

Attractive dads have more grandchildren

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(PhysOrg.com) -- A study of zebra finches has shown that males' attractiveness influences the number and size of eggs their daughters produce – not genetically but through the effect of their attractiveness on their mate's behaviour.

The research, carried out by biologists from St Andrews University and the James Hutton Institute in Aberdeen, manipulated the males' 'attractiveness' by giving them coloured leg rings. This demonstrated that it was the mothers' perception of their attractiveness, rather than the males' actual genetic 'fitness', that was influencing the reproductive characteristics of their offspring.

Maternal behaviour can influence offspring in various ways, often in response to environmental conditions. Identifying these more subtle 'non-genetic' influences on future generations can give us fresh insight into evolutionary processes.

'We wanted to look at environmental cues that aren't as obvious as how much food the mother has – like what role her psychology might play,' explains Dr Lucy Gilbert of the James Hutton Institute, lead author of the report published in *Proceedings of the Royal Society B*. 'And we wanted to see how long these non-genetic effects might last down through the generations.'

The study aimed to test the effects of the mother's perception of her mate on the reproductive quality of the next generation, using [zebra finches](#) which are easy to breed in captivity.

In common with many animals, zebra finches interpret the colour red as a sign of quality, and female [zebra finches](#) have been shown to find males with red leg rings more [attractive](#) than those with green rings.

The researchers randomly fitted either red or green rings to 70 males, so they could factor out the father's actual biological fitness as an influence on how the offspring turned out. Females were then paired with red- or green-ringed males at random.

Once [eggs](#) had been laid, the researchers swapped all the clutches around, introducing each clutch to new foster-parents. The mothers would continue to react to the perceived attractiveness of her mate, but at this stage it could not influence her biological investment in the egg (things like the amount of hormones and nutrients she produced); instead it could only have an effect through the way she cared for the nestlings.

The next phase of the experiment involved testing the new generation's fecundity, or reproductive potential. Once the daughters were sexually mature, they were paired with males (whose attractiveness had not been manipulated). The researchers then measured their clutch size and the weight of the eggs they'd laid, and looked to see if this related in any way to how attractive their fathers were.

They found that fecundity was related to the attractiveness of both biological fathers and foster-fathers. Daughters of attractive fathers produced both more eggs and heavier eggs, while daughters of attractive foster-fathers produced more, but not heavier, eggs.

The daughters of attractive biological fathers were larger, which would have to be down to the investment the mother made in the quality of her eggs. The result was offspring that could produce not just more, but larger eggs.

The influence of the foster-fathers had to be different though; because they arrived on the scene after the eggs were laid, they could only affect the effort the mothers put into rearing her young.

'We don't know exactly what the mechanism is for the maternal effect the foster-fathers are causing,' says Gilbert. 'Mothers paired with attractive foster-fathers did rear daughters that produced more eggs, perhaps because she gave them more or better food in response to him, but this wasn't enough to make larger daughters that produced bigger eggs.'

Clearly there's a difference between the effects of the quality of the hormones and nutrients the mother supplies to her eggs, and the time and care she gives to her nestlings. But either way, her response to her perception of her mate is having a measurable effect on future generations.

'It would be extremely difficult to get to the root of these causes and effects,' says Gilbert. 'But we can see that these subtle environmental influences at work on individual animals are important; in this case the mother's response to her perception of her mate is having a material effect on the reproductive quality of her young.'

Provided by PlanetEarth Online

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