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Dominance and neophobia in coyote (*Canis latrans*) breeding pairs

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Abstract

Previous research suggests that within social animals, subordinate individuals are less neophobic than dominant individuals. We investigated the effect of social status on neophobic responses using 10 captive coyote breeding pairs. Social status was determined from observations of feeding behavior and agonistic interactions during a series of reference trials. Once dominance was established, we surrounded an experimental area with novel stimuli (ropes adorned with interspersed flags) to create a novel context around a familiar food source. Contrary to hypotheses, dominant coyotes were first to feed, showed more interest toward novel stimuli, and eventually crossed the barrier, which subordinates never did. Our results indicate that dominant coyotes are less neophobic of novel settings that contain familiar food than subordinates are. Since a reduction in neophobia can be interpreted as an increase in risk taking, our results support previous observations that dominant (alpha) coyotes take more risks than subordinates. Our results also suggest reasons for differential observations of coyote behavior in the field: artificial selection against bold behavior in populations undergoing predator control.

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1. Introduction

Neophobia, the fear of novelty, is typified by hesitation, avoidance, or caution (Barnett, 1958; Harris and Knowlton, 2001) and is an indicator of an animal's internal state of risk perception as well as its degree of boldness, or propensity to take risks (Wilson et al., 1994). Neophobic responses to objects and food have been documented in numerous species (Marples and Kelly, 1999) and differential response within and between species has been the subject of much study (Wilson et al., 1994).

Neophobic phenomena can be used to resolve ecological and evolutionary questions in the context of social dominance and risk avoidance. For example, considerable evidence suggests that subordinate animals forage in riskier environments than dominants (Lange and Leimar, 2001) because dominant animals control preferential access to food resources (Wrangham, 1981; McClintock et al., 1982) and can displace subordinates from them. For subordinates to use riskier or novel alternatives, they must overcome fear associated with novel or otherwise risky environments. Thus, neophobia is hypothesized to be weaker or less prevalent in subordinate than in dominant individuals.

That different animals express different behavioral repertoires (e.g. personalities) is acknowledged, but the differing degree of boldness in dominant and subordinate animals is only beginning to be understood (Dingemanse and De Goede, 2004). Dominant rats (*Rattus norvegicus*) were shown to be more neophobic than subordinates (Robertson, 1982), and subordinate jackdaws (*Corvus monedula*) usually initiate feeding in novel situations (Katzir, 1983). Alternatively, boldness in trout (*Salmo trutta*) was positively associated with dominance (Sundström et al., 2004).

Neophobia in coyotes (*Canis latrans*) has been examined in substantial detail (Windberg, 1996; Harris and Knowlton, 2001; Heffernan, 2002). Relative to coyote hierarchies (Knight, 1978; Bekoff and Wells, 1980), dominant coyotes (3–6 months old) were more neophobic than subordinates (Johnson and Balph, 1990). The case of coyotes is particularly interesting, however. In natural conditions only dominant coyotes pursue and kill large dangerous prey and lead repelling of intruding conspecifics (Gese and Grothe, 1995), which suggests that dominant coyotes are more bold than subordinates. However, from field observations, Sacks et al. (1999) and Séquin et al. (2003) concluded that dominant coyotes were more wary (i.e. less bold or more neophobic) because they were less susceptible to photo and mechanical capture.

Coyote management programs that utilize visual stimuli may benefit from a better understanding of coyote neophobia and dominance. Coyotes that are less neophobic of control devices (e.g. cyanide guns and traps) are more likely to be captured or removed. Knowing which coyotes are less neophobic and therefore more susceptible to capture may be helpful to managers. Our objective was to experimentally examine the interplay between dominance and neophobia in adult coyotes in order to understand how dominant coyotes are sometimes observed to be more bold and at other times less bold than subordinates.

2. Methods

We conducted experiments at the Wildlife Services, National Wildlife Research Center, Predator Research Facility in Millville, Utah. We used 10 breeding pairs of coyotes to

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