

Stress in early life has a lasting impact on male birds' song

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White-throated dipper holding food in its mouth. Credit: Andrew Mawby, 2008

Male songbirds that had better early life conditions as nestlings sing more often and produce more complex songs as adults, according to a study by Lucy Magoolagan from Lancaster University, publishing November 14 in the open-access journal *PLOS ONE*.



Female songbirds are thought to judge a male's quality based on his skill at singing. The brain's <u>song</u> system develops during the <u>nestling</u> and fledgling period, so stress during this time, such as a lack food, might impair an adult's singing prowess—an idea known as the "developmental stress hypothesis". To test this hypothesis, the researchers monitored 18 nestlings in a long-term study population of wild white-throated dippers (*Cinclus cinclus*) living around the River Lune in Cumbria. They recorded brood size, the number of feeding visits by the parents and measured the nestlings' condition at 9 days old, and then returned to record the birds' song as adults.

They found that dippers that were healthier at 9 days old sang songs with more unique 'syllables' as adults, a measure of their singing repertoire. Nestlings that were fed more frequently also sang more often in adulthood. This is the first evidence from wild populations that food limitations during early life can influence song frequency and singing repertoire in adult birds, and supports previous experimental studies on captive European starlings (*Sturnus vulgaris*), zebra finches (*Taeniopygia guttata*), swamp sparrows (*Melospiza georgiana*), and song sparrows (*Melospiza melodia*).





White-throated dipper perching. Credit: Andrew Mawby, 2008

The next step will be to investigate the physiological mechanisms that link stressors in early life with the quantity and quality of bird song in adults.

Magoolagan adds: " Song complexity and singing frequency in male birds are shaped by female choice; they signal male quality because song is costly to develop and produce. The timing of song learning and development of the brain structures involved occur at a time nestlings are exposed to a number of potential stressors. Our results provide some of the first evidence from a wild bird of how the conditions experience during early life impact adult song."









White-throated dipper feeding at the nest. Credit: Andrew Mawby, 2008

More information: Magoolagan L, Mawby PJ, Whitehead FA, Sharp SP (2018) The effect of early life conditions on song traits in male dippers (Cinclus cinclus). *PLoS ONE* 13(11): e0205101. doi.org/10.1371/journal.pone.0205101

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