Unravelling dominance in dogs

Aggression is the canine behaviour most likely to lead to relinquishment or euthanasia. Understanding how dogs socially interact and manage conflict is therefore of particular importance to veterinary professionals. Traditional approaches to the prevention and management of canine aggression advocated owners assert themselves as ‘pack leader’ through routine control of all resources and correction of any perceived challenge for them. At its most extreme this included physical punishment and steps to inhibit any initiative by the dog, including free movement and social interaction. The theory evolved from early to mid 20th century research into captive wolf behaviour, embellished by subsequent generations of dog trainers and behaviourists. However, more recent research into the behaviour of non-captive wolves and domesticated dogs, both in the home and living feral, has brought the dominance theory into question. Perhaps more importantly, progress in the fields of animal welfare and training have highlighted ethical concerns and risks associated with the punitive methods of handling and training recommended by advocates. Modern approaches to modifying and managing the behaviour of the domestic dog use scientific principles to understand the motivation for their behaviour. Change is then facilitated through management of triggers, changing the dog’s emotional response to them and manipulating things the dog wants, to encourage preferred behaviour.

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Problem behaviour in dogs is potentially life-threatening. In a recent study of 5095 deceased dogs, 4% had been euthanised on behavioural grounds at a median age of just 4.2 years old and unwanted behaviour was the number one reason for euthanasia in dogs under 3 years of age (O’Neill et al, 2013). Dogs euthanised by rescue shelters are also predominantly destroyed on behavioural grounds (Bollen and Horowitz, 2008). Prevention, accurate diagnosis and effective treatment of problem behaviour should therefore carry equal weight to the care of an animal’s physical health. The first step to achieving this is understanding the natural behaviour of the dog and the factors that can influence it. As aggression is the behaviour most likely to lead to relinquishment or euthanasia, understanding how dogs socially interact and manage conflict, with both humans and other dogs, is of particular importance.

Historical views of canine social behaviour and conflict resolution

During the second half of the 20th and early part of the 21st century, the prevailing theory regarding the social behaviour of the domestic dog was that, when living in groups, canine social relationships are managed through formation of a linear dominance hierarchy (The Monks of New Skete, 1978; O’Farrell, 1992; Millan and Peltier, 2008). This theory suggests that each individual within a group holds a rank in order of seniority and that higher-ranking individuals have priority access to resources, lead all activities, and initiate social interactions ahead of those lower in the ‘pecking order’ (Figure 1). All dogs are said to have an innate desire to achieve the ‘alpha’ or ‘pack leader’ status held by the highest ranking individual, due to its association with the right to breed (Peterson et al, 2002). Attempts to gain access to a resource, or to initiate an activity or interaction ahead of a higher-ranking member, is interpreted as a challenge for higher status. Higher ranking members are therefore said to defend their status by controlling these at all times, using force if needed (Lindsay, 2005). Advocates of the theory tend to attribute all behaviour to the animal’s desire to maintain or elevate status, and advise owners to prevent or manage unwanted behaviour by asserting ‘dominance’ over their dogs (van Kerkhove, 2004).

The principle of the ‘dominance hierarchy’ as a structure to explain social interaction in animals was first proposed by Schjelderup-Ebbe (1922) during studies into the behaviour of chickens, hence the term ‘pecking order’ (van der Borg et al, 2015). It was then subsequently used...
to explain behaviour observed in two successive groups of up to 10 wolves of mixed races, captured from the wild and confined to a 10 m x 20 m enclosure during the 1930–40s (Schenkel, 1946). Schenkel described the wolves as forming two ‘sex orders of precedence’ (Schenkel, 1946: 10), and suggested that these ‘govern the total life management of the pack’ (Schenkel, 1946: 11). The notion that wolves maintained status by controlling the behaviour of weaker, so lower ranking, wolves is reflected in his observation that ‘by incessant control and repression of all types of competition (with the same sex), both of the ‘α animals’ defend their social position’ (Schenkel, 1946: 11). He also noted that attacks by the larger wolves, usually on the smaller wolves of a different race, continued until the target ‘steadily lost the significance of environmental social partnership, was robbed of all social initiative’. In some cases, these attacks continued until the weaker wolf was mortally wounded.

Scott and Fuller (1965) subsequently also described consistent dominance and submissive behaviours between some individuals, which in certain cases seemed to form ‘straight line dominance hierarchies’. However, the authors noted that this was not consistent across all the dogs studied, suggesting complex influences over demonstration of the behaviour, rather than this being the norm.

There is little mention of dominance or dominance hierarchies in books on the training or care of dogs aimed at pet owners prior to the late 1970s (Smith, 1948; Goldbecker and Hart, 1967). Popularisation of the theory is often credited to The Monks of New Skete (1978) in their book How to be your dog’s best friend: A Training Manual for Dog Owners. It then quickly spread and soon became the accepted way to explain and manage the behaviour of dogs with professionals and owners alike (Ryan, 2010). Precise interpretation and application of the method has varied widely. Behaviours such as stealing or possessive behaviour around food, pushing ahead through doorways or the dog positioning him/herself higher than the owner, are widely interpreted as acts of ‘dominance’ (Maguire, 2016a). More extreme interpretations may also attribute behaviour such as attempting to interact with the owner (My Smelly, 2016), problem behaviour when left alone (Maguire, 2016a), or eliminating indoors (Waters, 2016) as an attempt to elevate rank.

The methods recommended for maintaining alpha status are also varied. Controlling all resources, such as food or access to preferred — especially higher — sleeping places, initiation of all attention (Maguire, 2016b), and always walking ahead of the dog (Waters, 2016), are widely recommended. Some may also advocate intimidation or physical punishment to correct perceived challenges. This may include use of dominance or threat postures, such as staring at or standing over the dog, grabbing the dog by the scruff or muzzle, or corrections intended to imitate bites (e.g. using the hand like a claw or prong/pinch collars) (Preston, 2004). One of the most controversial methods is the ‘alpha roll’, which involves forcibly rolling the dog onto the ground and holding him or her there until they ‘submit’ by no longer struggling or retaliating (Preston, 2004).

**Was Schenkel’s interpretation of the wolves’ behaviour accurate?**

Science is constantly evolving. Advances in the fields of psychology, biology, neuroscience and ethology (the study of natural animal behaviour), and developments in technology, have enabled researchers to re-evaluate and build on the early research of Schenkel and others into the behaviour of wolves and dogs. Studies into the behaviour of wild wolf packs have revealed that, when living freely, wolves live in co-operative family groups and do not show the heightened aggression and controlling behaviour to maintain rank seen in Schenkel’s captive wolves (Mech, 1999). It is now thought that the behaviour of Schenkel’s wolves was
a result of the artificial nature of the pack formation and composition, and heightened competition due to the lack of control over resources and opportunities to disperse (Schilder et al, 2014).

Research into the behaviour of the domestic dog in its natural environment — i.e. living with people — has also made it increasingly apparent that canine behaviour has changed markedly as a result of domestication. For example, studies comparing hand-reared wolves and domestic dogs demonstrate that dogs respond to human social signals such as pointing (Miklosi et al, 2003), and show heightened attachment to people when compared to socialised wolves (Topal et al, 2005). Therefore, it is now increasingly accepted that the behaviour of dogs themselves needs to be studied in order to understand them as they now are (Coppinger and Coppinger, 2001).

Do dogs show dominance?
The terms ‘dominance’, ‘dominance hierarchy’ and ‘dominance aggression’ are used liberally in veterinary, academic and popular texts. However, they are sometimes used incorrectly. Therefore, before considering whether dogs show dominance or form dominance hierarchies, it is necessary to define what is meant by these terms.

In ethology, the term dominance describes a relationship in which one individual succeeds when in competition with another. Drews (1993) describes 13 different interpretations of the ethological definition of dominance, which he distils into a single now widely used definition which states: ‘Dominance is an attribute of the pattern of repeated, agonistic interactions between two individuals, characterized by a consistent outcome in favor of the same dyad member and a default yielding response of its opponent rather than escalation. The status of the consistent winner is dominant and that of the loser subordinate’.

This is based on Schjelderup-Ebbe’s original definition, adapted to suit any species. Ethologist and Certified Applied Animal Behaviourist, Patricia McConnell (2010), describes it perhaps a little more succinctly as: ‘Priority access to a preferred, limited resource’.

An example of a situation in which a dominance relationship may develop between dogs is where there are two dogs and one bone. One of the dogs will succeed in gaining/keeping possession of the bone and so will, on that occasion, be considered ‘dominant’. Physical disagreements are costly in terms of energy and the risk of injury. Social species therefore develop strategies for avoiding them (Goodenough et al, 2001). As such, in most cases, who wins the bone will be determined through body language, vocalisation and actions intended to indicate each dog’s willingness (or otherwise) to compete for the resource without the need for true aggression, i.e. inflicting injury. Once an agreement is reached, the interaction may then form the basis for future encounters, avoiding the need for ongoing disputes. However, if anything changes, such as either dog’s physical health, mood or the value placed on the bone, then this understanding may change too. There may also be cases in which neither dog is prepared to back down, leading to recurrent or injurious disagreements.

Dominance hierarchies can be defined as: ‘Social systems in which each individual’s behaviour is governed by its place in a highly structured social ranking’ (Russell et al, 2014: 1356). While the dog that wins the bone in the aforementioned scenario may be said to be ‘dominant’ at the time, and this may become a pattern to avoid future conflict, this differs from the type of dominance hierarchy described above and in the popular theory in a number of ways. It does not automatically involve all of the animals living in the same social group; nor does it imply that the same outcome will arise in every situation. Dogs that compete over bones may not compete over who sleeps where or gets the owner’s attention first. Perhaps most importantly, it does not suggest that the motivation for being prepared to fight for the bone is the desire to maintain rank or status. It may simply be that one dog wants the bone more than the other. Dominance and dominance hierarchies are therefore not interchangeable terms.

Do domestic dogs form linear hierarchies?
Research into whether dogs form the type of linear hierarchies suggested by the theory when living in groups, with or without humans, is ongoing. Bradshaw et al (2009) studied the behaviour of 19 male neutered dogs, allowed to freely socialise in a 0.28 hectare enclosure. They found that some group members consistently showed submissive behaviour to others, such as crouching, avoiding, displacement licks/yawns or running away. This suggests an ongoing dominance-submission relationship between those individuals. However, this was not consistent between all of the dogs and the relationships did not fall into a linear hierarchy involving multiple individuals. Consistent patterns of dominant and, more commonly, submissive behaviour were also seen between some individuals attending a day care centre (Trisko and Smuts, 2015) and free-ranging in Rome (Bonnani et al, 2010). However, as with Scott and Fuller (1965), such dominance relationships were not universal. For example, they only occurred in 29% of the pairs observed in the day care centre, with some dogs having ‘a stronger tendency to form dominance relationships than others’ (Trisko and Smuts, 2015: 21). Therefore, even where a pattern of relationships involving multiple dogs develops, this is not universal or even typical behaviour; so does not support the dominance hierarchy principle.

Controversy and consensus
A review of social media and dog forums will quickly highlight the degree of discord surrounding the application of the dominance hierarchy principle to the domestic dog. This is largely acted out between practising trainers and behaviourists. However, as discussed, academics also disagree in many areas, including definitions of ‘dominance’
and ‘dominance hierarchies’, whether patterns of ‘dominant’ and ‘submissive’ behaviour imply a dominance hierarchy, interpretation of the motivation for aggressive behaviour, and whether this can be attributed to an attempt to elevate rank, as well as the methodology for studying the subject, and how data collected is interpreted (Bradshaw et al, 2009; Perez-Guisado and Munoz-Serrano, 2009; Schilder et al, 2014; Trisko and Smuts, 2015; Westgarth, 2016).

Thankfully, there is also some consensus. Researchers tend to agree that dominance could be said to occur between dogs in the ‘two dogs and one bone’ scenario, in that the dog who gets the bone could be said to be dominant in that moment. They also agree that fights are typically avoided through the use of body language and other signals, and that ongoing relationships regarding who wins will often develop between two individuals to avoid wasting energy in future conflict. There is, to the author’s knowledge, no current research demonstrating the existence of a universal linear hierarchy involving all of the dogs in the group, as suggested by the dominance hierarchy theory. Neither is there any evidence of dogs asserting absolute control over resources or the behaviour of others for the purpose of maintaining status, as the methods suggested to maintain a ‘pack leader’ position imply. Instead, it is widely recognised that the behaviour of each individual, including in situations of conflict over anything of value, is governed by a complex combination of genetics, physical state, development, learning, environmental influences and the behaviour of others (Miklosi, 2014). Perhaps most importantly, there does appear to be a consensus among academics that many of the methods advocated under the banner of asserting dominance are potentially dangerous, and do not further the relationship between dog and owner (Steinker, 2007; Schilder et al, 2014).

Concerns with methods used to assert dominance

There are a number of concerns with the methods recommended to assert dominance over a dog to prevent or control unwanted behaviour. They may fail to address the behaviour (Wells, 2001; Schalke et al, 2007; Cooper et al, 2013), potentially resulting in ongoing risk to the owner, compromise of the animal’s wellbeing, rehoming or euthanasia. They may also lead to development of other problem behaviours, and some carry a direct risk to the dog’s welfare and/or owner’s safety (Hiby et al, 2004; Herron et al, 2009; Arhant et al, 2010).

For example, whether an owner eats before or after their dog is unlikely, in itself, to cause direct harm in most cases. However, if a dog is corrected for attempting to eat before its owner, on the basis they are challenging to be ‘pack leader’, this may lead to confusion and the expectation of conflict around food. This in turn may lead to defensive aggression. Preventing a dog eating first is also unlikely to address the unwanted behaviour, given the lack of evidence that dogs control each other’s behaviour in this way to maintain status or resolve conflict in other areas.

Preventing a dog from going upstairs may lead to separation distress or disruptive behaviour by unnecessarily increasing the amount of time the dog spends in isolation. Asking a dog to ‘wait’ as an owner walks through a doorway is useful for general management and good manners, if taught using reward-based methods. However, sternly correcting the dog for pushing ahead through a door on the basis that it is a challenge for ‘dominance’ can again cause confusion and, in some cases, trigger a defensive response.

Methods for asserting owner dominance that involve physically correcting or attempting to intimidate the dog are of particular concern. Once we remove the suggestion that the dog’s unwanted behaviour is a challenge for higher rank, and that it will recognise the punishment as the owner correcting that challenge, these actions become simple threat or fear/pain-based punishment. They therefore carry all the risks associated with those methods. Repeated threat and punishment compromises welfare and may lead to fear of the owner (Schilder and van der Borg, 2004). Poorly timed or inconsistently delivered punishments prevent the dog from being able to work out how to avoid them, resulting in failure to address the behaviour and chronic anxiety (Schalke et al, 2007). Punishment that is excessive will trigger fear and stress, both of which can interfere with effective learning (Shors, 2004). Studies have also shown that fear or pain-based punishments can trigger defensive aggression in an alarming proportion of cases (Hiby et al, 2004; Herron et al, 2009; Arhant et al, 2010).

Alternatives for management of behaviour

Modern approaches to managing or modifying problem behaviour rely on using scientific principles to understand the motivation for it and then addressing this directly. This may include managing triggers or changing the dog’s emotional response to them, e.g. reducing fear. Manipulation of things the dog finds rewarding can also be used to change his or her preferred behaviour. Studies comparing the effi-

Figure 2. Dogs trained using positive rewards perform better on new tasks.
cacy of behaviour modification based on rewarding wanted behaviour, rather than punishing unwanted behaviour, have shown the former is at least as, and often more, effective than the latter. Hiby et al (2004) found that prevention of chewing, teaching a dog to walk to heel, and to give up stolen items were all significantly more responsive to positive reward (giving the dog something it wants in response to desirable behaviour), than positive punishment (administering something the dog dislikes or finds distressing in response to undesirable behaviour). Blackwell et al (2012) also showed that owners reported greater success when using rewards to teach recall or address predatory chase behaviour, than when using remote training or ‘electric shock’ collars as a punishment. Rooney and Cowan (2011) found that dogs trained with positive rewards perform better on new tasks, suggesting an ongoing effect on the dog’s trainability (Figure 2). Dogs trained using these methods also showed less long-term anxiety than those trained using strong punishments (Cooper et al, 2013).

Conclusion
Ongoing research into the relevance of dominance and dominance hierarchies to dog behaviour continues to demonstrate that dogs do not routinely form hierarchies for priority access to all resources. Nor do they purposefully control these resources or each other’s behaviour to assert status. Methods intended to manage dog behaviour by elevating owner rank are widely shown to carry risk to owner safety, and to compromise the dog’s welfare and longevity. As such, they have no place in modern dog management. Alternative methods, based in objective research into the complex influences over a dog’s behaviour and techniques for changing motivation, are not only more effective, but also, they do not carry these risks—making them the obvious choice.

Where the practice does not have a staff member able to offer behavioural advice based on these principles, an appropriately accredited Clinical Animal Behaviourist can be found via the Animal Behaviour and Training Council (see http://www.abtcouncil.org.uk/clinical-animal-behaviourists.html), VN.

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