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Linking risk-taking traits and food-web interactions: Meta-analytic and experimental approaches

Nicholas P Moran; Alfredo Sánchez-Tójar; Holger Schielzeth; Klaus Reinhold

Animals often gamble with their lives, balancing predation and starvation risks with their need to gain resources and reproduce. Intraspecific differences in risk-taking traits can be partially driven by variation in trophic state (e.g., diet, competitive pressure), and in turn, behavioural trait variation can lead to among-individual differences in trophic interactions (e.g., variation in foraging behaviour). We combine meta-analysis and experimental methods to explore these interactive trophic state-behaviour effects. Diet effects on risk-taking behaviour was examined via a large-scale meta-analysis. Focusing of risk-taking in contexts such as predator and novelty responses (e.g., boldness-exploration), this preregistered study revealed that animals subject to poorer quantity or quality diet treatments showed an overall greater willingness to take risks. Meta-regression analysis found this effect to be dependent on the animal's life-stage and type of behavioural experiment. This comprehensive study suggests that what an animal is eating, and consequently it's physical condition can have substantial effects on their behaviour. Now, these effects are being explored in the Baltic Sea, with experiments measuring covariation between behavioural traits and trophic state in the invasive round goby (*N. melanostomus*). Combining animal personality and food web analysis methods, this work provides insight into how behavioural variation impacts on ecological interactions in nature.

Biological relevance affects visual attention in jumping spiders

Averill L Moser-Rust; Bonnie Humphrey; Ximena Nelson

Visually searching an environment is a computationally-demanding task, therefore, animals should restrict visual processing when necessary. Additionally, compared to other aspects of the environment, animals are likely to pay increased attention to key resources, such as food, mates, or predators. The attentional abilities of animals are finite and, in most animals, the ability to detect stimuli declines over time. This is known as the vigilance decrement. Understanding the mechanisms behind the vigilance decrement has important implications for workplace design in high risk jobs, such as air traffic control operators. Jumping spiders (Salticidae) are cursorial hunters that have an exceptional visual system with excellent spatial resolution and colour vision. This, combined with a relatively small number of neurons and highly complex behaviour, make them suitable study animals for sustained attention research. Using digital monitors, we repetitively presented *Trite planiceps* with nine stimuli differing in biological relevance, recording their optomotor responses to each stimulus over time. We hypothesised that decrements would be uniform across stimuli if biological relevance does not require higher-order cognitive processing to allocate attentional resources. We found that attention was sustained for longer with biologically-relevant stimuli. Further research is required to identify the cognitive mechanisms underpinning this effect.

Impacts of DEHP exposure on territory establishment in male triplefins (*Fosterygion capito*)

Fletcher Munsterman

As microplastics and the chemicals within them become more apparent in the environment, it is crucial to investigate the impact that these manmade materials have on the natural world. While there is evidence this plastic has physiological and behavioural impacts on exposed organisms, more work needs to be done to discover specific effects of plastics and plasticizers. This research will investigate the potential influence of microplastics and Di-2-ethylhexyl phthalate (DEHP) on the behaviours of a benthic reef fish, *Fosterygion capito*. It is predicted that the estrogenic influence of DEHP exposure will inhibit exposed males' ability to establish and guard territory during the breeding season. The environmental relevance of this study will be investigated by collecting sediment samples and nesting fish during the breeding season. Analysis of these