

Effects of Harness Attached Radio Transmitters on Pinyon Jays

Christian A. Nunes, Russell Benford, Russell P. Balda

Avian Cognition Laboratory • Department of Biological Sciences • <http://www4.nau.edu/acl/>
Northern Arizona University • Flagstaff, AZ

*The collection and use of radiotelemetry data in avian research is growing in popularity, yet few studies have investigated the potential behavioral implications of transmitter attachment on mid-sized birds. To test the hypothesis that the attachment of a radio transmitter affects the behavior of a mid-sized passerine, radio transmitters were attached to 6 captive, free-flying Pinyon Jays (*Gymnorhinus cyanocephalus*). Transmitters weighing $\leq 3\%$ of the mass of the birds were attached to bird's backs with elastic harnesses lopped around the bird's upper thighs. Birds with transmitters attached were released into an outdoor aviary; 6 control birds without transmitters attached were released into the same aviary. All birds were then observed from behind a blind for ten observation periods at randomized times of day in fall 2005 and spring 2006. During observations, data on resting, preening, object manipulation, flying, walking/hopping, sociality, and foraging were collected. Results suggest that birds with transmitters attached preen the transmitters, but that this preening does not significantly affect locomotive, foraging, or social behaviors. Thus, transmitter attachment does affect bird behavior, but transmitter attachment does not seem to affect behaviors relevant to bird well-being.*

Introduction

The use of radio telemetry as a tool for quantifying animal movements is becoming increasingly common (Rappole and Tipton 1991, Hooge 1991). However, several studies have found that radio transmitters have adverse effects on foraging capability, locomotion, and breeding behavior (Ramakka 1972, Massey et al. 1988, Gessaman et al. 1991). Because of these potential effects, care should be taken to choose the appropriate transmitter and attachment method in order to reduce the risk of adversely affecting the subject's behavior (Nudds and Sjöberg 1989, Rappole and Tipton 1991). One proposed method of transmitter attachment uses an elastic figure-eight harness wrapped around a bird's thighs to hold a transmitter in the center of the bird's back (Rappole and Tipton 1991). The behavioral implications of this method of attachment, however, have not been experimentally investigated in mid-sized passerines. Do backpack radio transmitters affect the behavior of mid-sized birds? It is possible that transmitters affect behavior adversely, that they affect behavior non-adversely, or that they have no effect on behavior. The goal of this study, therefore, is to determine what, if any, effects the attachment of a radio transmitter with a backpack harness has on a mid-sized passerine, the Pinyon Jay.

Methods

Behavioral effects of radio transmitter attachment were investigated by observing 12 captive jays in an outdoor aviary. Backpack transmitters (Holohil Systems Ltd., model PD-2) were attached to six jays following methods in Rappole and Tipton (1991), and six birds without backpacks were used as controls. All birds were released into an 5.7 x 4.3 meter aviary cell so that they could fly freely. Birds habituated to the cell for six months, and to their transmitters and harnesses for one day. For fifteen pseudorandomly selected days during November 2005 - April 2006, data were collected twice daily for one hour per bird. Data on resting, preening, locomotion, object manipulation, sociality, and foraging behavior were collected. All behaviors were categorized as being either normal or obtrusive. Obtrusive behaviors were defined as behaviors associated with the transmitter or harness (i.e. preening the transmitter or harness area, manipulating the transmitter/harness, encumbered flight or walking/hopping). The frequencies of each behavior in experimental and control groups were compared using Kruskal-Wallis tests.

Results

Birds outfitted with transmitters showed significantly more obtrusive behaviors compared to control birds ($n=12$, $\chi^2=9.46$, $P=0.00$) (Figure 3). Experimental birds preened the harness or transmitter area more than control birds did. No other obtrusive behaviors were observed. No significant difference was found between groups in any non-obtrusive behavior (Figure 3).

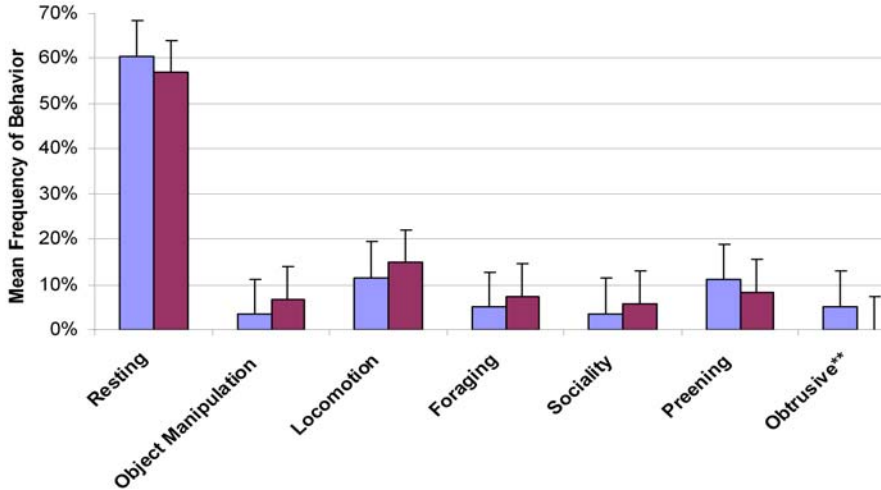


Figure 3: The frequency of individual behaviors. Only obtrusive behaviors are significantly different (** $p = 0.00$) between groups. Bars represent standard error.

Discussion

Results suggest that behavior is affected by the presence of a backpack transmitter, but that this affect is not adverse. The amount of preening increased for birds with transmitters, but the amounts of resting, object manipulation, locomotion, foraging and social interactivity were not affected. The effect of increased preening might pose a problem for future researchers if they are assessing the behaviors of individual birds. A bird with an increased rate of preening could have decreased attentiveness and elevated energy consumption, compared to non-burdened animals. Gessaman et al. (1991) found that tipler pigeons wearing a dorsal load/harness lost water 57-100% faster than birds without, but flew the same distance per hour and remained in natural flocks with control birds. Similarly, results of this study suggest that transmitter attachment has no effect on ecologically relevant activities such as locomotion, foraging and sociality. Thus, the use of a harness and backpack transmitter weighing $\leq 3\%$ of a mid-sized passerine's body mass seems to have no significant negative behavioral effects.

References

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