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From foraging starlings to fat humans: an ethological approach to the food insecurity-obesity paradox

In high-income countries there is huge variation in body fat, with some people being classified as underweight or normal, while the majority are overweight or obese. The recent rise in obesity must be driven by changes in our environment, but there is disagreement over the causes. In my talk, I will describe how my work on foraging and body weight in European starlings is yielding new insights into the causes of variation in human adiposity and health.

Food insecurity is a construct that captures uncertainty about access to food and deficiencies in the quality and quantity of food consumed. In humans, food insecurity is associated with obesity, a phenomenon referred to as the 'food insecurity-obesity paradox', and also with greater chances of depression, disease and shorter life span. We hypothesise that this suite of impacts is the output of mechanisms that have evolved as protection against starvation in those species that regularly face unpredictability in their food supplies. There is well-developed theory in behavioural ecology predicting that animals should increase body fat as insurance against starvation when access to food is unpredictable. In support, experimentally exposing starlings to unpredictable food causes rapid weight gain. Intriguingly however, the birds put on weight despite reduced overall food intake, suggesting that increases in body fat are driven by reduced energy expenditure rather than increased energy intake. Our results suggest that the birds achieve increased energetic efficiency via multiple mechanisms, including absorbing more energy from food, reducing energy expenditure and diverting energy from somatic maintenance and repair into building fat stores.

Our results from birds are causing us to challenge current thinking in humans about the causes of food insecurity-induced obesity. Furthermore, we suggest how the biological trade-offs underpinning food insecurity-induced weight gain could be directly contributing to declines in human health and wellbeing.