When stressed birds fly the nest

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Stress in young birds makes them leave home early and occupy more central social network positions later in life, according to the latest research published today by scientists at the Universities of St Andrews and Oxford.

The researchers found that zebra finches that were stressed as nestlings

later became less choosy with whom they visited bird feeders. These developmentally-stressed birds had more foraging associates, resulting in more central network positions.

The paper, published in the Royal Society journal *Biology Letters* by Dr Neeltje Boogert (University of St Andrews), Dr Damien Farine (University of Oxford and University of California Davis) and Dr Karen Spencer (University of St Andrews) may have significant implications for our understanding of the ways in which environmental change affects animals' social behaviour and decisions to leave the place where they were born.

The team looked at how social foraging behaviour is influenced by exposure to adverse conditions during early life.

Dr Boogert, lead author of the study, said: "Which developmental factors drive individuals to become more or less social later in life is a major outstanding question".

When faced with environmental challenges such as food scarcity, predators or competition with siblings, wild birds secrete a stress hormone. The researchers experimentally increased stress hormone levels in young zebra finch chicks and tested how this affected their later social foraging behaviour. The birds' behaviour was monitored in aviaries where the developmentally-stressed chicks and their families could visit bird feeders whenever and with whomever they pleased.

Each bird was fitted with a unique chip containing a 'barcode' that was automatically recorded each time a bird visited one of the feeders. All birds' feeder visits were recorded for five weeks.

Boogert explained: "Using this technology enabled us to capture every single foraging visit that each bird made for the entire duration of the

study, so we could tell exactly who they chose to feed with."

The researchers used these data to compute social networks, where birds that frequented the same feeders at the same time were considered to have stronger social bonds.

The researchers found that chicks stressed during early development were less choosy with whom they visited the bird feeders. Not only did they show more independence from their parents in their feeder visits, but they associated more randomly with other members of their flock.

Boogert said: "Birds that were stressed as nestlings essentially left home sooner, and were less discriminant about whom they foraged with".

As a result, the stressed chicks occupied more central positions, or were more "connected", in their social network. Previous research has shown that being more central in a social network increases the chance of finding food in winter when regular food is scarce.

Boogert went on to say: "In natural populations, chicks whose parents cannot find enough food to feed them experience similar increases in stress hormone levels. As a result, birds may have developed a mechanism that prompts them to leave their natal environment sooner in search of better places to live".

Dr Farine concluded: "These results could have implications for how populations respond to increasingly disturbed and variable environments. If food becomes scarcer or less reliable, we could see more movement by these developmentally-stressed birds once they fledge, leaving their local area and dispersing more widely. This could thus have major implications for maintaining locally-adapted behaviours and genetic structure across different sub-populations."

More information: "Developmental stress predicts social network position." *Biol. Lett.* October, 2014 10 10 20140561; DOI: 10.1098/rsbl.2014.0561 1744-957X

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