

The Emergence of Social Phenotypes: Plasticity Matters

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In cooperative animal societies, a major life history decision is whether to stay in the natal territory and provide alloparental care or to disperse and breed independently. These two trajectories often result in distinct social phenotypes. If these represent genetic morphs, within-group relatedness can lead to the coevolution of helping and philopatry and a negative relationship between cooperative behaviour and dispersal tendencies. Philopatric, cooperative individuals accrue indirect fitness benefits through interactions with relatives, whereas 'selfish' dispersers are more likely to interact with unrelated individuals. However, if social trajectories arise plastically, the link between cooperative behaviour and dispersal is less stringent. Using highly social cichlid fish as model, I will present evidence that life-history trajectories are developmentally plastic. The said relationship between cooperation and dispersal may go into reverse and become positive. When within-group relatedness is low, divergent life history trajectories resulting in distinct social phenotypes can emerge, where cooperative helpers disperse early whereas less helpful individuals remain philopatric. Which of these alternative social trajectories is pursued is determined by social and ecological contexts early in life. At the neural level, these behavioural differences go along with differential gene expression and stress axis programming in the brain. I will discuss the environmental reasons for either negative or positive associations between cooperation and dispersal across cooperative animal species.