The Influence of Visual and Acoustic Stimuli on the Mobbing Behavior of Crows

Kate Bouchard
University of Washington, School of Environmental and Forest Sciences, Wildlife Conservation

Introduction
Corvids have a striking ability to problem solve and employ their advanced intellectual acuity. Mobbing is a widely utilized behavior reported in varying species of birds and across the mammalian spectrum. Why do these select organisms participate in this conspicuous behavior? I propose that this behavior is a crucial communication tool within a flock of Northwestern Crows (Corvus brachyrhynchos). By effectively communicating between individuals, crows can efficiently distract targeted predators and place increasing risk equally over participating members of the mob.

I examined the physical responses of crows to predatory stimuli in the field to determine whether or not crows would discriminate between research decoys. Specifically, I compared an obviously fake predator model and a crow model (Mates et al., 2015), to a taxidermy Great Horned Owl (Bubo virginianus) and a control (no model) condition.

Mobbing Behavior
Mobbing is defined as a form of cooperative anti-predator behavior (Cario, 2005). Lord and colleagues (2009) defines mobbing in this way: “It is elicited by the approach of a predator or an unknown stimulus, including unfamiliar members of the same species or other species: more generally, an “intruder”. Mobbing involves multiple group behavioral responses and is characterized by conspicuous displays: rapid and abrupt movement, and on occasion joint physical attack. It is typically initiated by a single individual who has first detected an intruder, and is signaled by means of vociferous and conspicuous vocalisation. Mobbing calls are received by both the intruder and the sender’s conspecifics (Clamp and Shalter, 1984). Conspecifics may respond by approaching the sender, joining in the production of the mobbing vocalisation, and repeatedly approaching and withdrawing from the intruder. The intruder’s approach (often predatory) behavior is interrupted.”

Methodology
Study site locations were selected as open public areas with at least one foraging crow present and were never repeated. 40 trials were conducted throughout the greater Seattle area and northern Oregon. A white bag was placed over the decoy and set up 10-30 feet from the foraging crow. A hidden Bluetooth speaker was placed in nearby bushes or behind a tree, 20-30 feet away. The observer was concealed. A voice recorder was used to document the number of flyovers, date, time, weather, number of crows present at the beginning of the trial and the maximum number of crows.

The presentation of stimuli was as follows:
1) Taxidermy Great Horned Owl with Call (5), Taxidermy Great Horned Owl without Call (5)
2) Plastic Owl with Call (5), Plastic Owl without Call (5)
3) Dead Crow Decoy with Call (5), Dead Crow Decoy without Call (5)
4) Controls: No Decoy without Call (5), No Decoy with Call (5)

Each trial lasted 5-6 minutes from start to finish of observations. The call was played for two minutes at the start of each call trial and observations continued three to four minutes after the call finished.

Results
There were no significant effects of call playback. Unsurprisingly, the number of crows present at the start of the trial did influence the number of crows-at-peak, flyovers, and dives and this effect was statistically removed as a covariate. The type of decoy presented did influence all three measures: for crows-at-peak (df=3,33; F=7.615; p=0.001), significantly more crows appeared in response to the Crow presentation than to No Decoy. For flyovers (df=3,33; F=8.373; p=0.001), significantly more flyovers occurred in response to Crow presentation than to the Fake Owl or No Decoy presentations. And for dives (df=3,33; F=7.242; p=0.001), significantly more dives occurred in response to the Real Owl than to the Fake Owl or No Decoy presentations.

Analysis: four by two, two-way analysis of variance with two covariates (how many birds were on the ground foraging at beginning of trial, time of year to control for breeding season aggression).

Conclusions
• In general, responses to crow decoys were most intense, followed by the response to the taxidermy owl decoy.
• The response to the plastic owl was similar to that for no-decoy presentations.
• Crows responded with greater intensity to either crow or taxidermy owl decoys than to the plastic owl or no-decoy presentations.

Discussion
• More trials (20) will be conducted to reduce variance, and provide greater sensitivity to detect more subtle effects.

Questions
• Are crows predisposed to focus on specific visual characteristics of predators, such as a color, shape and texture?

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References
