

11. Variation and similarities in how Eurasian magpies respond to threats

Miriam Kuspiel^{1*}, Marc Naguib¹, Arnout Lindeman¹, Kat Bebbington^{1,2}, Sjouke A. Kingma¹

¹ Behavioural Ecology, Wageningen University & Research, The Netherlands

² Groningen Institute for Evolutionary Life Sciences, University of Groningen, The Netherlands

* Corresponding author. E-mail: miriam.kuspiel@wur.nl

Acoustic communication is widespread across the animal kingdom in a variety of contexts, such as warning about predators or to defend the territory against conspecifics. Previous research has shown that some alarm calls are specific to certain predatory contexts or signal threat urgencies, while others are generic to any type of threat. It remains unclear in which species specific versus general alarm calls evolve, and to what extent response strategies and calls differ when conspecifics versus different predators surpass the boundaries of an individual's territory. We tested this in Eurasian magpies (*Pica pica*) of the Corvid family which produce a loud and harsh multi-syllable alarm call in a variety of contexts. Specifically, we conducted experiments exposing wild magpie pairs to taxidermic models of aerial or ground predators, magpies or pigeons (control group). We will present whether sparrowhawks are perceived as a greater threat and thus evoke different call types or variations of the alarm call and less risk-taking behaviours than fox models. We further tested whether behavioural and vocal responses are similar when mobbing less dangerous predators versus conspecifics. This study thus combines approaches from both anti-predator and territorial behaviours while analysing not only context-specificity of call types but also variation within calls. We thereby broaden the perspective of classical alarm call investigations and contribute to a better understanding of mechanisms and functions of animal communication.