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Genetic parameters and predictive capacity of behavioural puppy test in guide dogs

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Introduction

- Behavioural puppy testing has started in Finnish guide dog school at 1987
- During the years the test has been further developed and more traits introduced
- The purpose of this study was to estimate the genetic parameters of the puppy test traits and evaluate its ability to predict young dogs success in training

Puppy test

- The puppy test is done when puppies are circa six weeks old
- Puppies are taken to test room one by on and two persons does the evaluation
- Puppy test contains nine subtests
- Last two of the traits are evaluated by the puppy's performance during the entire test

Puppy test traits 1

- Behaviour when nestled
- Approach
- Contact
- Tug of war
- Dominance/submission when laid on the back
- Capability to recover from earlier handling
- Noise sensitivity
- Behaviour when put on the table
- Following
- Capability to function during the test
- Nerve stability during the test

Puppy test traits 2

Behaviour when nestled

- Tester broughts puppy to test room in his/her arms. Simultaneously puppy's behaviour is evaluated (1= very scared, 5= very relaxed). This trait was introduced in to the test in 1995.

Approach

- Puppy is put on the corner of the test room back towards tester. Tester walks to the other side of the room and crouches down to wait how willingly puppy approaches to him/her. If puppy does not approach then tester encourages it to come. If puppy is still not coming it will be picked up. (1=does not approach, tries to hide or escape when picked up, 5= puppy approaches willingly).

Puppy test traits 3

Contact

- How willingly puppy makes contact to the tester after it has approached (1=not interested at all, 5=very willingly).

War of tug

- How interested puppy is to play with the tug (1=not interested at all, 5=very willingly bites and carries the tug).

Dominance/submission when laid on the back

- Puppy is laid on its back on the floor and tester keeps his/hers hand on puppy's stomach. Tester evaluates how relaxed puppy is (1= very afraid or goes to panic, 5= very relax).

Puppy test traits 4

Capability to recover from earlier handling

- How well puppy can recover from earlier handling (1= not at all, 5= handling had no effect).

Noise sensitivity

- Metal can with small stones inside is softly dropped on the floor from 20 cm height. Puppy's reaction to the noise and can is evaluated (1=very afraid, 5=not afraid at all and interested of the can after the drop). Noise sensivity was introduced to the test at 1998.

Behaviour when put on the table

- Puppy is laid on the metallic table and its confidence to move on the table is evaluated (1= very afraid/does not move at all, 5=moves confidently and reasonably).

Puppy test traits 5

Following

- Puppy is taken to corridor next to the test room and tester walks away from the puppy. Puppy's willingness to follow is evaluated (1=afraid to/not interested to follow, 5=follows very willingly).

Capability to function during the test

- Based on the puppy's behaviour during the test, testers evaluate puppy's capability to function in test situations (1=poor, 5=very good).

Nerve stability during the test

- Based on the puppy's behaviour during the test, testers evaluate puppy's nerve stability in test situations (1=poor, 5=very good).

Material 1

Variance components

- 686 labrador retrievers (bred 1991-2008)
- 115 litters from 48 sires and 78 dams
- 318 males and 368 females
- average inbreeding (4 generations)
  - 1.27% (0-12.77%)

Material 2

Predictive capacity

- 502 labrador retrievers (bred 1991-2007)
  - 225 dogs who are rejected from guide dog training
  - 277 dogs passed the training

Methods

- Fixed effects: test development status, birth year, age and test place
- Random effects: interaction of litter x test person
- Animal model
- REML with VCE software (Groeneveld et. al. 2008)

Heritability estimates 1

- Low or moderate (h^2=0.07-0.39)
  - Dominance/submission 'h^2=0.39 (S.E. 0.03)
  - Capability to function 'h^2=0.32 (S.E. 0.03)
  - Contact 'h^2=0.31 (S.E. 0.05)
  - Following,' Capability to recover from earlier handling 'and Nerve stability 'h^2=0.07-0.12 (S.E. 0.02/0.03)

Heritability estimates 2

	n	h^2 ± S.E.
Behaviour when nestled	467	0.23 ± 0.02
Approach	633	0.26 ± 0.04
Contact	592	0.31 ± 0.05
War of tug	626	0.25 ± 0.03
Dominance/submission	628	0.39 ± 0.03
Capability to recover	559	0.09 ± 0.02
Noise tolerance	407	0.24 ± 0.05
Behaviour when on table	629	0.28 ± 0.05
Following	583	0.07 ± 0.03
Capability to function	630	0.32 ± 0.03
Nerve stability	629	0.12 ± 0.02

Correlations

- Genetic correlations
  - From low to very high (-0.02-0.99)
    - Approach ,' Contact ,' Tug of war ,' Voice tolerance 'ja Behaviour when laid on the table 'were very stronly correlated (0,75-0,99)
    - Dominance/submission 'and Recovery from earlier handling 'had lowest correlations
- Phenotypic correlations
  - From moderate to high (0.11-0.73)

Predictive capacity

- T-test analysis did not show any statistical differences in Puppy test results between the group means of dogs that were rejected or passed the training
- None of the Puppy test behaviour traits had a statistically significant effect on dogs later status (rejected/passed)

Conclusions 1

- Genetic correlations indicate common genetic background
- Genetic improvements can be achieved in all traits except 'recovery from handling', 'following' and 'nerve stability ‘
- Recovery from handling ‘and 'following ‘had problems with observation distribution which may cause noise in results

Conclusions 2

- No predictive capacity were found
- Trait definition and recording of the traits needs to be further developed