



The quality of the relation between handler and military dogs influences efficiency and welfare of dogs

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Abstract

Over the last 10 years, the influence of the dog–owner relationship on dog behaviour has received growing attention, unlike the working dog handler’s relationship. Using a questionnaire addressed to the 430 dog handlers of the Belgian army in 2001 (303 respondents), this study investigated the association between the time spent by handlers with their military dog (MD) and some behaviours of these dogs, reflecting welfare, obedience, and aggressiveness. Less than half of the handlers took their MD home and/or practised a sport with their MD. Most of the handlers practising sport with their MD also took their animal home. Statistically significant associations were detected. Obedience of MDs was clearly greater in MDs living at their handler’s home and in MDs practising sport. On the contrary, we found no influence on obedience either for the first time handlers or for their length of service. Handlers taking their MD home and handlers practising sport with their MD declared fewer bites than the other handlers did. Bites concerned almost exclusively military staff. Only one family member was bitten by an MD and this MD had been left in a military kennel. Suspicion of previous rough handling was associated with fearful and aggressive behaviours. Handlers taking their MD home had dogs that were more sociable, this was not evidenced for MDs practising sport. Finally, being taken to a handler’s home and practising sport were associated with a lower expression of behaviours indicative of impaired welfare. Discussion of our results in the field of dog–human relationship leads to conclude that the effects of housing at a handler’s home and practising sport were strongly linked to the enhanced dog–handler relationship.

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1. Introduction

In the past decade, studies have underlined the influence of the relationship between pet dogs and their owner on dog welfare and dog behaviour problems related by owners, as overexcitement, aggressiveness, or separation-related problems (Jagoe and Serpell, 1996; Kobelt et al., 2003). The occurrence of behavioural problems had been linked to meal distribution time, sleeping locations, and reasons for acquiring a dog (Jagoe and Serpell, 1996), amount of time spent with the dog (Kobelt et al., 2003), as well as owners' prior experiences of dog owning (Jagoe and Serpell, 1996; Kobelt et al., 2003). Other authors found no influence of meal distribution time or the playing competitive games with dogs on their aggression level (Voith et al., 1992; Podberscek and Serpell, 1997). The impact of obedience training, commonly recommended for treatment of dog behaviour problems, is discussed in the literature. Jagoe and Serpell (1996) found that obedience training per se was associated with reduced prevalence of aggression, separation-related problems, and escaping/roaming. On the contrary, other authors found no effect of obedience training on aggression or other behaviours considered as problems by owners, such as excessive barking or disobedience (Voith et al., 1992; Podberscek and Serpell, 1997; Kobelt et al., 2003). Instead of that, they found a link between walks/exercises and low levels of aggressiveness (Podberscek and Serpell, 1997). Furthermore, all these authors suggest the importance of the quality of the dog–owner relationship in reducing prevalence of behaviour problems. In the same sense, Clark and Boyer (1993) found that the level of owners' attachment was not independent of their dog's behaviour problems and Podberscek and Serpell (1997) showed that owners of “low” aggressive dogs were more likely to be attached to their animal, whereas owners of “highly” aggressive dogs were less likely to regularly groom them. Furthermore, Clark and Boyer (1993) demonstrated that obedience and dog–owner relationship were improved within 8 weeks not only by obedience training associated with canine behaviour counselling but also by 20 min of simple daily dog–owner interactions. In addition, both treatments lowered separation anxiety, compared to a reference group having received no instruction. This study aims to identify if the level of owners' attachment, the time spent with the dog (in the context of obedience training or not), and the dog behaviour, in particular obedience performance, are dependent on each other. If so, owners' attachment to their dogs would therefore to enhance dog performance and to lower dog behavioural problems (linked to anxiety).

All of these studies were performed on pet dogs. However, pet–owner relationship and working dog–handler relationship may be quite different. This difference may be particularly marked when focussing on guard dogs acquired for security tasks such as the prevention and defence against intruders in military installations (the Belgian army in our case). In fact, Belgian military handlers do not generally choose their dog, which is attributed depending on the dogs available. Their level of attachment to the dog is neither automatic nor necessarily important. Moreover, these dogs are sometimes considered by handlers as simply work tools and used with little considerations as to their welfare (Schilder and van der Borg, 2004). In spite of these particularities, the handler–dog relationship has received little attention so far.

In this study, we used a questionnaire to study the relationship between working dogs of the Belgian army and their handlers. Our first aim was to determine the proportion of handlers who spent more time and energy with their dog, either by taking it home (the alternative being to leave the military dog at the military kennel, caring for it only when at work) and/or by practising sport with their military dog when off duty. Our second aim was to measure the interaction between these handlers' choices, considered as time “invested” in the dog–handler relationship, and dog behaviours reflecting obedience, aggressiveness, and welfare.

2. Material studied and methods

2.1. Subjects

Study subjects were dog handlers of the Belgian army and their military dogs (MD), mostly Belgian Shepherds (Malinois). Dogs are bought between 1 and 3 years old. The selection tests are physically (i.e. hip dysplasia) and behaviourally (i.e. reaction at gun shot, bite work) oriented. After 2 weeks of familiarisation with the already operational handler, the team is sent to its unit in order to protect military installations (i.e. to alert the handler about the presence of an intruder, to guard and escort the intruder, to protect the handler). The team is trained once a month. When working, handlers walk their MD on a leash for about 20 min every 2 h, for 16 h (weekdays) or 24 h (weekends). When off duty, handlers may either leave their MD at the military kennel (MK) in an individual pen or take it home. In the first case, dogs stay in their pen between two working periods. In the second case, handlers have to have an individual pen for their MD but, as their social contacts are not fixed, the dog is free to have various social interactions with human (handler's family members or friends) or pets.

2.2. Questionnaire

The questionnaire consisted in 34 questions related to (1) the MD–handler relationship and to (2) the handlers' perception of their MD's behaviour and personality. Data concerning the second point, even if obtained by way of a questionnaire, were considered as reliable: questions were as simple as possible in order to be clearly understood in the same way by all of the handlers and to avoid misunderstanding of MD behaviours. The first questions were about the handlers (e.g. length of service), their MD (e.g. sex, suspicion of previous rough handling before entering the army), and the dog–handler relationship. Handlers were in particular asked if they practised a sport with their MD when off duty, that is biathlon, Ring, R.C.I. (“Règlement de Concours International”, i.e. International Dogshow Regulations, sort of Ring, defence and attack, Agility, obedience, other). Some questions followed which concerned only those handlers taking their dog home and focused on the location of MD in the handler's home (e.g. in the house/garden/kennel). The respondents were then required to give information on their dog's sociability (e.g. is the dog gentle with people), aggressiveness (e.g. has already bitten), obedience, and personality (e.g. level-headed/aggressive/fearful). Finally, handlers were asked if they observed one or more of seven listed abnormal behaviours (“paw licking”, “destroying material”, “diarrhoea”, “howling”, “pacing”, “running around after its tail”, “barking”) while their MD was in its pen. These behaviours were chosen according to their demonstrated link with chronic stress (Beerda et al., 1997, 1999) and because they can be easily recognized by all handlers. Whereas the three first behaviours have material consequences and may be rated even if not directly seen, the four remaining need to be observed to be rated. A particular difficulty is for the last one, which, depending on when handlers rated it (in view from their MD pen or out of sight), may have different significations: (a) indicator of reduced welfare (Beerda et al., 1997, 1999), or (b) simple reflection of dog excitation linked to human presence (Adams and Johnson, 1995).

2.3. Sample

Questionnaires were sent to the 430 military handlers in 2001. Three hundred and three handlers responded, that is 70.47%. This good response rate allowed us to consider that we disposed of a representative sample of the considered MD–handler population.

2.4. Analyses

Responses were recorded in a table (62×303), to number responses per question (categorical variables) and to cross-reference them. The influence of MD housing location (their handler's home or MK), their possibility to practise a sport when off duty (yes or no), and the suspicion of previous rough handling before entering the army (yes or no) on categorical variables were tested using chi-square (SAS, 2002). Other potentially pertinent interactions were tested this way or using chi-square or ANOVA for numerical variables. Results were expressed in mean \pm S.D.

3. Results

3.1. The handlers

Handlers exercised their profession for $10.03 \text{ years} \pm 6.09$. Given that they could apply for this job only from the age of 38, they were globally older. One hundred and two MDs (33.66%) were the first MDs for their handler.

One hundred and forty-three handlers (47.19%) took their MD home or practised sport with it. Forty-nine handlers (16.17%) took their MD home and practised sport with it. One hundred and twenty-one handlers (39.93%) took their MD home. The others left their MD at the MK. Handlers could explain their choice with one or more predefined responses. Handlers took their MD home in order to enhance their animal welfare (95.87% of the 121 handlers) and their relationship with it (89.26%). Few handlers did it because it was easy (15.7%) or to benefit of the monthly indemnity (75 euros; 5.79%). Handlers left their MD at the MK because of—(1) material problems: inappropriate handler housing (36.26% of the 182 handlers) and financial difficulties (infrastructures too expensive: 12.64%; insufficient indemnity: 5.49%), (2) human problems: no interest in taking the MD home (26.37%), disagreement of family or neighbourhood (8.79%), and/or (3) problems directly linked to the MD: potentially dangerous (32.97%), handler seldom at home (7.69%). To the question of where the dog stands when taken at the handler's home (always in its pen, in the garden, in the house, always in the house), 26.45% of the 121 handlers taking their MD home affirmed that it lived 24 h a day in its pen. However, 90.91% of the handlers affirmed their dog had access to the garden, this is inconsistent with some of the responses to the previous question. Forty-seven MD (38.84% of the 121 handlers) had access to their handler's house and 14 MD (10.74%) had permanent access to their handler's house.

Seventy-one handlers (23.43%) practised a sport with their MD when off duty (just one handler did not respond to this question). Sports were defence and attack (54.93% of those handlers), obedience (43.66%), other (e.g. jogging; 22.54%), biathlon (16.90%), Ring (11.27%), Agility (8.45%), and/or R.C.I. (5.63%). The proportion practising sport depended on dog housing location (χ^2 , d.f. = 2, $p < 0.001$): whereas 40.50% of the 121 handlers taking their MD home practised sport with it, only 12.08% of the 182 handlers leaving their MD at MK did. Handlers not practising sport with their MD when off duty ($N = 231$) did so because of a lack of time (35.93% of the handlers), diverse (e.g. think that sport is forbidden during off duty time; 16%), lack of interest (9.52%), physical problems linked to the dog or to the handler (8%), problems linked to the distance between the handler's house and the MK (8%).

3.2. The dogs: characteristics of the population

Most of the MDs were entire males (only 2.33% of MD were sterilized and 4.32% were females). Status depended on sex: 23.08% of females were sterilized whereas only 1.39% of

males were. Handlers worked with their MD for 4.14 years \pm 2.50 (S.D.). Concerning the MD life before entering the Belgian army, 81 handlers (26.73%) thought that their MD had been previously roughly handled. Eighteen handlers (5.94%) did not respond to this question.

3.3. The dogs: obedience

For security reasons, after having ordered their MD to bite, handlers have to be able to stop them biting on command (with the “loose” order). One hundred and seventy eight handlers (58.75%) affirmed that their MD complies with this order after one to three commands (MD referred as “obedient”). However, 116 handlers (38.28%) had to command more than three times and/or had to physically intervene to be obeyed (“non-obedient” MD). Nine handlers did not respond. The proportion of obedient dogs was greater within MD taken home (72.73%) than within MD left at the MK (49.45%; χ^2 , d.f. = 2, $p < 0.001$), and within MD practising sport (73.24%) than within the MD not practising (54.11%; χ^2 , d.f. = 2, $p < 0.001$; Fig. 1). The proportion of obedient dogs did not vary with suspicion of previous rough handling (χ^2 , d.f. = 2, $p = 0.394$), on length of service of their handler (one-way ANOVA, F -value = 1.62, d.f. = 1, $p = 0.199$), or on the fact that they were or were not the first MD of their handler (χ^2 , d.f. = 2, $p = 0.846$).

3.4. The dogs: security

Seventy-eight handlers (25.74%) declared that their MD bit at least one person (1–3), which lead to 90 declared bites. Most of these bites (90.11%) concerned military staff: the handler (34.07% of declared bites, 31 persons), another handler (35.16%, 32 persons), or another military person (20.88%, 19 persons). Of the nine civilians bitten, one was a member of a handler’s family but none was a child. Handlers taking their MD to their home declared fewer bites (19.83%) than handlers leaving their MD at the MK (29.67%; χ^2 , d.f. = 1, $p = 0.014$). Handlers practising sport declared fewer bites (19.72%) than handlers not practising (27.71%; χ^2 , d.f. = 1, $p = 0.045$). Proportion of declared bites was independent of the suspicion of previously rough handling (χ^2 ,

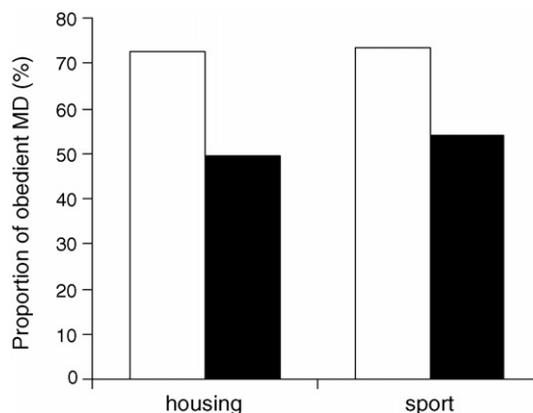


Fig. 1. Influence of the three studied treatments on the proportion (%) of obedient MD. Obedient MD were defined as responding to three “loose” orders or less (for the other MD, handlers had either to give the order more than three times or to physically intervene). We considered the influence of housing location (white bar: the handler home; black bar: at the MK), and of practising sport when off duty (white bar: yes; black bar: no).

d.f. = 1, $p = 0.182$). Eighty-five handlers (28.05%) declared they had been bitten by the MD of another handler.

3.5. The dogs: personality

To describe their MD's personality, handlers chose one (277 handlers) or more (19 handlers) response(s) within the three proposed (level-headed/fearful/aggressive), this made 316 responses. Seven handlers did not respond. Most of the handlers considered their MD as level-headed (84.49%). On the contrary, few handlers considered their MD as fearful (11.22%) or aggressive (8.58%). Level-headed and aggressive MD were generally not suspected of previous rough handling (71.48% of the level-headed MD; 65.22% of the aggressive MD). On the contrary, most of the fearful MDs (58.82%) were suspected of previous rough handling. Furthermore, MD suspected to have been roughly handled ($N = 81$) were less often perceived as level-headed (76.54% of them), but more fearful (24.69%) or aggressive (9.88%) than the other MD (level-headed: 89.71% of these last MDs; fearful: 4.90%; aggressive: 7.35%; χ^2 , d.f. = 2, $p < 0.001$; Fig. 2). Perception of MD personality and their obedience were not independent (χ^2 , d.f. = 3, $p < 0.001$). Most of MD considered as level-headed (59.77% of 256 MD) or fearful (42.31% of 26 MD) were obedient, unlike MD considered as aggressive who were generally non-obedient (79.41% of 34 MD). Perception of MD personality depended neither on their housing location (χ^2 , d.f. = 3, $p = 0.820$) nor on the practise of a sport (χ^2 , d.f. = 3, $p = 0.182$).

3.6. The dogs: sociability

Two hundred and six handlers (67.99%) perceived their dog as sociable. Seventy-four handlers (24.42%) considered their MD as unsociable. Seven handlers (2.31%) affirmed that their MD sociability varied according to the situation. The last 16 handlers did not respond to the question. Handlers taking their MD home were proportionally more numerous (77.69%) to consider them as sociable than handlers who did not (61.54%; χ^2 , d.f. = 3, $p < 0.001$). MD considered as sociable were more obedient (63.59% of these MD) than MD considered as unsociable (51.35%; χ^2 , d.f. = 2, $p < 0.026$). Handlers whose MD had already bitten someone

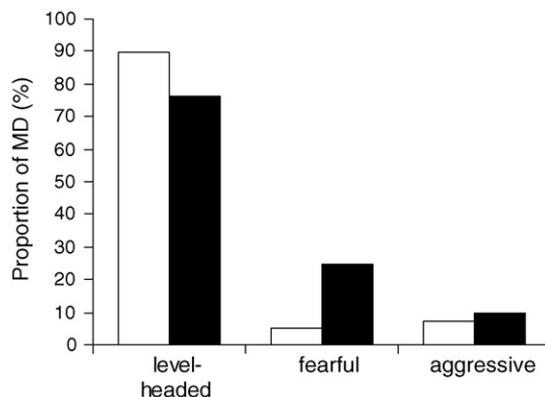


Fig. 2. Suspicion of previous rough handling before entering the army (white bars: not suspected; black bars: suspected) and perception of MD personality by handlers.

were proportionally less numerous to consider their dog as sociable (43.59%) than the other handlers (76.44%; χ^2 , d.f. = 3, $p < 0.001$).

Perception of the MD sociability was independent of practising sport (χ^2 , d.f. = 1, $p = 0.55$) and of suspicion of previous rough handling (χ^2 , d.f. = 1, $p = 0.424$).

One hundred and sixty-seven handlers (55.12%) affirmed that their MD accepted being stroked by an unknown person. Ninety-eight (32.34%) responded in the negative and six (1.98%) that the response of their MD varied according to the circumstances. Thirty-two handlers (10.56%) did not respond to this question. MD taken to their handler's home were proportionally more numerous accepting to be stroked by an unknown person (63.64%) than MD left at MK (49.45%; χ^2 , d.f. = 2, $p < 0.009$). MD accepting to be stroked by unknown persons were more numerous to be obedient (61.68%) than other MD (52.04%; χ^2 , d.f. = 2, $p < 0.038$). MD accepting to be stroked by an unknown person was more often considered as sociable (94.01% of the 167 MD) than MD not accepting (27.55% of these 98 MD). Note that this last proportion also signifies that about one third of MD, having already bitten, were however considered as sociable by their handler. MD having never bitten were proportionally more numerous to accept being stroked by an unknown person (63.11% of these 225 MD) than MD having already bitten at least one person (32.05% of these 78 MD; χ^2 , d.f. = 2, $p < 0.001$). To accept being stroked by an unknown person was independent of the practise of sport (χ^2 , d.f. = 2, $p = 0.475$) and of the suspicion of previous rough handling (χ^2 , d.f. = 2, $p = 0.326$).

Two hundred and eighty handlers (92.41%) affirmed they could approach their MD while it ate. Two hundred and sixty-five handlers (87.46%) were able to touch it while it ate. Two hundred and ten handlers (69.31%) were able to take away their MD's bowl as it ate. The proportion of handlers being able to approach their MD, touch it, or take away its bowl while it ate was greater within those taking their MD home (approach: 96.69% of 121 handlers; touch: 92.56%; take away the bowl: 80.17%) than handlers leaving their dog at the MK (approach: 89.56% of these 182 handlers; touch: 84.07%; take away the bowl: 62.09%; χ^2 , d.f. = 4, $p < 0.01$ for the three situations). These proportions were independent of practising sport (χ^2 , d.f. = 4, respectively: $p = 0.138$, $p = 0.169$, $p = 0.406$).

3.7. MD behaviours in their pen (indication of welfare)

On average, each of the seven abnormal behaviours was observed by 27.57 ± 21.98 (S.D.) of the handlers (mean observation rate: 9.10%; Fig. 3). The most observed behaviours were "pacing" (22.11%), "barking" (14.19%), and "destroying material" (11.55%). The least observed behaviours were "running after its tail" (1.65%), "diarrhoea" (3.63%), and "howling" (5.28%) and "paw licking" (5.28%). Moreover, 88 MD (29.04%) exhibited at least one of the seven behaviours.

Proportions of the observed behaviours varied according to the MD housing location (χ^2 , d.f. = 6, $p < 0.01$): within MD housed at their handler's home ($N = 121$), each behaviour was observed on average by 7.14% handlers, whereas, within MD left at MK ($N = 182$), each behaviour was observed on average by 11.07% handlers (Fig. 3a). Proportions varied according to the practise of a sport (χ^2 , d.f. = 6, $p < 0.001$): within MD practising sport ($N = 71$), each behaviour was observed on average by 1.98% of the handlers, whereas, within MD not practising sport ($N = 231$), each behaviour was observed on average by 7.12% of the handlers (Fig. 3b). Proportions varied according to the suspicion of previously rough handling (χ^2 , d.f. = 6, $p < 0.01$): within MD suspected of previous rough handling ($N = 81$), each behaviour was observed on average by 11.64% of the handlers, whereas, within MD not suspected ($N = 204$), each behaviour was observed on average by 7.91% of the handlers (Fig. 3c).

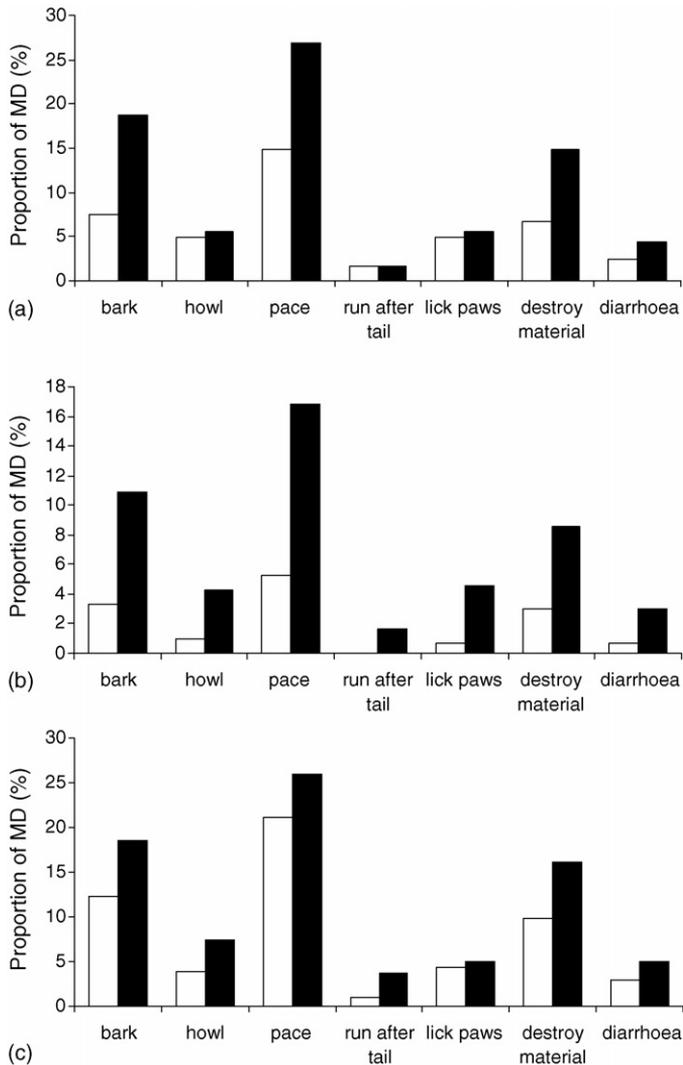


Fig. 3. Rate of abnormal behaviours observed, according to (a) the MD housing location (white bars: handler's home; black bars: MK), (b) the practice of sport when off duty (white bars: yes; black bars: no), (c) the suspicion of previous rough handling (white bars: no; black bars: yes).

4. Discussion

4.1. Handlers "investment" in their relationship with their MD

Less than half of the handlers took their military dog (MD) home and/or practised a sport with their MD. Surprisingly, the proportion of handlers practising sport we found was similar to that found for civil dog owners (Kobelt et al., 2003). Most of the handlers practising sport with their MD when off duty also took their MD home. We propose two explanations: (1) handlers taking their MD home were the most motivated to spend time with their MD, probably because of their

greater interest in their MD, or (2) taking the MD home was more convenient for practising sport. The first explanation is partly confirmed by motivations for handlers' choices: most of them took their MD home in order to enhance their MD's welfare and/or their relationship with it. In this sense, Podberscek and Serpell (1997) showed that owners more attached to their pet dog were more likely to groom them and to walk/exercise them than owners less attached to their pet dog. The second explanation does not seem to be confirmed by our data: only 18 handlers did not practise sport ($N = 231$) because it was inconvenient.

4.2. Obedience

Obedience to the basic "loose" order was far from optimal. More than one third of handlers had to give the command more than three times and/or to physically intervene to be obeyed.

Being taken home and practising sport were clearly linked to better obedience of the MD. This result leads to two comments. First, disposing of no apparent causal relationship, we propose two explanations: (1) MD were taken to their handler's home or practised sport because of their good obedience, or (2) good obedience of MD resulted from being taken home or practising sport. Clark and Boyer (1993), in accordance with the second proposition, found that obedience might be improved just by increased time spent with pet dogs and by improvement in dog-owner relationship. Second, although respective effects of housing location and practising sport were hardly distinguishable in our results, the literature furnishes elements of discussion. Voith et al. (1992) showed that practising sport, in particular obedience training, has no influence on behaviour problems of pet dogs (e.g. aggression, disobedience, fearful behaviours). Furthermore, Podberscek and Serpell (1997) showed that dogs whose owners were attached to them were not only less aggressive but were also more rapid to obey. These authors, in accordance with other authors (Kobelt et al., 2003), suggest that the quality of the dog-owners relationship could be more important than practising sport. These elements lead us to conclude that better obedience of MD was associated with good dog-handler relationship coupled with increased time spent with the animal, through housing at home or, in some cases, practising sport.

We found no link between the suspicion of previous rough handling and MD obedience. We propose two explanations: (1) rough handling of MD had no influence on their obedience, (2) rough handling of MD influenced their obedience but this influence was modified by years of working in the Belgian army with their current owner. More data are needed to conclude.

Aggressive MD were less obedient than fearful and level-headed ones and sociable MD were more obedient than non-sociable ones. Given that suspicion of previous rough handling was linked to aggressive and fearful behaviours,¹ it may be suggested that rough handling impairs the MD obedience at least in the case of aggressive dogs. In this sense, authors showed that punishment, in particular with shock collars, enhances behaviours indicating compromised welfare of pet dogs (Hiby et al., 2004) and of working dogs (Schilder and van der Borg, 2004) without concurrent benefits in obedience (Hiby et al., 2004). The particular point of previous rough handling needs to get further attention as it might be possible that some handlers, searching

¹ Again, we dispose of no causal relationship and it may be assumed that (1) these MD were roughly handled because they possess such undesirable characteristics, that (2) they had these characteristics because of such treatment or that (3) handlers thought that their dog was previously roughly handled because they noticed that their dog was fearful or aggressive.

for an explanation for disobedience, aggression or abnormal behaviours in their dogs, found convenient to think that this bad treatment might be responsible for them. This paper is not able to state about that point.

We found no influence either of the first time of handlers' ownership or of their length of service. Handler experience was therefore not of prime importance in the obedience performance of their MD. It could signify that handlers acquired no additional experience through doing their job, but stayed at the level acquired at the beginning their job (through training). This result underlines the importance of initial staff selection and training. This result agrees with [Kobelt et al. \(2003\)](#) where owner's perception of pet dog's obedience is independent of first-time ownership. It however disagrees with [Svartberg \(2002\)](#) where pet dogs of experienced owners better performed behavioural tests (including obedience tests) than less experienced owners. Differences between these studies could be attributable to subjective (owner's perception) versus objective (behaviour tests) dog's evaluation. If dog obedience actually increases with handlers/owners experience but is not perceived by handlers/owners, then the use of questionnaires for assessing dog obedience should be very cautiously in future studies.

4.3. *Security*

Security may be improved. In fact, one quarter of the handlers declared one or more bite(s) from their MD. Handlers taking their MD home, and handlers practising sport, declared fewer bites than the others. Again, our data do not give a causal relation between these elements. Concerning the timing of bites, the biters in the Belgian army were young (average age = 4.4 years; [Haverbeke et al., 2005](#)) suggesting great caution during the period of familiarisation between the handler and his MD and the following few months. Nevertheless, we can affirm that, according to our data, MD taken to their handler's home did not represent a danger for the family members of handlers: bites of civilians concerned only 1.15% of bites and the only family member bitten was by a MD left at the MK.

4.4. *Sociability of MD*

Handlers taking their MD home had more sociable MD; this was not evidenced for MD practising sport. MD taken home were not only more often considered as sociable but were also more numerous to accept to be stroked by unknown persons. These results may be interpreted in two ways: (1) MD taken to their handler's home were initially more sociable and were taken at their handler's home for this reason, (2) because they were taken to their handler's home, MD became more sociable. Handlers explained their choice of taking their MD to their home essentially by the desire to enhance the welfare of their MD and their relationship with it and none of them mentioned the initial sociability level of their MD; on the contrary, about one third of handlers leaving their MD at military kennel (MK) gave for explanation the potential danger represented by MD. Therefore, either this group of handlers actually received few sociable MD or their perception of the dogs differed from that of other handlers. They could have, for example, a lower threshold of tolerance toward their MD's behaviour, less affinity with dogs, or lower ability to face the aggressiveness of their MD. Handlers taking their MD home were more numerous to be able to approach, touch, or take away the bowl of their MD when eating. These dog behaviours, likely indicative greater subordination to or confidence in the handler, and may be considered as normal and desirable in any dog. They were however not associated to practising sport. The influence of living at a handlers' home on MD sociability and MD

behaviour when eating could be due to the reasons having led to these handlers' choice (mostly to enhance their MD welfare and their relationship with it) and to the way of life offered to these MD. Effectively, even if some of the handlers affirmed leaving their MD permanently in pen, most of them gave access to their garden and some of them to their home. Such a way of life may have increased occurrence of MD contacts with humans (with handler but also with family members and/or friends of handler) and therefore enhanced behavioural reactions of these MD to human actions.

The absence of interaction between practising sport and MD sociability could be due to the motivations of handlers in practising sport. Even if we lack of data about the latter, we can suppose that handlers' choices were linked to (1) the MD welfare, (2) the MD performance, (3) the handler's pleasure (which sport practised), and/or (4) the handler's performance. Practising sport linked to reasons (1) and (3) would entail more sportive and fun aspects for MD, whereas practising sport linked to reasons (2) and (4) would entail more working aspects for the MD, implying efforts and strict obedience. Whereas the first case seems favourable to enhance the dog–handler relationship and the MD sociability this is not obvious for the latter case. In particular, 'attack and defence' was the more practised sport and this sport is not known to make a dog more sociable. This needs further exploration.

4.5. Welfare

Being taken to handler's home and practising sport were associated with decreased expression of behaviours linked to impaired welfare. According to studies concerning pet dogs, each of the three following parameters probably intervened—(i) time spent by the handler with MD: Kobelt et al. (2003) found that the amount of time the owner spent with the dog was negatively correlated with problematic behaviours (constant running around, digging, and chewing). (ii) Better quality of relationship between the handler and MD: Jagoe and Serpell (1996) showed that dogs chosen primarily for exercise exhibited a reduced prevalence of dominance-type aggressions and possessive aggressions. Authors explain their result as a reflection of the more interactive, owner-lead style of this exercise-based relationship. (iii) Time spent in pen by MD: Tuber et al. (1999) and Marston and Bennett (2003) have reviewed studies showing that to be sheltered (kennelled) is stressful for dogs. In this sense, a recent study on MD (Lefebvre, Diederich, Giffroy, unpublished data) suggest that confinement in MK produces prolonged behavior disorders (stereotypies) and activation of the hypothalamic–pituitary–adrenal (HPA) axis.

5. Conclusion

Taking MD home was strongly associated with good MD sociability and dog–handlers relationship. Such an association was not observed through practising sport probably because of quality differences in dog–handlers relationship. However, taking MD home, and practising sport, enhanced dog welfare and obedience, whereas suspicion of previous rough handling was associated with impaired obedience. These results are in accordance with previous studies on pet dogs and strongly contradict the widespread opinion according to which working dogs have to be harshly trained in order to be efficient (see for example Myles, 1991; Hiby et al., 2004; Schilder and van der Borg, 2004). According to previous studies done on pet dogs (Hiby et al., 2004; see also Boivin et al., 2003 for more general purpose), we conclude that time spent with dogs may enhance their welfare, without concurrent deficit in obedience or increased danger for the family.

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