

## Topic Summary

The behavior that is explored is corvid interspecific recognition and information transfer as mediated by social learning. Specifically, the ability of crows and ravens to recognize individual humans (Blum et al. 2020; Cornell et al. 2012; Marzluff et al. 2010; Swift & Marzluff 2015), especially those deemed dangerous or threatening (Marzluff et al. 2010; Swift & Marzluff 2015), and pass that information to other individuals of the same species, this is referred to as social learning (Cornell et al. 2012; Miller et al. 2016).

Studies conducted by Cornell et al. (2012), Marzluff et al. (2010), Swift & Marzluff (2015), and Blum et al. (2020) involved the use of masks and presented situations where dangers and threats were perceived by corvids. The recognition of danger and subsequent association of the danger to a mask occurred quickly (Blum et al. 2020; Swift & Marzluff 2015) and repeated reinforcement of association of danger to the mask over long periods of time was not necessary (Blum et al. 2020; Cornell et al. 2012; Marzluff et al. 2010; Swift & Marzluff 2015). This association of danger to a specific mask is a learned behavior of corvids. As such, in each study (Blum et al. 2020; Cornell et al. 2012; Marzluff et al. 2010; Swift & Marzluff 2015), the visual recognition of the 'dangerous' mask would result in corvids scolding (harsh alarm caws) and mobbing (contagious scolding and sometimes attacking with more than one bird) whoever was wearing the mask. The ability to recognise individuals of another species is strongly tied to predator and threat recognition (Blum et al. 2020; Cornell et al. 2012; Marzluff et al. 2010; Swift & Marzluff 2015) as such, it is important to consider agitation levels of birds prior to conducting such studies on anti-predatory responses (McIvor et al. 2018).

In corvids, having recognized which individuals are a danger or threat will result to mobbing and scolding of the individual. Sometimes this mobbing is contagious, but this behaviour is also influenced by individual learning—this can be a direct experience of experiencing danger or witnessing it happening to another individual or social learning—this is learning through peers or learning through parents (Cornell et al. 2012). The social behavior of corvids is greatly shaped by how they are raised (Boucherie et al. 2020) hence, the impact of social learning and information transfer can be quite rapid. By understanding corvid social life, (Boucherie et al. 2019) the bigger picture of how social learning may occur. In addition, there is a lot of information encoded in the calls of corvids, which is the main method of how social learning occurs (Mates et al. 2015). Corvids differ from other species in that many species recognize individuals of their own species, but it is less known for individuals to recognize individuals of other species (Marzluff et al. 2010). Evolutionarily, there is an advantage to being able to recognize dangers, but it is costly to gain such accurate and specific info (Cornell et al. 2012; Marzluff et al. 2010). The proximate influence of this behavior is to avoid danger. Ultimately, the influence is that there is an increase of fitness and survivability, which gives insight to why this behavior is present amongst corvids (Marzluff et al. 2010). It is quite difficult to observe corvid recognition in nature without the use of tagging and experimental variables, hence the influence of this behavior is mostly studied in experimental laboratory conditions. In addition, corvid adaptability to recognise information on another species (Nácarová et al. 2018) show evolutionary and fitness benefits to their survival.

Through reviewing these ten studies, areas for further exploration includes evolutionary influences on the recognition of individuals of other species can be explored, as well as the reason why some animals have adapted to recognize and why other animals have not. A cost benefit analysis of the ability to recognize individuals of other species is also another area of additional investigation, this will help give understanding as to why some species have developed and have invested energy into such behavior.

## References

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