Neurobehavioral development in puppies: Responses to landmark and referential human signalling

Abigail O'Connor, Chelsey Kaminski, Jennifer Vernick[1], Karen Overall[1]

1. Department of Biomedical Sciences, Atlantic Veterinary College, UPEI, Charlottetown PE Canada

Domesticated dogs outperform wolves and chimpanzees in tasks using human social signalling (pointing/knocking/gazing) to find hidden objects. Human infants do this by 14 months. Knocking/pointing are referential social signals – intentional goal-directed movements that communicate information to a recipient. Flags are landmark/discriminative signals. As part of a larger study investigating when abnormal behavioural development diverges from normal in puppies, 39 owned puppies were tested 4 times over 12 months in a series of cognitive tests including a signalling test. The signalling test presented here involved 3 opaque boxes, one of which contained a toy. The location of the toy was indicated by knocking, pointing or placement of a flag. Signals/location of the toy were randomly assigned for 12 trials (3 signals; 4 repetitions each). Measures included latency to find toy and scored, fear-related behaviours. At 3-months, puppies successfully found the toy 60% of the time across all signals and 35% of the time on the first attempt (knock>point>flag for both). Puppies with a fear-related behaviour score >24 at 3-months took longer to look in the correct box (t-test: $t = 2.088$, $p = 0.048$) and were reported on an owner questionnaire to be more likely to bark, growl, howl upon the approach of a strange human while confined at 12-months of age ($p = 0.01$, OR = 9.8, RR = 2.96). Puppies were more likely to bark, howl, growl upon the approach of a friendly human at 12-months if they correctly interpreted the signal (a) on their first try for <50% of trials ($p = 0.02$, OR = 6, RR = 2.67) and (b) on any try during <70% of all trials ($p = 0.01$, OR = 7.56, RR = 2.75). The ability to use referential/landmark signaling may be associated with the future ability to read social cues and accurately assess whether approaches from humans are threats. These data, especially combined with those from other tests, should allow us to identify and intervene in abnormal puppy behaviour early when we can best improve welfare and reduce relinquishment/surrender rates.