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If Not Dominance...How Do We Explain the Development of Social Behavior?

The article titled “What’s Wrong with Using ‘Dominance’ to Explain the Behavior of Dogs” presented the reasons why ‘dominance theory’ is no longer used to explain the behavior of domestic dogs. Here, we address the question that inevitably arises next: ‘So how do you explain the way dogs behave with each other and towards us?’

Although their social structure is not the same as their ancestral species, dogs, like wolves, are a highly social species. This means that they are strongly motivated to maintain contact with familiar individuals, and try to avoid social isolation. This characteristic explains the high incidence of separation related behavior (undesired behaviors occurring when left alone by owners) in dogs (Bradshaw et al. 2002).

An important characteristic of being a social species is being able to both display and read communication signals as this enables individuals to adapt their behavior according to the behavior of other individuals (Wilson 1975). As well as displaying and reading social signals, it is clear that social interactions amongst groups depends on individuals learning about these signals (van Doorn et al. 2003).

Learning

Those working in dog training or behavior are very familiar with the concepts of associative learning. We tend to talk about learning mainly in terms of training. For example, by giving a dog a treat each time it sits down, as long as our timing is good, the dog will associate this action with the reward, and is more likely offer to park its bottom on subsequent occasions. However, this apparently simple piece of learning actually involves complex processing in the brain.

Since being given the treat is an important event to the dog (assuming he or she likes treats), the learning process starts with the brain evaluating all the incoming information to identify what particular events might be predictive of the treat appearing, whether this is an external event or the dog’s own activity. In almost all ‘real life’ situations, it is combinations of specific cues and contexts that predict particular events. For example, many owners will be familiar with their dog learning to show a behavior in one context (e.g. sitting when the owner says ‘sit’ AND is in the training class, and has a calm voice, relaxed posture, maintains eye contact, has their hand in their pocket, is wearing their jeans and is smelling of treats) but not immediately doing the same if some of these cues change.

Over time, by repeating the association between the word ‘sit’, the action and the treat in multiple contexts the dog learns that the only important predictive cue is the word ‘sit’ and will show the behavior whatever else is going on. This type of learning does not only occur when we are training dogs, however, but goes on all the time, constantly shaping the way our dogs interact with their environment. Their brains are constantly evaluating what is important, what predicts important events, and what the consequences (good or bad) of their own actions are.

Learning in Social Interactions

Although we have a good understanding of learning, and how it influences dogs’ responses in training, we have historically disregarded the importance of learning in the development of social interactions between dogs, and between dogs and people. The assumption that dogs’ responses in social interactions are fixed by innate characteristics, such as ‘dominance’ disregards their amazing ability to learn complex associations. However, dogs clearly are able to learn about the consequences of specific social interactions (Elgier et al. 2009), and it is important to recognize this when considering the development of social interactions.

From the perspective of mathematical modeling (van Doorn et al. 2003) and direct observation of behavior (Bradshaw et al. 2009), the types of social structures which arise in social species appear to be best explained by each individual

forming a distinct relationship with each other animal in the group. In other words, each animal both reads the signals of each other and is able to learn what this might predict in different circumstances. In addition, on each encounter they will be learning about the consequences of their own behavior from the responses of others. This is no different from the way in which social behavior is learnt in people. Throughout life we observe other people and pick up information that might help us predict how they may behave in different situations (Frith and Frith 2007). We also constantly gather more information as to how our own behaviors might affect multiple other people in a range of different circumstances (Keysers and Perrett 2004).

In other words, when you go into a bar and meet a stranger, are all your behaviors directed by trying to establish 'social dominance' over them? Or are you working out how they might react to you, so that you can find out the best way of passing the time with them? You initially don't know how they will react to you smiling at them, or saying 'hello', or bumping into them by accident. So, you are likely to be more anxious to start with, until you start to be able to predict their reactions. Essentially, you bring to this new interaction all of your previous experiences of how different facial expression, or tones of voice might predict particular outcomes, so you look at and listen carefully to the person to see if you can pick up any of these familiar 'cues', and change how you behave accordingly. Smiling at someone in the corridor as you pass them, or holding a door open to allow them through does not mean that you think that they are socially superior to you, but simply that you have learnt that if you do this for people they will smile back and thank you!

Social Behavior Between Dogs

Dogs go through a very similar process when they first meet a new dog in the park. They may have had lots of previous experiences of meeting dogs of all shapes and sizes, and will use all the information gained in previous encounters to inform how they respond to a new dog (Bradshaw et al. 2009). For example, a particular dog (lets call him 'Ben') might have learnt from previous encounters that the combined cues of another dog being large and black with a tense body posture predicts aggression. A new dog approaching with these characteristics, therefore, is likely to cause anxiety. How Ben responds to this event is also learnt – he may have previously found that showing appeasement, running away, or showing aggression worked best in that particular situation to resolve the perceived threat.

So when two dogs first meet in the park, there is often increased anxiety because they don't know how each other are likely to respond. They will often have a very tense, vigilant posture, and show jerky sudden movements as they gather information about each other. In contrast, once they get to know each other, they will be able to predict how each other are likely to respond and react accordingly. Depending on what they have learnt, they might go straight into playing when they meet up, ignore each other, or even show aggression. 'Behavior problems' occurring between dogs are relatively common, and occur through this same process of learning. For example, a dog that shows aggression to other dogs will often have had an aversive experience of particular other dogs, and learnt that aggression is an effective 'strategy' of avoiding the perceived threat. Similarly, a puppy that lives with a tolerant elderly dog may learn that the most effective way of getting playful interaction is to charge up and jump on another dog! This behavior causes problems when the puppy starts to interact with other dogs that don't appreciate this type of greeting. In dealing with such cases, therefore, a behaviorist will first obtain information about specific previous experiences, so that the reason for the development of the behavior can be identified.

Social Interaction with People

Obviously, if dogs interact with each other based on complex associative learning, there is absolutely no reason to suppose that they do any different when interacting with us. Indeed, there has been a flurry of recent research investigating the extent to which dogs can learn about specific human signals in comparison to their ancestral species, the wolf (e.g. Udell et al. 2008). It would be foolish to think that they see people as other dogs – but as they develop within a human 'family', they learn about all the things that humans do which relate to them, just as they would with other dogs. So, for example, they may learn that when people smile, or talk in a high pitched voice it generally predicts a good outcome, and behave accordingly (waggy tail, running up, etc.), but may also learn that if particular people have a raised voice

pitch, dilated pupils and put their hand towards their collar it predicts a bad outcome. Again, they may learn different responses that work to resolve this situation. The possible options might be to show appeasement behaviors, to avoid contact by hiding, or to show aggression to get the perceived threat to move away. Whichever of these is 'successful' (i.e. works to avoid the threat) becomes reinforced, and is more likely to be shown on subsequent occasions.

Considering an example helps to explain what might happen in an individual case. Imagine a dog (let's say 'Ellie') who is scared of fireworks. It is just after 5th November, and when she recently went out into the garden last thing at night to go to the toilet, a firework went off further down the street. From this experience, Ellie has learnt that going into the garden when it is dark predicts that a terrifying event is likely to occur (but going out in the daytime is fine). She therefore no longer wants to go out into the garden at night before her owners go to bed. However, her owners particularly want her to go into the garden last thing, as otherwise she may mess in the kitchen overnight. They haven't connected her reluctance to go out with the fireworks, and consider her new habit of trying to avoid going out rather irritating.

Understandably, from a human point of view, they insist she goes outside, and grab her by the collar to guide her outside. From Ellie's point of view, going outside in the dark is a life-threatening event, and she wants to avoid this at all costs. Initially she might show appeasement behaviors, but in this type of situation owners often ignore these. She might wriggle free and go and hide under the table, but her owners are also likely to go and get her out again. She learns that neither appeasement nor avoidance 'work' to escape the perceived threat. She may, therefore, try the alternative option of aggression. When dogs growl or snap for the first time owners are often very surprised or shocked and sensibly back away, even if only momentarily. This is enough, however, for the behavior to become reinforced, and the next time that Ellie is in the same situation she would be more likely to try this option first.

Over repeated occasions, an aggressive response like this becomes more and more well established. Dogs like Ellie will gradually learn the specific cues that predict the threat (e.g. an owner's hand reaching for their collar) and will select aggression more rapidly on identifying these cues. They will also become more confident that aggression is likely to 'work' in this situation, and will progressively show less signs of fear, and instead have a 'confident' body posture. The aggression will gradually become more immediate on the dog identifying the first predictive cues, such that they could bark or growl at the owner as soon as they enter a room. This behavior appears very confident, and historically has been described as 'dominant' or 'offensive' aggression. However, if we examine the history of the problem in the light of our knowledge about learning, we can see that this is a defensive response to a perceived threat which the dog has developed into a (very effective) avoidance strategy. Once this type of avoidance response is well established, the dog will have a strong expectation that it will be successful, and trying to interrupt it can be very dangerous. Owners should therefore seek specialist help in cases of aggression.

Conclusions

Although the importance of learning in training is widely recognized, the extent to which learning influences how social behaviors develop and are shaped over time in dogs is often underestimated. Rather than explaining how an individual interacts with others in terms of fixed characteristics, it is important to recognize that previous experience has a profound influence on the way each dog behaves with every other dog and person that it meets. The ancestral history of dogs has led them to being a highly social animal with an amazing ability to identify where complex combinations of events might predict particular outcomes, and also to discriminate between apparently similar cues where these might have different meanings. This makes them fantastic pets, because they can pick up very subtle changes in our behavior and respond accordingly, but it can also lead to misunderstandings, anxiety, and the occurrence of undesired behaviors. It is therefore important that those advising owners about their pets have a thorough knowledge of the science of learning, and the ability to use this knowledge in the practical evaluation of individual cases.

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