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Individual Variation in Behavior Among Male Blue Grouse

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Ornithologists, and banders in particular, studying populations of birds in the wild are frequently impressed by individual variations in behavior, with certain individuals consistently acting in a manner different from other conspecifics of the same sex and age. As noted by Thomson (1964), such variability might be expected to be even greater than morphological variation, as behavior may be determined by genetics, experience, or both. Indeed, variation to an individual level is documented well for some behavioral components, such as call notes and song (e.g. Falls 1969; Beer 1970; Falls and McNicholl in press). Yet, few behavior studies stress such variability, except in relation to such practical problems as trapability (e.g. Doan 1976; Hamerstrom and Hamerstrom 1977), band removal affecting population estimates, longevity data and other information based on banding returns (Wiseman 1977), and persistent difficulty of feeding some individuals in captivity (Berry 1975). Studies, such as those by Kennard (1894), Lockley (1940), and Partridge (1976), emphasizing individual variation in behavior, are relatively few.

The current development of fast and efficient methods of analyzing large volumes of numerical data make the quantification of behavior both valuable and tempting. Yet behavior patterns are rarely so stereotyped as to allow ready tabulations without loss of qualitative information. Knowledge of individual variation, however, does allow quantification of behavior with considerable confidence. For example, 13 male Blue Grouse *(Dendragapus obscurus)* on Vancouver Island, British Columbia showed distinct differences in responses to playbacks of taped hooting (the song of Blue Grouse), at the boundaries of their territories in 1973 (Tables 1 and 2). Nevertheless, by combining several behavioral parameters, J.B. Falls and I were able to demonstrate that each individual showed less response to the songs of neighbors from the correct direction than to songs of other individuals (Falls and McNicholl in press). All but one of these birds were color-banded, enabling us to confirm individual identity.

Several recent investigators have attempted to test for genetic differences in Blue Grouse at a population level by comparing behavior (e.g. Mossop 1971; Willie 1971; Hemus 1972; Donaldson 1973; Low 1974; Bergerud and Hemus 1975; Cooper 1977). With the exception of Cooper's study, these investigations were based on such behavioral parameters as reaction to an "arena" consisting of three mirrors, a female squat dummy and female calls, and reactions to observers. Although these researchers did indeed find differences in these parameters, indicating possible differences in populations, their results are inconclusive without background data on individual variation within the population, and variability in behavior of each individual. If individual behavior is marked and consistent within each bird, their results likely reflect genetic differences, but if behavioral variation varies markedly within each individual, their results may reflect only chance reactions of each bird on a particular encounter. During detailed studies of color-banded males from 1971 to 1974, I did find marked individual differences in reactions to me (McNicholl 1978a), "tameness" (McNicholl 1978a: table 3), individual hooting patterns as to number of syllables per song and frequency of

Table 1. Postural responses of male Blue Grouse to taped hooting at edge of territory.

Experimental subject	Responses to two experiments, each including 3 playbacks[1]
1	Remained in neutral posture throughout first experiment; in 2nd, no display on 1st N, partial display on both S.
2	Remained in neutral posture throughout 1st experiment; in 2nd, showed aggressive reactions on both S, no display on N.
3	In 1st experiment, white around lateral apteria on S and 1st N, no display on 2nd N; aggressive reactions to both S and no display to N of 2nd experiment.
4	No display on either N of 1st experiment; full display on S. In 2nd experiment, no display on N; full display on 1st S; aggressive on 2nd S.
5	In 1st experiemnt, no display on either N, full display on S; in 2nd experiment, no display on N, full display on 1st S, aggressive on 2nd S.
6	In 1st experiment, no display on either N, partial display on S; in 2nd experiment, no display on N, full display on 1st S, aggressive on 2nd S.
7	In 1st experiment, no display on either N, partial display on S; in 2nd experiment, no display on N, full display on both S.
8	In 1st experiment, no display on either N; on S, partial display, in 2nd experiment, no display on N, full display on both S playbacks.
9	No display on 1st N in 1st experiment, full display on S, and full display to J.B.F. on 2nd N; in 2nd experiment, no display on N, full display on both S, with aggressive reaction on both S.
10	No display on either N in 1st experiment, partial display on S. In 2nd experiment, full display on both S, no display on N.
11	Full display on both N of 1st experiment, aggressive reaction on S; in 2nd experiment, full display on 1st S, no display on N, partial display on 2nd S.
12	In 1st experiment, no display on either N, partial display on S; in 2nd experiment, no display on N, partial display on 1st S, full display on 2nd S.
13	In 1st experiment, no display on either N, full display on S; in 2nd experiment, no display on N, full display on both playbacks.

[1]1st experiment: playback of correct neighbor (N), then stranger (S), then same N; 2nd experiment, playback of different S, then N, then S. Order of presentation and other details in Falls and McNicholl, in press.

Table 2. Movements[1] of male Blue Grouse in response to taped hooting at edge of territory.

Experimental subject	N-S-N[2]			S-N-S[2]		
	N	S	N	S	N	S
1	0	1/119	0	0	0	0(/119)
2	0	0	0(/66)	125/140	0	15/15
3	4/55	8/51	0	64/64	0	0
4	0.3/115	4/115	-4/115 (moved back)	115/115 (but circled to 15 away)	0	15/15
5	0	2.5/82	0/79.5	62/82	0	20/20(flew)
6	0	12/50	0/38	52/91	0	37/39+5 (went behind speaker)
7	0	4/56	-4/56 (moved back)	12/52	0	26/40
8	0	59/117	0/58	30/64	0	27/34
9	0/33	46/33 (behind speaker)	0/13	59/59	0	0, but circled speaker
10	0	6/85	0/79	32/93 (flew)	0	53/61
11	55/55 (flew)	0 (circled speaker)	0 (circled speaker)	15/270	0	45/255
12	0	2/40	0/38	8/35	0	25/27
13	0	57/60	0/3	23/50	0	20/28

[1]Distance moved in M.K.M. paces/remaining distance between bird and speaker in M.K.M. paces. All movements on foot unless otherwise noted.
[2]N-S-N and S-N-S experiments as per Table 1 footnote.

singing (McNicholl 1978b: table 8), and individual tendency to sing (McNicholl 1978b: table 7). Although most birds showed occasional atypical responses, behavioral differences were generally consistent within individuals. Such results suggest that differences found by the several workers in the studies cited above reflected true behavioral differences among birds of different populations; a remote chance still remains that the researchers encountered atypical or individualistic responses in the birds studied. This possibility is also indicated by the work of Cooper (1977), who found marked individual variation in behavior of particular grouse in cages.

Thus, behavior can be compared at a population level, but the results are difficult to interpret without both knowledge of the amount of behavioral variation within each population, and the consistency of behavior of the individual birds studied. Banders and others studying wild populations of birds can provided welcome additional information on this topic through careful and detailed observations of individually marked birds.

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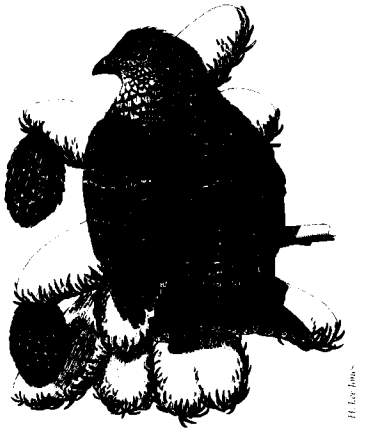

Corrections to MTAB 36

The BBL has informed us of two errors in the recent MTAB:

5. "Page 26" should read "Page 2—7."
   Delete new band sizes for Broad-winged Hawk. 5—6 are the correct sizes.