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Relationships between personality of human–dog dyads and performances in working tasks

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ABSTRACT

Improving operational performances of working dog–human dyads is receiving more and more attention. Despite this interest, the associations between human personality, dog personality, dog-human personality matching and dyad performances have rarely been addressed. This study explores the links between human and dog personality traits, their matching, the human-dog relationship, and dyad performances of handlers and working dogs belonging to the canine unit of the Paris Firefighters Brigade. Using a repeated searching task in a training field, we evaluated the performances of 14 dyads using three parameters: searching speed, searching precision and speed improvement of the dyad. Using a questionnaire, we assessed the quality of life of dogs (activities, relationship between handlers and their dog). Personality traits (neuroticism, extraversion, openness to experience, agreeableness, conscientiousness) and subtraits of handlers (30 subtraits belonging to the five human traits) were determined using the NEO-PI-R questionnaire, and personality traits of the dogs were investigated through six subtests that allowed us to characterize five dog personality traits. We compared the performances of dyads in relation to the human-dog relationship and correlated these with human, dog personality traits and their matching. Dyad performances were different depending on the quality of life of the dog and the human-dog relationship: dogs with toys at home showed a lower improvement capacity, while dogs with few physical punishments showed a lower number of errors in the searching task. The dog personality trait "human familiarity" was correlated with dyad performances, with a higher improvement ($r = 0.52$, $p = 0.05$) but a lower performance speed (correlation with total time of the searching task: $r = 0.55$, $p = 0.05$). Human "deliberation" (i.e. "conscientiousness"), "aesthetics" (i.e. "openness") and "modesty" (i.e. "agreeableness") were all positively related with precision of the searching task (correlation with the number of errors: $r = -0.48$, $p = 0.08$; $r = -0.52$, $p = 0.05$; $r = -0.51$, $p = 0.07$). Human "dutifulness" (i.e. "conscientiousness") and "activity" (i.e. extraversion) were positively related with dyad improvement ($r = 0.61$, $p = 0.02$; $r = 0.52$, $p = 0.06$; respectively) while human "excitement seeking" was negatively related to dyad improvement ($r = -0.50$, $p = 0.07$). Dyads with handlers higher on "gregariousness" (i.e. "extraversion") were more efficient when speed was considered ($r = -0.60$, $p = 0.023$).

Matching dogs and humans on "neuroticism" traits (human "anxiety" and dog "neuroticism") was negatively correlated with improvement ($r = -0.52$, $p = 0.06$). Matching of dog "activity-exploration" and human related subtraits to "extraversion" ("activity", "positive emotions") was correlated with higher speed (human "activity" and dog "activity-exploration" $r = -0.50$, $p = 0.07$ for time searching) but a lower precision (human "activity" and dog "activity-exploration" $r = 0.45$, $p = 0.11$ for number of errors) and a lower improvement (human "positive emotions" and dog "activity-exploration" $r = -0.47$, $p = 0.09$). However, matching on human subtraits "positive emotions" and "activity" and the dog trait "human familiarity" was positively correlated with speed ($r = -0.53$,

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$p = 0.05$ with time), precision ($r = -0.55$, $p = 0.04$) and improvement performance ($r = 0.62$, $p = 0.02$). This preliminary study provides new hypotheses for future examination of factors associated with the performances of working dogs and their handlers that could lead to selection of more efficient dyads.

1. Introduction

Since their domestication, estimated between 33000 and 15000 BP (Villa et al., 1995; Savolainen et al., 2002; Ovodov et al., 2011; Thalmann et al., 2013), dogs and humans have been sharing an old and fruitful history. Recent studies have revealed the benefits of the relationship between humans and dogs in helping humans to enhance social support, or maintain a lower-stress lifestyle (González Ramírez and Landero Hernández, 2014; Irvin, 2014). Moreover, dogs have been bred for various purposes (military dogs, companion dogs, working dogs for narcotics detection, guarding, search and rescue, guide dogs for blind or disabled persons; Svartberg and Forkman, 2002; Maejima et al., 2007). Working dogs play an important role in our daily life: in the United States of America, more than 22 000 people live with assistance dogs (Irvin, 2014). Furthermore, military working dogs are used by numerous governmental organisations for a variety of purposes, including police and patrol duties, or for search and rescue in emergencies (accidental building destructions, earthquakes) (Beach, 2013; Lazarowski and Dorman, 2014).

Officers, breeders or canine trainers attempt to obtain the highest performances by selecting dogs by their morphology, physiology, or behaviour, in particular linked with their personality traits (Wilsson and Sundgren, 1997; Svartberg, 2002; Jeong et al., 2015). Some studies have therefore been examining working dog performances, showing that some factors (relationship, personality...) are associated with the success of dogs in performing various obedience tasks. According to Lefebvre et al. (2007), a good obedience performance is associated with a good dog–human relationship, and positively correlated with the time the handler spends with the dog. Moreover, dogs belonging to dyads with lower performances had received more aversive stimuli than in high-performance dyads (Haverberke et al., 2008). Regular training, associated with positive dog-handler interactions, also appears to improve dyad performance (Haverbeke et al., 2010). As the quality of a relationship relies on the behaviour expressed by both the handler and the dog, and as behavioural patterns are linked to personality traits, it can be assumed that personality of both the human and the dog can influence the efficiency of a dyad. It has indeed been found that human personality is associated with the behaviour of a dog (Podberscek and Serpell, 1997). For example, Wedl et al. (2009) showed that the higher the owner scored on conscientiousness (i.e. the motivation to perform a task well), the lesser the dog barked and growled during a test. In Kotrschal et al. (2009), showed that owners higher on neuroticism (i.e. a trait characterized by anxiety, fear, worry, frustration, jealousy, and loneliness) were less efficient during the tasks with their dogs than owners lower on neuroticism. Moreover, in tests requiring the owner commanding the dog to sit, dogs of owners higher on neuroticism obeyed with a longer latency than the other dogs (Kis et al., 2012). Besides these studies highlighting the role of the owner's personality on obedience efficiency, the personality of the dog also appears to be associated with performances, particularly in military working dogs. According to Svartberg (2002), the shyness–boldness axis seems to predict some performances: bolder dogs showing a higher efficiency in performing tasks than their shyer counterparts. The dyad's performance is also linked with the dog's ability to concentrate: dyads with dogs showing less concentration had lower performances (Haverberke et al., 2008).

However, few studies have so far investigated the similarity (match) or dissimilarity (mismatch) of humans and dogs personality traits within the same pair. Personality matching was first referred to as "Byrne's law of similarity", suggesting that similarity of personality traits may predict the attraction between two individuals (Byrne et al., 1967; Botwin et al., 1997; Cavanaughet al., 2008; Turcsán et al., 2012; Tidwell et al., 2013). Turcsán et al. (2012) provide the first evidence that dogs and owners resemble each other in terms of personality. They indeed found a positive correlation between an owner and their dog in five personality traits (neuroticism, extraversion, conscientiousness, agreeableness and openness). However, in Turcsán et al. (2012) study, human–dog personality matching was not associated with the performance of the dog, and to our knowledge, no study has addressed the issue of human-dog personality matching yet, at least in a context of a searching task performance. As Byrne's law could be applied to the human-dog relationship in the context of a dyad performance improvement, one could hypothesize that the matching of human–dog personality traits would enhance dyad efficiency.

We investigated if the dog's quality of life, the personalities of the dog or the handler, or the combination of these, predicted working performance. According to previous studies, we expected that: (1) high-performance dyads would be composed of bold dogs, (2) high-performance dyads would be composed of owners ranking lower on neuroticism, that (3) dyads with personality matching would be more efficient and (4) high-performance dyads would be dyads with dogs having a better quality of life (i.e. more activities, low physical punishment).

2. Materials and methods

2.1. Subjects and general procedure

Fourteen human–dog search dyads composed of 12 men and two women and their intact working dogs (11 Belgian Shepherd males, two Belgian Tervuren males and one Belgian Tervuren female, average age: 5.8 years, minimal age: 2.4 years, maximal age: 8.5 years) were used in this study. The dyads belonged to the BSPP (Brigade cynotechnique des Sapeurs-Pompiers de Paris; the canine unit of Paris Firefighters Brigade specialized in search and rescue). Each dyad was working at that time and had received their yearly qualification. Dyads were working together since the arrival of the dog in the brigade (average time working together: 5.0 years, minimal time: 1.5 years, maximal time: 8.5 years). Dyads have commonly four days of continuous service during which they stay at the Fire Brigade base. During this period, dogs are trained every day. During days off, handlers are free to take their dog back home. Dog toys mainly consist of motivational bite training dummy toys: dogs are routinely rewarded by the game of "tug of war" rather than by food.

Data were collected from January to April 2013. Dyads were involved in three sessions of evaluation of the performances, on the training field used by the BSPP. Handlers had to fill in a questionnaire about their relationship and activities with their dog (e.g. toys at home for the dog, physical punishment...) and about their