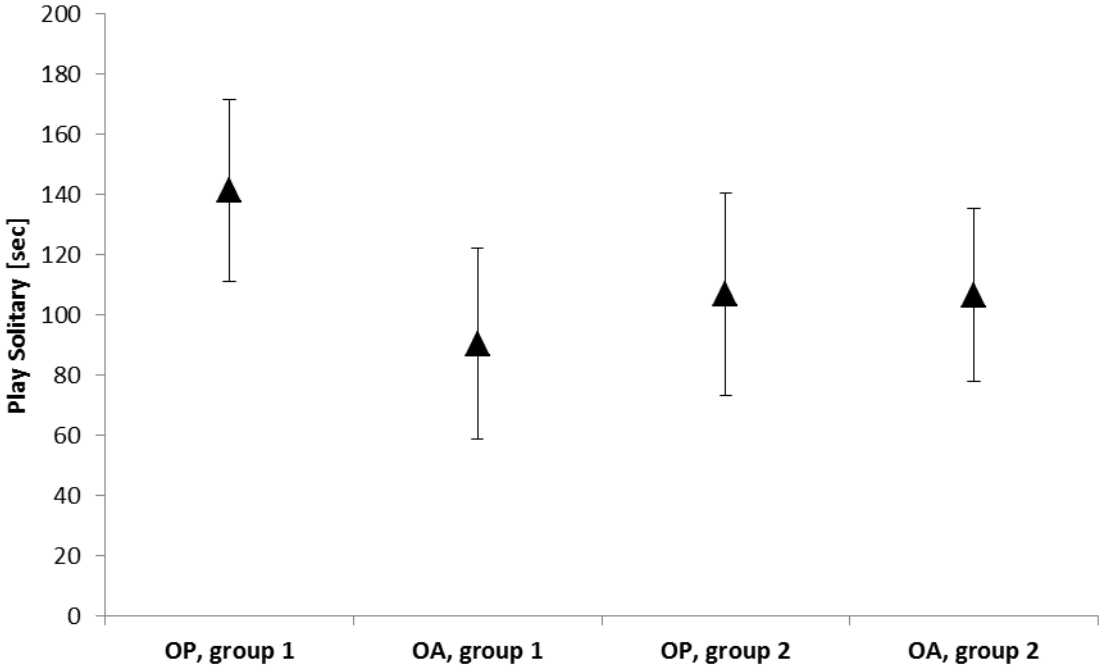

Fig. 10: Total time of Play Solitary in owner present (OP) and owner absent (OA) in comparison between group 1 (OP/OA) and group 2 (OA/OP)

4.4 LINK BETWEEN DOG BEHAVIOUR AND HUMAN PERSONALITY

To analyse the correlations between the variables of the dog Playing test and human personality traits, I was able to use a sample size of 48 human-dog dyads. Four of the owners declined to fill out the questionnaire, and were thus excluded.

I tested for any correlations between the human NEOFFI personality factors “Extraversion” and “Neuroticism” and the Social play, Solitary play and Ask for Play variables. After performing a sequential Bonferroni Correction for multiple testing, I could not find any significant correlations. To prevent the oversight of a correlation with the other human traits “Openness”, Agreeableness” and “Conscientiousness”, I conducted the same test for them,

which also found no significant correlations. The only, and really very slight correlation I was able to find, was between Solitary play and the human personality factor Openness (two-tailed Pearson rank correlation test, p= 0.020, r= 0.334). The correlation was only in the owner present condition and could not be found in the owner absent condition.

Finally, to test the prediction that dogs of highly neurotic owners show a larger difference in their playing behaviour between the owner present and the owner absent conditions, the difference between the conditions was calculated by computing the total Solitary playing time (part 1 plus part 3), the total Social playing time, and the total Ask for play time, in the OP condition minus the total time in the OA condition, was then correlated to the human NEOFFI factor "Neuroticism" of the owner. The variable Solitary play showed no correlation (Spearman rank sum test) with the difference between OP/OA (N= 48, p= 0.764, r_s = 0.044) (Fig. 11). Also no correlation for the variable Social play (p= 0.382, r_s= 0.129) and the variable Ask for play (p= 0.666, r_s= 0.064) was found.

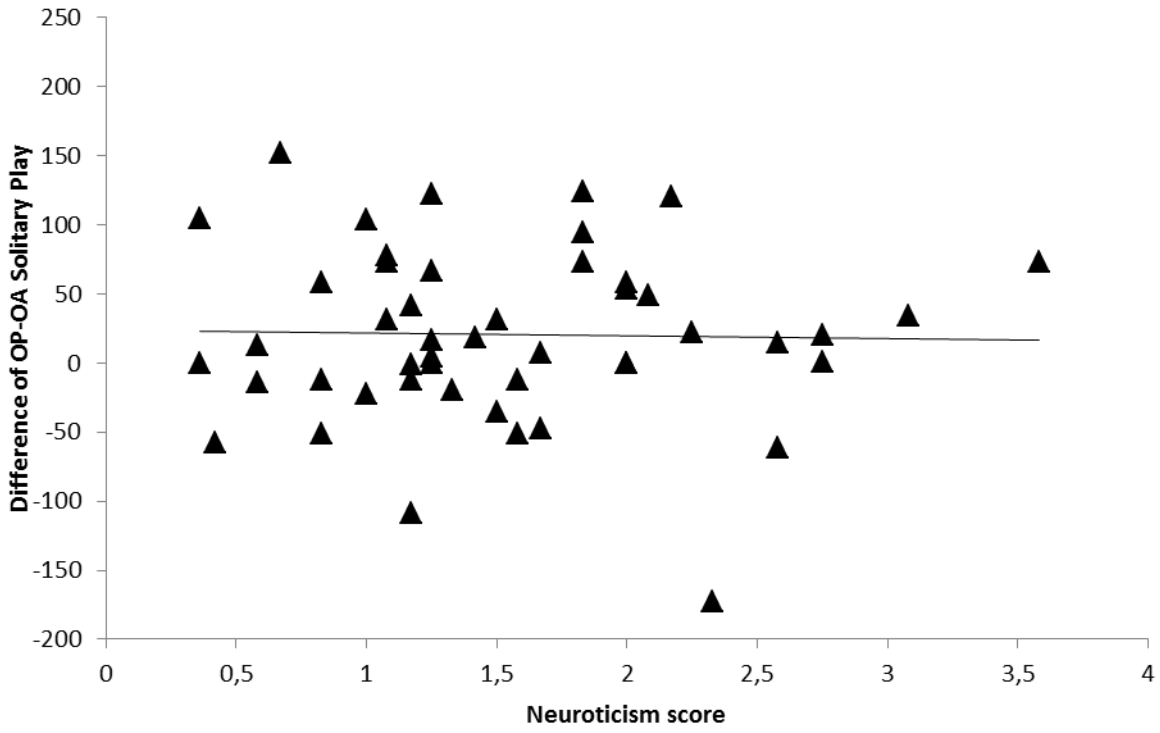

Fig. 11: Relationship between the difference of owner present (OP) minus owner absent (OA) of Solitary play time and the human NEOFFI personality trait Neuroticism (scale 0-4)

5 DISCUSSION

The present study set out to investigate the temporal stability of the dog personality trait "Playfulness" and its consistency across contexts. Results showed some correlations between the variables of the Personality test compared with the playing behaviour of the dog in the Playing test. Thereby some evidence for temporal stability was able to be provided. However, I found no evidence for a correlation between the variables Ball encourage in the Personality test and Gaze alternation in the Playing test. The assumptions that dogs who ask their owners to play with them in the Playing test should also do a lot of Gaze alternation between the toy and their owners in the Ball play task (Personality test) could not be confirmed, while dogs which played a lot with the experimenter in the Personality test did indeed show more interest in playing with the experimenter in the Playing test. The absence of a correlation between the variables Ball encourage and Gaze alternation in the Personality test and Ask for play in the Playing test, could be explained through floor or ceiling effects (i.e. almost all dogs never asked, or almost all dogs asked constantly).

When comparing the owner present condition of the Playing test with the owner absent condition, dogs who played a lot on their own, and played a lot together with the experimenter in the OP condition, also showed a lot of Solitary play behaviour. These dogs also played more with the experimenter in the OA condition, than dogs which did not show much play interest in the OP condition. Although there can be several reasons for the fact that the correlations varied between the variables, for example for the variable Ask for play, there could be social aspects which could affect the behaviour of the dog, like dogs may have learned previously that asking their owners after they played together for further activities is not as efficient as asking them beforehand. Also a context dependent reason could explain this finding – when analysing the videos of the Playing test a significant difference between asking the experimenter versus asking their owners could be found for both conditions OP and OA. The finding that the dogs asked the experimenter much more often than their owners in the Playing test, can be explained by a novelty and curiosity factor, due to the motivating effect of the pre-phase of the Playing test, where the dog worked with the experimenter for food while the owner was passive.

According to the outcome of my analyses, I found strong evidence for a consistency across context of the playfulness trait in dogs. Solitary, and Social play, as well as total time asking for play was positively correlated in the owner absent and the owner present conditions. Additional evidence for consistency across contexts was found in several other studies. For example, in a study about the quality of life in pet dogs, regarding the influence of owners and dogs characteristics, the authors Marinelli et al. (2007) had to exclude the variable play completely from their factor analysis because they could not find any significant difference between play behaviour in the presence versus the absence of the owner; which also suits to my results. Their results showed that a dog which plays, explores or shows passive behaviour, tends to perform similarly in the presence of the owner as well as in the presence of a stranger, when the owner was absent, although to a different degree (Marinelli et al., 2007).

Furthermore to address the remaining questions, regarding the influence of human personality on dog behaviour, the results of the present study did not show any correlations between the dogs play behaviour and any human personality traits. The prediction that dogs whose owners have a high score in extraversion will show a higher playfulness score could not be confirmed. The investigation of the difference between OP and OA which were then correlated with the owner personality results from the NEOFFI score "Neuroticism" also did not reveal any significant results. The prediction that dogs of highly neurotic owners will show a larger difference between the OP and OA conditions than other dogs could not be found.

Hence, it seems rather more likely that the differences in the dogs' behaviour in the owner present and the owner absent conditions could be influenced by the attachment of the dog to the owner, rather than the personality of the owner. Rooney and Bradshaw (2003) pointed out that the term attachment is often used to describe elements of the dog–human relationship. The procedure and the behavioural analyses used to investigate the dog-human relationship are similar to the methods developed to study attachment in human infants (Prato-Previde et al., 2003). Dog-owner pairs are observed in an unfamiliar room, and introduced to a human stranger, as well as being subjected to short episodes of separation in an increasingly stressful test, called the Ainsworth Strange Situations Test. Various different studies have been carried out on dogs, which test for the presence of attachment in dogs, which is similar to attachment in humans. Prato-Previde et al. (2003) described attachment as a particular kind of affectional bond, which endures over time, involves a specific individual and is emotionally significant,

but can also be clearly distinguishable from other types of affectional bonds by the fact that "the individual experiences security and comfort from the relationship with the partner, and the ability of the individual to use the secure base provided by the partner, to gain the confidence to engage in other activities (Ainsworth, 1989)" (Prato-Previde et al, 2003). In the Prato-Previde et al. (2003) study the authors found evidence for a secure base effect, through the fact that the dogs played with the stranger more often in the presence of their owner, than during his or her absence. Horn et al. (2013) also revealed such a secure base effect in a manipulative problem solving task. In future studies which examine the personality trait playfulness, one additional factor would be interesting, namely to look at the effect of attachment on the playing behaviour of the dogs, when the owner is present compared to when the owner is absent. This would be especially interesting to do it in a follow-up study with the same dogs which participated in this study. I mainly tested dogs that had already participated in the studies of my colleagues Stefanie Riemer, Corsin Müller and Lisa Wallis, and therefore most of these dogs had also participated in an attachment test, which was based on a modification of the Ainsworth's Strange Situation Test and was developed by Lisa Horn. Thus, the comparison would be possible to be carried out in the future.

When looking for correlations between the behaviour of dogs and the personality traits of their owners, it would be important for future studies to have a look also on the other dog personality traits. Despite the fact that the experimenter and the stranger were unknown to the dog, and in case of the experimenter, were interacting with the dog, it was not necessary for me to compare the personality of the experimenter with the playfulness of the dog, since I did not find any correlation between the playing time of the dog and the NEOFFI owner personality traits. Nevertheless it should be noted that in future studies, this aspect could still play a role, especially if the experimenter's personality is very dissimilar to the personality of the main attachment figure (the owner).

One possible confounding factor when testing play behaviour in dogs using different toys is to test if the dog shows a particular preference for one toy. However, by coding the videos, I found that determining any preferences would not be possible, as most of the tested dogs tried to play with more than one toy, sometimes even with three toys at the same time, for example by carrying both netting and tennis balls, while playing with the tug or vice versa. Another reason why determining toy preference would be problematic, as is also shown in Svartberg, (2006) is the fact that working dog breeds are more toy motivated, hence they like every type

of toy and are very fast in adjusting their play behaviour to the particular toy they are presented with. This also relates to the result of a study by Toth et al, (2008), who worked on playing styles and possible causative factors in dogs' behaviour when playing with humans, and showed that the behaviour of dogs in play situations is more influenced by their general play motivation. In future studies about playfulness knowing a dog's toy preference might be helpful when choosing a good reinforcement most dogs like to work with.

According to the prediction that a personality trait has to be stable over time and consistent across contexts (Costa and McCrae, 1992; Ley et al, 2008; Svartberg, 2003), the results of the present study suggests that there was both consistency over time and across context for the dog personality trait "Playfulness" (Svartberg and Forkman, 2002). These findings lead to the validation of the trait "Playfulness", and confirm its presence as a personality trait in the domestic dog. For future studies in the field of dog personality, it would be important to validate a method to investigate objective rating of dog behaviour, where dog personality traits are examined and an overall statement about individual dogs can be made. Currently, Borbala Turcsan and Stefanie Riemer are investigating this question within the Clever Dog Lab. The results of my study reveal the importance of testing other dog personality traits separately, to also validate their stability over time and context.

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8 APPENDIX

	Dog's name	Sex	Age (months)	Order of conditions
1	Xela	female	71	OA/OP
2	Fin	male	21	OP/OA
3	Merlin	male	41	OA/OP
4	Amir	male	38	OP/OA
5	Miley	female	48	OA/OP
6	Balian	male	39	OP/OA
7	Carlisle	male	22	OA/OP
8	Chio	female	48	OA/OP
9	Ellen	female	39	OP/OA
10	Caya	female	67	OA/OP
11	Rico	male	33	OP/OA
12	Keanu	male	31	OP/OA
13	Gatsby	male	34	OP/OA
14	Even	male	28	OA/OP
15	Cindy	female	31	OP/OA
16	Amy	female	32	OA/OP
17	Hollywood	female	32	OA/OP
18	Meena	female	44	OP/OA
19	Ultimo	male	44	OA/OP
20	Chaplin	male	67	OP/OA
21	Evil	male	39	OA/OP
22	Lass	female	36	OP/OA
23	Maggie	female	52	OP/OA
24	Yes	male	32	OA/OP
25	Dana	female	34	OA/OP
26	Connor	male	18	OP/OA
27	Josie	female	34	OA/OP
28	Fenja	female	74	OA/OP
29	Holly2	female	30	OA/OP
30	Chasper	male	42	OP/OA
31	Dream	male	26	OA/OP
32	Flori/Florida	female	23	OA/OP
33	Bea	female	51	OP/OA
34	KingLouie	male	54	OA/OP
35	Blake	male	24	OA/OP
36	Lenny	male	53	OP/OA
37	Aimy	female	81	OP/OA
38	Apryl	female	51	OA/OP
39	Pip	male	34	OP/OA
40	Leah	female	110	OA/OP
41	Cleo2	female	51	OP/OA
42	Zazou	male	28	OA/OP
43	Q.T.	male	92	OP/OA
44	Izzy	female	20	OA/OP

45	Quismo	male	42	OP/OA
46	Luke	male	90	OA/OP
47	Suri	female	27	OP/OA
48	Felix	male	110	OP/OA
49	Aeden	male	62	OP/OA
50	Allegro	male	110	OA/OP
51	Flocke	male	48	OP/OA
52	Clara	female	19	OA/OP

Tab. A: Table of the dogs that participated in the experiment plus the order of conditions (OP= owner present; OA= owner absent) for the Playing test

9 ZUSAMMENFASSUNG

Persönlichkeit kann als Anlage gesehen werden, die regelmäßig und dauerhaft das Verhalten in verschiedenen Situationen bestimmt und eine wichtige Rolle in der Variation von individuellem Verhalten innerhalb derselben Art spielt. Obwohl Persönlichkeit bei vielen verschiedenen Arten untersucht wurde, unterscheiden sich die einzelnen Dimensionen in ihrer Beschreibung selbst innerhalb derselben Art. Das Ziel der vorliegenden Studie war es, eine der Persönlichkeitsdimensionen für Hunde, im speziellen „Verspieltheit", auf ihre zeitliche und kontextbezogene Beständigkeit zu testen, da dies eine gängige Bedingung für die Bestimmung von Persönlichkeitsmerkmalen bei Menschen und Tieren ist. Weiters sollte herausgefunden werden ob bestimmte Typen von Persönlichkeit des Besitzers/der Besitzerin in Zusammenhang mit hoher Spielfreudigkeit des Hundes steht. Aufgrund der Tatsache, dass frühere Studien argumentieren, der Besitzer/die Besitzerin hätten einen beachtlichen Einfluss auf das Verhalten des Hundes, wurde ein Spielzeugtest durchgeführt, einmal in Anwesenheit und einmal in Abwesenheit des Besitzers/der Besitzerin, um die Beständigkeit von „Verspieltheit" über den Kontext zu testen. Für die Überprüfung der zeitlichen Beständigkeit wurde ein weiterer Test, ein Persönlichkeitstest, verwendet und vergleichbare Teile daraus mit dem Verhalten der Hunde während des Spielzeugtests korreliert. Zusätzlich wurde ein NEO-FFI Fragebogen verwendet, um zu untersuchen ob die menschlichen Persönlichkeitszüge „Extraversion" und „Neurotizismus" der Besitzer/innen das Spielverhalten der Hunde während des Spielzeugtests beeinflussen. Die Ergebnisse der Studie zeigen starke Beweise für eine Beständigkeit der Persönlichkeitsdimension „Verspieltheit" über den Kontext und ebenso wurden einige Beweise für eine zeitliche Stabilität von Verspieltheit gefunden. Eine Korrelation der Persönlichkeitszüge des Besitzers/der Besitzerin und der Verspieltheit des Hundes konnte nicht nachgewiesen werden, weder für „Extraversion" noch für „Neurotizismus". Aufgrund des Fehlens derartiger Korrelationen wird für zukünftige Studien, welche sich mit dem Einfluss des Besitzers/der Besitzerin auf das Verhalten des Hundes beschäftigen, geraten, zusätzlich die Bindung zwischen Besitzer/in und Hund zu untersuchen. Frühere Studien konnten zeigen, dass dieser Faktor einen Einfluss auf das Verhalten des Hundes, in Bezug auf die beiden Bedingungen An- und Abwesenheit des Besitzers/der Besitzerin, haben kann. Die Ergebnisse der aktuellen Studie zeigten eine Validierung der Persönlichkeitsdimension „Verspieltheit" für Hunde, da eine Beständigkeit der Dimension „Verspieltheit" sowohl über Zeit und Kontext gefunden werden konnte.

10 DECLARATION

I hereby declare that I wrote this master thesis independently and that I only used the stated sources and auxiliary means. Parts of the thesis that are either directly or indirectly deduced of other publications are marked with references throughout the thesis. This applies also for tables, figures and pictures.

Hiermit erkläre ich, dass ich diese Masterarbeit selbstständig verfasst habe und nur die angegebenen Quellen und Hilfsmittel angewendet habe. Jene Teile der Arbeit, die entweder sinngemäß oder im Wortlaut aus anderen Publikationen entnommen wurden, sind innerhalb der Arbeit mit Quellenangaben versehen. Dasselbe gilt auch für Tabellen, Grafiken und Bildern.

11 CURRICULUM VITAE

Personal information

Name: Claudia Manuela Rosam
Date of birth: 11.08.1987
Adress: Johann-Strauß-Straße 6; 9800 Spittal an der Drau
E-Mail: claudia_rosam@gmx.net
Nationality: Austria

Education

Dates: 1993 - 1994
Vorschule; 9800 Spittal an der Drau

Dates: 1994 - 1998
Volksschule; 9800 Spittal an der Drau

Dates: 1998 - 2006
Bundesgymnasium Porcia and Bundesobersufenrelgymnasium, nature science department, 9800 Spittal an der Drau
School leaving certificate: Matura

Dates: 2006 to 2010
Undergraduate Studies: Bachelor of Science
Department of Ecology and Biodiversity
University of Salzburg, Salzburg, AUT
Bachelor's theses:
Rosam, C. (2008): Die Muscheln des Wattenmeeres mit besonderer Betrachtung von Cerastoderma edule. Bachelorarbeit zur Lehrveranstaltung Tierische und pflanzliche Lebensräume. Fachbereich Organismische Biologie, Paris Lodron Universität Salzburg.
Referee: Dr. Ao. Univ.-Prof. Robert A. Patzner

Rosam, C. (2009): Biologie des Säbelschnäblers [*Recurvirostra avosetta*] und dessen Haltung im Tiergarten. Bachelorarbeit zur Lehrveranstaltung zur Lehrveranstaltung Methoden des Tiergarten- und Wildlifemanagement. Fachbereich Zoologie, Paris Lodron Universität Salzburg.
Referee: Mag. Dr. Slotta-Bachmayr

Dates: since 2009
Undergraduate Studies: Nutritional Science
Department of Nutritional Science
University of Vienna, Vienna, AUT

Dates: since 2010
Graduate Studies: Behavior, Neurobiology and Cognition
Department of Cognitive Biology
University of Vienna, Vienna, AUT

Dates: 2011
Internship project at the Clever Dog Lab, Department of Cognitive Biology, University of Vienna
Project title: Cognitive Bias in Pet Dogs
Publication: Müller, C.A., Riemer, S., Rosam, C.M., Schößwender, J., Range, F., Huber, L. (2012): Brief owner absence does not induce negative judgement bias in pet dogs. Animal Cognition, 15. 1031-1035.

Dates: since 2012
Master thesis
Department of Cognitive Biology
University of Vienna, Vienna, AUT
Messerli Research Institute
University of Veterinary Medicine, Vienna, AUT
Thesis entitled: „Repeatability of dogs' playfulness across time and contexts – is it really a personality trait?"
Referee: Univ.-Prof. Mag. Dr. Ludwig Huber; Dr. Corsin Müller