Turning off dogs' brains: fear of noises affects problem solving behavior and locomotion in standardized cognitive tests

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Hypothesis: Dogs that react to noise perform less well on a problem solving tests (CITP: Canine Intelligence Test Protocol).

Tools

- WDQ-PET (AIR scores to calculate noise reactivity)
- CITP – Test 11 – Puzzle box test
- VOYCE band accelerometer measurement of movement in 3 dimensions every second, averaged every minute (custom firmware) and calculation of deviations and extremes

Puzzlebox test results

- Noise reactive dogs were statistically less likely to complete 2/3 rounds of puzzle box testing (Yates corrected Chi-square=6.4215; p<0.011).

- With respect to the slower dogs, of the 9 dogs who took 150 seconds or more to complete the puzzle box during the first attempt, 6 were noise reactive, and 3 were not (Fisher exact test 0.1059; p >0.05).

- When the fastest of 3 trials were compared, 5/6 dogs taking 150 seconds or more were noise reactive (Fisher exact test 0.0276; p < 0.05).

Fluidity results

- Dogs who solved the puzzle box quickly on the first or best trial were significantly more active than dogs who solved it slowly or not at all ($p<0.0001$ and $p<0.0004$, respectively).

- Dogs who solved this test quickly and were not lucky did so by coordinating their movements to those of the ball.

- Dogs with AIR scores = 0 (non-noise reactive) demonstrate more continuous, coordinated movement (eg, less 'fluidity', more consistency) than do dogs with AIR scores > 0 (Welch two sample t-test; $t=-2.9227$, $df=21.982$, $P<0.0079$).

Fluidity and AIR Score group

Welch Two Sample t−test:
t = −2.9227, df = 21.982, P < 0.0079

Fluidity

AIR Score = 0
N=9

AIR Score > 0
N=15

AIR Score GROUP
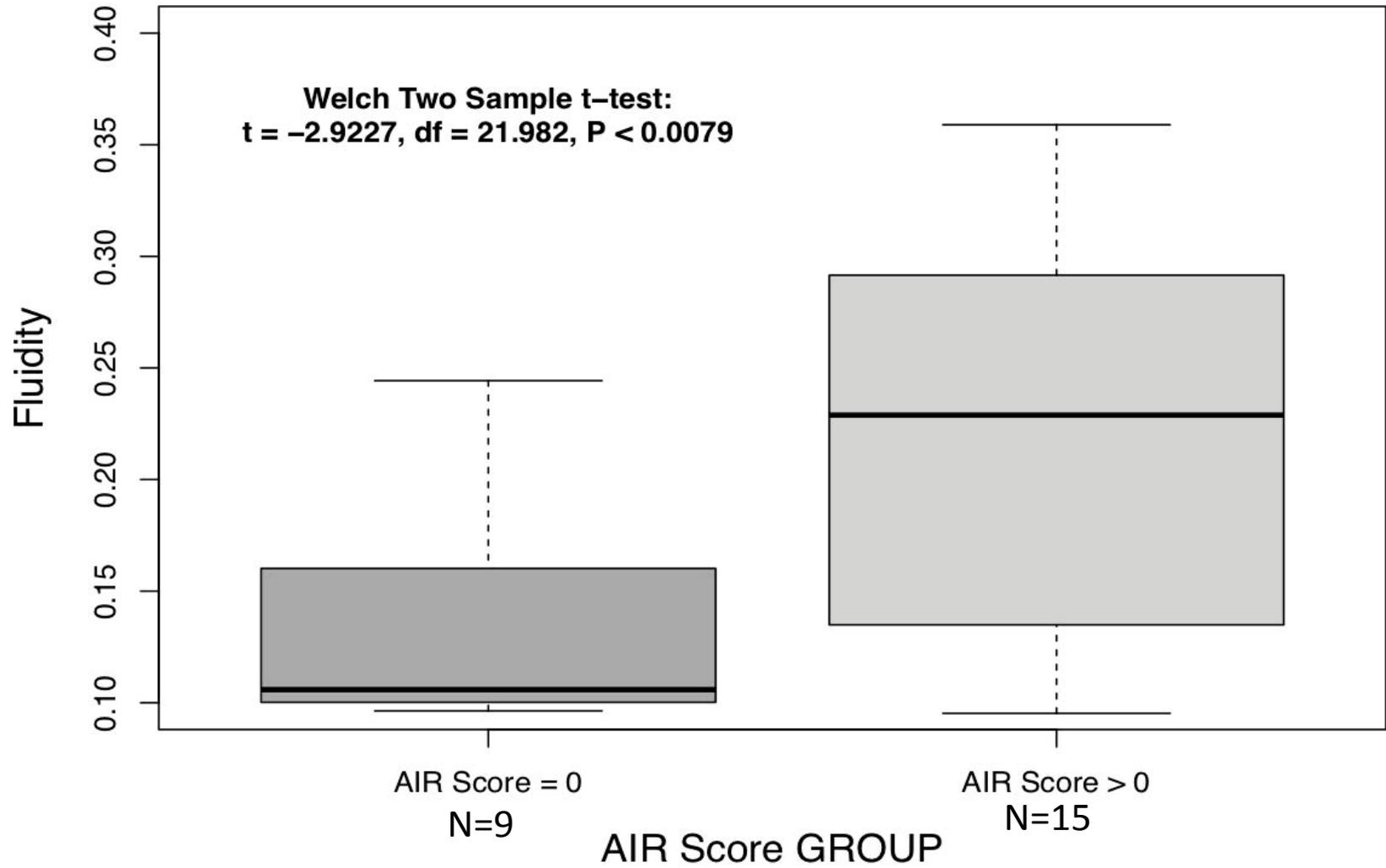
Results – VOYCE x CITP

- Movement across all aspects of the tests for noise reactive/phobic dogs was more erratic, subject to more starts and stops, and deviations from mean were greater.

- The dogs who solved the problems fastest and most accurately did not react to noise and were deliberative and consistent in their movements across all tests.

- Within the puzzle box test, the most active dogs during the test were the fastest and were overwhelmingly not reactive to noise. These dogs figured out the test and actively solved it without delay, hesitation or agitation. They could learn from the test and became faster with experience. *Success may help non-reactive dogs more than it does noise reactive dogs.*

Summary conclusions

- Being affected with noise reactivity/phobia – at any level:

  1. impairs performance in a problem solving task.

  2. affects how you move when you use environmental and social information.

  3. likely affects many aspects performance that are under-appreciate because the dog is viewed as 'difficult' or 'uncooperative'.

  4. is mentally and emotionally painful for the dog.

  5. *essentially functions to turn off the plastic, problem solving canine brain.*

Acknowledgments