



Barbara A. Caspers, Dr. rer. nat.

Biology

Universität Bielefeld

Born in 1975 in Wiedenbrück, Germany
Studied Biology at the the Johannes-Gutenberg-Universität, Mainz, the
University of Bielefeld, and the Humboldt-Universität zu Berlin

FELLOWSHIP
College for Life Sciences

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Parental Care to Unrelated Offspring: Taxonomic Specific Perspectives of a Common Phenomenon

Since my Ph.D., I have been fascinated by the use of odours for social communication, including kin recognition. Kin recognition is often based on olfactory cues and it has been shown that olfactory kin cues are present early in life, i.e. closely related individuals smell more similar than unrelated individuals. The potential of an olfactory kin cue has been completely ignored in birds, as most birds have been thought to lack the sense of smell. Therefore it is widely accepted that, specifically in songbirds, parents are unable to distinguish between related and unrelated offspring early in life. However, evidence is accumulating that birds are able to recognise kin based on olfactory cues. If birds are able to recognise their kin, why are there so many evidences of misdirected parental care, i.e. parental care for unrelated offspring?

Parental care for unrelated offspring is widespread across the animal kingdom, with birds being no exception. In contrast, the vast majority of social monogamous bird species has been shown to be genetically polyandrous, i.e. at least one parent cares also for unrelated offspring. From an evolutionary point of view, investment in unrelated offspring is maladaptive. It comes with costs in terms of energy and resources that cannot be invested in related offspring at the same time.

But why do individuals care for unrelated offspring?

If parents are able to recognize their own offspring, it is assumed that parental care for unrelated offspring is intentional, with potential fitness-relevant benefits. In group-living animals, for example, predation risk for one's own offspring decreases with an increasing group size. This dilution effect may induce parents to provide additional care to unrelated offspring in order to increase their own offspring's chances for survival. Interpretations of parental care for unrelated offspring differ with respect to the presence/absence of a kin cue. Given the finding that parents as well as offspring of songbirds may also be able to distinguish between kin and non-kin at a very early life stage, we may have to start thinking about the potential functions of parental care for unrelated offspring, as has been done in mammals or fishes.

During my stay at the Wissenschaftskolleg I aim to address the question how the potential existence of a kin cue in birds may influence interpretations of the phenomenon.

Recommended Reading

Caspers, B. A., E. T. Krause, R. Hendrix, M. Kopp, O. Rupp, K. Rosentreter, and S. Steinfartz (2014). "The more the better - polyandry and genetic similarity are positively linked to reproductive success in a natural population of terrestrial salamanders (*Salamandra salamandra*)". *Molecular Ecology* 23: 239-250.

Caspers B. A., J. I. Hoffman, P. Kohlmeier, O. Krüger, E. T. Krause (2013). "Olfactory imprinting as a mechanism for nest odour recognition in zebra finches." *Animal Behaviour* 86: 85-90.

Krause, E. T., O. Krüger, P. Kohlmeier, and B. A. Caspers (2012). "Olfactory kin recognition in a songbird." *Biology Letters* 8: 327-329.

Caspers, Barbara A. (Oxford,2022)

Olfactory camouflage and communication in birds

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1793726809>

Caspers, Barbara A. (2017)

Begging blue tit nestlings discriminate between the odour of familiar and unfamiliar conspecifics

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1048670805>

Caspers, Barbara A. (2015)

Chemical fingerprints encode mother-offspring similarity, colony membership, relatedness and genetic quality in fur seals

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=846789353>

Caspers, Barbara A. (Berlin,2015)

Impact of kin odour on reproduction in zebra finches

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=846788004>

Caspers, Barbara A. (2012)

Olfactory kin recognition in a songbird

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=846788675>

Caspers, Barbara A. (2011)

Odour-based natal nest recognition in the zebra finch (*Taeniopygia guttata*), a colony-breeding songbird

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=846790068>