Increasing arousal enhances inhibitory control in calm but not excitable dogs
Animal Cognition
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Results excluding the pet dogs in the bottom third of group for weight

We first excluded pet dogs in the bottom third of the group for weight (N = 9 excluded dogs, all under 35 pounds, see Table S2). The following analyses were then conducted on the remaining dogs (N=20). With the composite response score as the dependent variable, we used a linear mixed model with trial type (low arousal vs. high arousal), order (low arousal first vs. high arousal first), trial number (1-10), population (pet vs. assistance), the population by trial type interaction, and the population by order interaction as fixed effects, and dog ID as a random effect. We also included two interactions, population by trial type and population by order, to investigate the possibility that the problem solving of assistance and pet dogs is affected differently by arousal level.

The main findings are summarized in Table S3. The full model revealed a significant main effect of trial number; almost all dogs improved (that is, achieved a lower composite response score) over time. There was also a significant interaction between population (pet, assistance) and trial type. Therefore we used contrasts to investigate the strata-specific effects of trial type within assistance and pet dogs. These analyses revealed that assistance dogs performed significantly better in high arousal than low arousal trials (b = -0.28, z = -6.44, $p < 0.001$). In contrast, pet dogs achieved significantly better composite scores during low arousal than high arousal trials (b = 0.25, z = 2.97, $p < 0.01$). Thus, while the trial type influenced performance in both populations, it had opposite effects between pet and assistance dogs.

Additionally, there was a significant interaction between population and the order in which high and low arousal trials were administered. Contrasts revealed that assistance dogs

achieved significantly better composite scores when facing the block of high arousal trials first (b = -0.25, z = -2.99, $p < 0.001$). In contrast, pet dogs achieved better composite scores when facing the block of low arousal trials first, although the effect of order was not significant for pet dogs (b = 0.21, z = 1.31, p = 0.189).

Results excluding the pet dogs in the top third of group for age

We first excluded pet dogs in the top third of the group for age (N = 10 excluded dogs, all over 74 months, see Table S4). The following analyses were then conducted on the remaining dogs (N=20). With the composite response score as the dependent variable, we used a linear mixed model with trial type (low arousal vs. high arousal), order (low arousal first vs. high arousal first), trial number (1-10), population (pet vs. assistance), the population by trial type interaction, and the population by order interaction as fixed effects, and dog ID as a random effect. We also included two interactions, population by trial type and population by order, to investigate the possibility that the problem solving of assistance and pet dogs is affected differently by arousal level.

The main findings are summarized in Table S5. The full model revealed a significant main effect of trial number; almost all dogs improved (that is, achieved a lower composite response score) over time. There was also a significant interaction between population (pet, assistance) and trial type. Therefore we used contrasts to investigate the strata-specific effects of trial type within assistance and pet dogs. These analyses revealed that assistance dogs performed significantly better in high arousal than low arousal trials (b = -0.28, z = -6.58, $p < 0.001$). In contrast, pet dogs achieved significantly better composite scores during low arousal than high arousal trials (b = 0.42, z = 5.06, $p < 0.001$). Thus, while the trial type influenced performance in both populations, it had opposite effects between pet and assistance dogs.

Additionally, there was a significant interaction between population and the order in which high and low arousal trials were administered. Contrasts revealed that assistance dogs achieved significantly better composite scores when facing the block of high arousal trials first (b = -0.25, z = -3.04, $p < 0.01$). In contrast, pet dogs achieved better composite scores when facing the block of low arousal trials first, and the effect of order was also significant (b = 0.37, z = 2.33, $p < 0.05$).

Table S2

Pet dogs excluded in supplementary analysis for being in bottom third of group for weight.

Dog Name	Breed	Condition	Weight (pounds)
Loki	Chihuahua	B	6
Deacon	Maltese	B	7
Charlie Brown	Cavalier KC Spaniel	B	11
Enzo	Jack Russell Terrier	B	12
Jaq	Rat Terrier	A	15
Taylor	Pug	A	16
Scout	Beagle	A	25
Merlin	Border Collie	B	26
Tola	Beagle	B	28

Table S3

Results of a Linear Mixed Model in which the dependent variable was the composite score, bottom third in weight of pets removed.

Predictor variables	Estimate	SE	*t* value	*p* value
Population	-0.18804	0.14392	-1.307	0.1940
Order	-0.25114	0.08401	-2.987	0.0036**
Trial number	-0.09721	0.00678	-14.342	0.0000***
Trial type	-0.28266	0.04391	-6.437	0.0000***
Population x trial type	0.52768	0.09315	5.665	0.0000***
Population x order	0.45846	0.17900	2.561	0.0120*

Predictor variables were population (pet vs. assistance), order (low arousal trials first vs. low arousal trials first), trial number (1-10), and trial type (low arousal vs. high arousal). Dog ID was entered as a random effect. $N = 21$ pet dogs and 76 assistance dogs.
*** $P < 0.001$ ** $P < 0.01$ * $P < 0.05$

Table S4

Pet dogs excluded in supplementary analysis for being in top third of group for age.

Dog Name	Breed	Condition	Age (months)
Lily	Poodle	B	74.5
Bugsy	Mixed: Pointer/Dane	A	75.1
Dooright	Golden Retriever	A	80.3
Sarah	Mixed: Terrier/Cattle	A	88.6
Jaq	Rat Terrier	A	93.8
Layla	Mixed: Hound/Shepherd	A	94.1
Max	Belgian Tervuren	B	96
Tola	Beagle	B	108
Scout	Beagle	A	115.8
Sienna	Vizsla	A	137.1

Table S5

Results of a Linear Mixed Model in which the dependent variable was the composite score, top third in age of pets removed.

Predictor variables	Estimate	SE	*t* value	*p* value
Population	-0.43996	0.12926	-3.404	0.0009***
Order	-0.25114	0.08271	-3.036	0.0031**
Trial number	-0.09802	0.00670	-14.632	0.0000***
Trial type	-0.28266	0.04391	-6.437	0.0000***
Population x trial type	0.70405	0.09420	7.474	0.0000***
Population x order	0.62561	0.18088	3.459	0.0008***

Predictor variables were population (pet vs. assistance), order (low arousal trials first vs. low arousal trials first), trial number (1-10), and trial type (low arousal vs. high arousal). Dog ID was entered as a random effect. $N = 20$ pet dogs and 76 assistance dogs.
*** $P < 0.001$ ** $P < 0.01$ * $P < 0.05$