Applied Animal Behaviour Science, 17 (1987) 353–359
Elsevier Science Publishers B.V., Amsterdam — Printed in The Netherlands

Short Communication

Frequency of Back-Tracking in the Tracking Dog

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(Accepted for publication 24 September 1986)

ABSTRACT

Mackenzie, S.A. and Schultz, J.A., 1987. Frequency of back-tracking in the tracking dog. *Appl. Anim. Behav. Sci.*, 17: 353–359.

Trained tracking dogs were tested on straight tracks 200 paces long to determine if they would always go in the direction a track-layer had walked when brought in at 90° angle at the mid-point of a track. None of the dogs tested had any previous experience with this task. A total of 66 tracks were run. In 60.6% of these, the dogs tracked in the direction the track-layer had walked. These results are not significant enough to say that the dogs tested were going in the direction of the track-layer any more frequently than one would expect from random chance ($P > 0.05$). Thirty-two percent of the dogs exhibited a position preference with regard to the direction they first turned at the decision point. However, the preferred direction was not the same for all these dogs. As a group, the dogs showed no overall position preference ($P > 0.05$).

INTRODUCTION

An important part of practical tracking is to determine the direction of a track (Bryson, 1984). Many trainers of tracking dogs assume that a dog will always follow a track in the forward direction (i.e. the direction a track-layer has gone).

Studies have been conducted which indicate that dogs will go in the correct direction on tracks less than half an hour old (Johnson, 1977). Johnson presents a conclusion, but no procedure or data are given. He does state that tracks less than half an hour old and also 3-h-old tracks were tested under four different wind directions. The difficulty came on the older tracks. It is not stated whether or not these results are statistically significant.

Other studies, mentioned by Davis (1974), indicate that dogs approaching a trail at right angles will always follow that trail in the correct direction. Davis also presents a conclusion without the procedure or data being given. He states that these conclusions were arrived at during 17 years of continuing research on scent and tracking conducted by the United States Government. Conclusions from these studies were arrived at only after 100 tests were run on each

0168-1591/87/$03.50

study with 90% consistency of results (Davis, 1974). Written research reports on these studies are not currently available.

Other studies suggest that the direction a dog follows on a track is no better than random chance (Morrison, 1980; Schwartz, 1980). Morrison tested 25 dogs: 12 German Shepherds, 6 Bloodhounds, 2 Dachshunds, 4 Labradors and a Great Pyrenees. The test consisted of the handler bringing his dog at a 90° angle to the center of a 100-yard track that was between 20 and 40 min old. The ends of the tracks were marked by flags, with the direction of the track being unknown to the handler. The results were tested statistically and not found to be significantly different from random chance. Schwartz tested 5 dogs: 1 Rottweiler, 1 Ibizan Hound, 2 Standard Poodles and 1 Miniature Schnauzer. The dogs were tested on tracks that were 50 yards long and aged anywhere from 15 min to 1 h. A flag was placed at the beginning and end of each track. In each case the direction of the track was unknown to the handler. The results were tested statistically and not found to be significantly different from random chance.

Studies have also been conducted on olfactory detection and position preferences in dogs (Lubow et al., 1976). In studying sampling strategies, Lubow tested 3 mongrel dogs which had each previously aquired 4 simple olfactory discriminations. Two scent discrimination stations were used and 15 trials were run on each of 15 test days. Two odors were simultaneously presented, with reinforcement dependent on a response to one of them and not the other. It was shown that each dog acquired an individual, but highly consistent, pattern of sampling. In 95% of the trials, the dogs approached the left stimulus station first.

Studies have also been conducted on other species. Mandler (1966) demonstrated that position preferences can be learned in a Y-shaped maze. Ten rats were over-trained with 150 repetitions to learn a position preference. Ten additional rats were trained to mastery criterion on the same position preferences. They were then evaluated for speed of transfer to visual stimuli. No statistical difference was found between the over-trained and the mastery-trained rats. Hall (1974) tested 32 White Carneaux pigeons using a 3-key pigeon chamber. He demonstrated that when 2 positive stimuli were presented, the pigeons pecked the key on their preferred side, and when 2 negative stimuli were presented, the pigeons pecked the key opposite to their preferred side.

This study is an attempt to determine if the direction chosen on a track by dogs trained under standard methods is any better than random chance, and to investigate the possibility of tracking dogs exhibiting a position preference at the descision point when approaching a track from the side.

METHODS

A total of 22 experienced tracking dogs of varying ages were tested (8 months to 7 years). The breeds included 20 German Shepherds, 1 Rottweiler and

TABLE I

Experimental data

Training group	Dog No.	Breed[1]	Sex[2]	Age group[3]	Number of correct tracks
1	1	GS	M	C	1
1	2	GS	M	C	1
1	3	GS	F	D	0
2	4	GS	M	D	1
2	5	GS	M	D	3
2	6	GS	M	B	1
3	7	GS	M	B	3
4	8	GS	M	C	2
4	9	GS	M	B	2
4	10	GS	M	B	2
5	11	GS	M	D	3
5	12	GS	O	D	2
5	13	GS	M	B	2
6	14	GS	M	C	1
6	15	GS	M	C	3
6	16	GS	M	D	1
7	17	GS	M	D	2
7	18	GS	F	C	2
8	19	GS	M	B	1
8	20	R	M	A	3
8	21	T	M	B	3
8	22	GS	M	C	1

[1]Breed: GS = German Shepherd; R = Rottweiler; T = American Staffordshire Terrier.
[2]Sex: M = male; F = female; O = castrated male.
[3]Age group: A = 8 months; B = 2-3 years; C = 4-5 years; D = 6-7 years.

1 American Staffordshire Terrier (Table I). The dogs tested came from 8 different training groups representing both West Germany and the U.S.A. In each case the dogs were handled by their owners. None of the dogs had any prior training on distinguishing the direction of a track.

Each of the dogs ran a total of 3 straight tracks. Each track was 200 paces long and no more than 15 min old. In each case the wind was blowing into the face of the dog as he approached the decision point (Fig. 1). The tracks were laid in grass that ranged from short to lush.

The direction that each track was laid was determined randomly for each dog. If the first 2 tracks laid for a dog went in the same direction, then the third was laid in the opposite direction. This was done to ensure that each dog experienced tracks running in both the right and the left directions. In each case both the handler and the dog were unaware of the direction in which the track was laid.

The tracks were laid with either an article or man at the end and a flag at

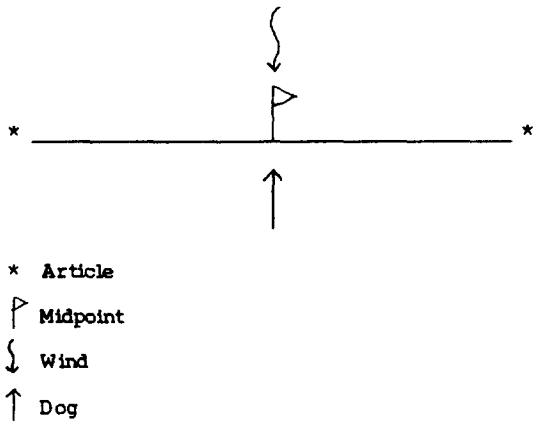

Fig. 1. Orientation of dog to track.

the mid-point. The track-layer started out in the randomly chosen direction, dropping an article at the starting point. At the mid-point (100 paces), a flag was placed. The track was then completed, and an article or the track-layer was hidden at the end.

Each dog was brought in at the mid-point as indicated by the flag, at 90° to the direction of the track, with the wind in his face. The dog was then given the command to track. The direction the dog first turned upon arriving at the track was recorded. This information was subsequently analyzed in the investigation of position preferences. The direction that the dog first completed on the track was also recorded. This information was used as the direction the dog chose to track.

The frequency of first turns and the final track direction were analyzed using χ^2 for position preferences and to determine if the frequency of tracks in the correct direction was any different from what would be expected from random chance, using exact probabilities to calculate the number of expected observations.

The effects of trainers and age of dogs were tested with a 2-way analysis of variance with interaction using the general linear models procedure of SAS (SAS, 1985).

RESULTS

A total of 66 tracks were completed. Forty of these tracks (60.6%) were followed by the dogs in the correct or forward direction. Twenty-six tracks (39.4%) were followed in the incorrect direction (back-tracked). Out of the 22 dogs, 6 went in the correct direction on all 3 tracks, 7 went the correct direction on 2 tracks, 8 dogs went in the correct direction on 1 track, and 1 dog

TABLE II

Frequency of forward tracking

Number of correct tracks	Number of dogs observed	Number of dogs expected	χ^2 value
0	1	2.75	1.1136
1	8	8.25	0.0076
2	7	8.25	0.1894
3	6	2.75	3.8409
			5.1515 NS[1]

[1] $P > 0.05$.

back-tracked on all 3 tracks (Table II). This was not significantly different from what would be expected from random chance ($P > 0.05$).

Out of the 66 trials, 38 (57.6%) showed first turns to the right at the decision point, and 28 (42.4%) showed first turns to the left. Of the 22 dogs, 7 made their first turn in the same direction on all 3 tracks and 15 made their first turn in the same direction twice, showing no significant difference from random chance (Table III).

Of the 7 dogs (31.8%) who first turned in the same direction on all 3-tracks, 5 first turned to the right and 2 first turned to the left on all 3 tracks.

There was no significant difference between the training groups or age groups (Table IV).

DISCUSSION

In some tracking manuals it is suggested that dogs trained under standard training procedures can and do tell the correct direction a fresh track is going (Johnson, 1977). Others go so far as to say that dogs will always follow a track

TABLE III

Frequency of first turns

Possible No. first turns same direction	Number of dogs observed	Number of dogs expected	χ^2 value
3	7	5.5	0.1818
2	15	16.5	0.0606
Sum			0.2424 NS[1]

[1] $P > 0.05$.

TABLE IV

Effect of trainers and age

Source	Degrees of freedom	Sum of squares	F value	$P>F$
Trainer	7	6.4998	0.86	0.5829
Age	3	1.8585	0.57	0.6540
Trainer×age	5	2.6917	0.50	0.7700

in the correct direction (Davis, 1974). The results of this study do not support these ideas.

The findings of this study are more consistent with Morrison (1980) and Schwartz (1980). Morrison reported 61% of the tracks in the correct direction, and Schwartz reported 65% of the tracks in the correct direction. In contrast to this study, Morrison and Schwartz conducted studies with tracks more than 15 min old. Future studies should investigate the effect of track-age on the frequency of back-tracking.

The results of this study shed no light on whether or not dogs are physiologically capable of detecting the proper direction of a track. They merely indicate that with standard training techniques, many dogs do not follow the track in the direction we would like them to. It is important to remember that this study was limited to dogs with no prior training for this task. Two approaches to the problem should be considered. (1) Tactics should be developed to compensate for this when on actual tracks. (2) Training techniques should be developed to encourage the dog to follow the track only in a forward direction. Although such attempts by Morrison (1980) and Schwartz (1980) proved unsuccessful, further studies should investigate the possibility of using different training methods to accomplish this.

Tracking manuals such as Johnson's (1977) suggest that dogs have a tendency to circle to the right. Lubow et al. (1976) suggest that dogs have a tendency to go to the left. The results of this study suggest that the dogs as a group did not exhibit a position preference either way. It was found, however, that while not all the dogs indicated a position preference, some of the individual dogs did exhibit a tendency toward this behavior.

Further studies need to be done to determine if position preferences affect the direction a dog chooses to go on a track.

ACKNOWLEDGEMENTS

This work was funded by the NYS/UUP Professional Development and Quality of Working Life Committee, and the Ulster Dog Training Club.

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