

Great tits: birds with character

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Great tits are skilful climbers and flight acrobats. Individuals with a particular gene variation are also especially curious - but this is only the case in certain populations. Image: Henk Dikker

(PhysOrg.com) -- In humans and animals alike, individuals differ in sets of traits that we usually refer to as personality. An important part of the individual difference in personality is due to variation in the underlying genes. One gene, the dopamine receptor D4 gene, however, is known to influence novelty seeking and exploration behaviour in a range of species, including humans and birds. Researchers of the Max Planck Institute for Ornithology in Seewiesen now show that the gene's influence on birds' behaviour differs markedly between wild populations of great tits. (Published in *Molecular Ecology*, February 9th, 2010)

In 2007, researchers of the Max Planck Institute for Ornithology found a

gene related to individual variation in exploratory behaviour in great tits. Birds with a certain variant of this so-called "dopamine receptor D4 gene" (DRD4 gene) showed stronger novelty seeking and exploration behaviour than individuals with other variants. This association was originally tested and found in a lab-raised group of birds.

Now, a large international group of researchers around Bart Kempenaers, director at the Max Planck Institute for Ornithology, Germany, repeated the test in adult wild birds captured in the field. Research groups from the Centre for Terrestrial Ecology in Heteren (NL), the Universities of Antwerp (Belgium) and Groningen (NL), and the Edward Grey Institute of Field Ornithology in Oxford (UK) all measured exploratory behaviour of large numbers of great tits in a similar way. And they brought their data together to test the generality of the association between the different gene variants and exploration behaviour. "To our knowledge, this is the most extensive study of gene variants underlying personality-related behavioural variation in a free-living animal to date, and the first to compare different wild populations", says Peter Korsten, first author and a former member of Kempenaers' department.

Similar results in great tits and humans

To their surprise, the researchers found the association between the gene and the behaviour present in one population, but not in three others. "It was important to confirm the association between the DRD4 variants and exploratory behaviour in the original population", says Kempenaers, but he adds "We do not yet understand the differences between populations". However, the results mirror the outcome of similar research into gene-personality associations in humans, which also varies between populations. More than 30 studies confirmed that the DRD4 gene is associated with novelty seeking in humans, but large differences between populations were observed, and several studies did not find an

effect.

"Perhaps further investigation of great tit populations could shed some light on the differences in outcome in the human populations", says Peter Korsten. The difference between populations is perhaps not that surprising, given the small effect of the gene's variants on the behaviour, and may be explained by a strong influence of the environment or through the effects of other (still unknown) [genes](#).

More information: -- Peter Korsten, Jakob Mueller, Christine Hermannstädter, Karen Bouwman, Niels Dingemans, Piet Drent, Miriam Liedvogel, Erik Matthysen, Kees van Oers, Thijs van Overveld, Samantha Patrick, John Quinn, Ben Sheldon, Joost Tinbergen and Bart Kempenaers, Association between DRD4 gene polymorphism and personality variation in great tits: a test across four wild populations. *Molecular Ecology* pp. 832-843. Volume 19, Issue 4 from February 9, 2010 ([DOI: 10.1111/j.1365-294X.2009.04518.x](https://doi.org/10.1111/j.1365-294X.2009.04518.x))

-- Barbara Tschirren and Staffan Bensch. Genetics of personalities: no simple answers for complex traits, *Molecular Ecology* Volume 19, Issue 4 from February 9, 2010 ([DOI: 10.1111/j.1365-294X.2009.04519.x](https://doi.org/10.1111/j.1365-294X.2009.04519.x))

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