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APPROACH AND WITHDRAWAL BEHAVIOR IN DOGS*

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These experiments were suggested by casual observation of wide variations in friendliness exhibited by the individual members of a group of 300 dogs studied at the Cornell University Experimental Morphology Station.[1] Some dogs were completely friendly and would invariably seek human companionship, while other animals were extremely negative and withdrew on the approach of a person Many of the dogs were untame when first seen since they had not been handled or befriended, so a series of simple experiments were devised for taming the animals while roughly measuring quantitative changes in the positivity of their behavior.

An experimental group of 178 dogs, representing 14 pure-bred types and 19 hybrid mixtures derived through known heredity from the thoroughbred types, were studied. The dogs were lodged and fed in parallel concrete runways about 6 feet wide and 50 feet long. Some litters of 4-5 dogs occupied the same runway, but usually only two or three dogs chosen for their compatibility were quartered together. All the tests to be reported were performed with all the animals remaining in their own runways under conditions as normal as possible.

Three simple tests were adopted in which (*a*) the experimenter offered food through the wire fence without entering the run, (*b*) the experimenter entered the run and squatted in its entrance while offering food, and (*c*) the experimenter entered the run, and while standing, simultaneously offered food and attempted to pat the dog on the head. Quantitative scores were obtained by measuring the distance in feet of the closest point of approach of each animal to the experimenter in each of the three tests. An animal was judged completely friendly when he unflinchingly submitted to patting

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in Test 3. The dogs were fed daily at 4 P.M., and the tests were carried out the next morning so that the animals were hungry and appreciative of the dog biscuit given as reward.

Each of the three tests was given daily to all dogs for 30 days. Table 1 presents data showing the progress in taming over this

TABLE 1

SHOWING FOR EACH FIVE-DAY PERIOD DURING THE 30-DAY EXPERIMENT THE PERCENTAGES OF ANIMALS IN A GROUP OF 178 DOGS APPROACHING TO WITHIN CERTAIN DISTANCES OF THE EXPERIMENTER IN THREE TESTS OF FRIENDLINESS

The 0 in the *Distances away* column indicates that the dogs came in contact with the experimenter. *"Patted"* means that the dogs allowed themselves to be touched. Taming is shown by the higher percentages of dogs coming close to the experimenter in the later periods.

	Distances away	Five-day periods (averages) 1	2	3	4	5	6
Test 1	0	77%	80%	81%	82%	84%	85%
	1 to 10 feet	13	10	11	13	9	10
	10 to 20 feet	6	4	1	2	4	2
	20 to 50 feet	4	6	7	3	3	3
Test 2	0	64%	71%	75%	78%	80%	79%
	1 to 10 feet	24	16	17	11	11	10
	10 to 20 feet	2	5	3	6	3	5
	20 to 50 feet	8	7	6	6	5	6
Test 3	Patted	40%	45%	51%	54%	55%	56%
	0	9	19	21	19	19	21
	1 to 10 feet	38	20	18	15	17	8
	10 to 20 feet	5	8	4	6	4	8
	20 to 50 feet	8	8	6	6	6	7

period. It is seen that the three test situations represent graded problems of increasing difficulty since it required more courage for the dog to approach when the experimenter was inside the run than when he was outside. The percentage of dogs coming close enough to the experimenter to eat from his hand during the first five-day period was 77 per cent in Test 1, 64 per cent in Test 2, and only 49 per cent in Test 3. A month of thrice daily visits to the dogs resulted in an increase from 49 per cent to 76 per cent in animals friendly enough to eat from the hand in Test 3, however one in five of the 76 per cent still would not submit to patting. The greatest improvement in friendliness occurred during the first 10 days of the experiment, and after 20 days, practically every dog

had demonstrated the maximum friendliness of which he was capable in this situation.

The behavior of the less tame dogs warrants description for contrast with the friendly animal who met the experimenter with wagging tail, indicative of confidence. The unfriendly animal approached with mincing steps, tail motionless and dragging, and with frequent retreats to safer ground. Some shy dogs sat 20-50 feet away from the entrance to the run and made no attempt to obtain the food, while others actually retreated to a point farther away on seeing the experimenter. The behavior of any dog was usually consistent, and did not appear to be influenced by imitation of other dogs. In the shy dogs there seemed to be a balance between positive and negative factors which was easily upset by the slightest disturbance, resulting in momentary increases in negativity of the shy animals.

Since Test 3 was hardest for the shy dogs to face, the results from it have the most meaning and warrant further analysis. From Table 1, it is significant that improvement in friendliness occurred principally through taming of dogs originally approaching to within 10 feet at the beginning of the experiment. The percentage of dogs remaining more than 10 feet from the observer is essentially the same at the end of the 30-day period as at the beginning. This result is further demonstrated through individual rankings of the dogs according to the maximum degree of friendliness exhibited:

A—Dog completely friendly at all times.
B—Eats from hand but cannot be touched.
C—Approaches to within 20 feet of experimenter.
D—Dog remains 20 or more feet from experimenter.

As noted in Table 2, 69 per cent of the dogs attained their highest ranking during the first five-day period, and 90 per cent by the 15th day, indicating that early ratings are reliable indicators of what the dog will eventually do.

The tabulation of the number of dogs failing to attain *A* rating reveals 46 per cent of the dogs showing varying degrees of negativity which tended to persist. At the start of the experiment, there were 17 very unfriendly animals and this group was augmented by the addition of 10 other animals who became more neurotic or unfriendly during the experiment, so that at the end

TABLE 2

SHOWING THE NUMBER OF DOGS RECEIVING THEIR MAXIMUM RANKINGS FOR FRIENDLINESS IN EACH FIVE-DAY PERIOD DURING THE EXPERIMENT (70 ANIMALS RECEIVED AN *A* RATING DURING THE FIRST PERIOD, WHILE THREE DID NOT ACHIEVE IT UNTIL THE SIXTH PERIOD)

The starred numbers referred to animals which became neurotic or more unfriendly during the course of the experiment.

Ranking	Five-day periods 1	2	3	4	5	6	Totals	%
A	70	7	11	4	1	3	96	54%
B	13	12	6	3	4	2	40	22
C	12	0	1	1	0	1	15	9
D	17	2*	1*	3*	1*	3*	27	15
Totals	122	19	18	8	5	6	178	
%	69	11	10	4	3	3		100%

there were 27 completely negative animals. It should be emphasized that the experimenter made special attempts to coax these negative animals to be friendly through extra attention and food. The distribution of dogs according to the degrees of friendliness, together with their constant maintenance of these rankings, suggests the existence of some factor underlying negativity which is relatively impervious to conditioning.

In an attempt to discover whether a more attractive reward than dog biscuit would cause some of the animals to become more friendly, raw juicy meat was substituted in another experiment using the three tests. The friendly animals accepted the meat with alacrity. The shy animals became paradoxically more negative, the meat seeming to excite them with a resultant heightening of the fear reaction. In no instance did meat overcome the shyness of a negative animal. That both meat and dog biscuit were acceptable to the negative animals is revealed in the fact that the food was immediately snapped up when the experimenter moved away.

A point of major interest regarding conditioned friendliness is that it appears to be specific to a given situation. It was observed that with tamed but timid animals, slight changes in the test procedure (such as wearing different apparel) were sufficient to cause the dog to revert to his original negative behavior until olfactory or other cues established the experimenter's identity. An experiment to test the transfer of tameness to individuals unknown to

the dogs was carried out with four new observers who repeated the procedure originally completed by the author. Unfortunately, the results from this transfer experiment are not strictly comparable to the author's results from Table 1, since the author had become known to the animals through preliminary experiments before the data were taken. Summarizing the results from this experiment it may be stated that the 30-day taming period produced no appreciable difference in the attitudes taken by the shyer animals to newcomers. For all three tests, percentages of positive responses in the transfer experiment were consistently lower than the author's results at the beginning of the taming experiment. In other words, the friendly responses built up toward the author did not produce any appreciable difference in the attitudes of the dogs to unfamiliar people.

The demonstration of a large group of dogs who could not be conditioned to become friendly through the use of passive methods suggested the use of force to overcome negativity. For various reasons, only 54 of the 82 shy animals remaining at the end of the taming experiment were available for further study. Under conditions comparable to the taming experiment, the shy dogs were cornered and forcibly patted and handled whether they liked it or not.

Three characteristic responses to the force technique developed in the dogs, which give considerable insight into the rôle of fear in negative behavior. One group of dogs submitted to, and later sought the patting after they discovered that no harmful results followed. No typical emotional disturbances were noted in this group. The second group showed an inhibitory reaction in which they retreated to a far corner and then sat down shaking, refusing to eat although the saliva dripped from their jaws, vomiting occasionally, and usually urinating or defecating. The emotion of fear appeared to paralyze them, and prevent any action. The third group of dogs displayed an excitement characterized by restlessness, running about, and biting if touched.

The degrees of fear in the various dogs was roughly estimated according to the following criteria:

I. *No fear,* no incapacitation. Dog eats. No vomiting, urination or defecation.

II. *Slight fear,* partial incapacitation. Dog doesn't eat, or urinates while eating. No vomiting or defecation.

III. *Extreme fear,* incapacitation. Dog defecates, urinates and vomits. Doesn't eat.

The responses of urination, defecation, and vomiting are roughly indicative, in the order named, of the degree of fear present in a dog. In addition to the fear response itself, the reaction of the animal to fear is important. An animal inhibited by fear presents a very different picture from the excited animal. The effect of daily forcing the dogs to submit to friendly overtures has been presented in Table 3. The effect of daily forcing the animals to submit to friendly

TABLE 3

SHOWING THE REACTIONS MADE BY 54 SHY DOGS OVER A 30-DAY PERIOD OF BEING FORCED TO SUBMIT TO HANDLING

The cornered animals showed inhibitory reactions, while the excited animals ran back and forth and couldn't be touched. The animals in Groups 2 and 3 are divided according to the degrees of fear shown. Group 1 contains the animals that became friendly with this technique.

	Group 1	Group 2			Group 3		
	Patted animals	Cornered animals			Excited animals		
Degree of fear		I	II	III	I	II	III
1st day	2	10	18	8	1	10	5
5th day	7	4	23	3	1	10	5
10th day	13	7	14	3	0	11	6
15th day	17	4	15	1	2	3	12
20th day	19	4	14	1	2	3	11
25th day	20	4	8	2	2	6	12

patting resulted in an increase in friendly dogs from two to 20 in one month. Of this group, two dogs showed no fear the first time they were caught, 16 were first inhibited and later friendly, while only two animals belonging originally to Group 3 (excited animals) became friendly with this technique. It appears that an animal showing excitement is not accessible to stimuli productive of positive conditioning.

The results indicate that when an animal is excited, any attempt to corner him exaggerates the excitement. Specifically, two of the dogs showing characteristic excitement became conditioned so that the behavior appeared whenever the experimenter appeared in the distance. These dogs urinated, defecated, frothed at the mouth, snapped, bit, and hurled themselves at the fence in a frenzy of fear when they saw the experimenter coming. This behavior grew progressively worse. In dogs which were originally cornerable and

inhibited, the patting occasionally appeared to become suddenly intolerable and a typical excitement developed. In these cases, a mild degree of fear produced the inhibitory behavior, while high degrees of fear changed inhibition into excitement. Usually, however, the two types of behavior were distinct, and a dog that showed one would not show the other.

Discussion

Statistical tables do not yield an adequate picture of the variations in friendliness in different dogs. A study of individual graphs representing daily fluctuations in friendliness showed that positivity occurs as a gradient, and that there is a delicate balance between positive and negative reactions. The more fearful the animal, the shyer he will be, and the more readily is his confidence disturbed with resulting inconsistencies in behavior. Chance episodes tending to destroy the animal's confidence appeared to be more potent in producing negativity than are comparable influences inducing positive attitudes. This fact is demonstrated by an episode occurring with Dogs 59 and 61. At the start of the experiment, they never came closer than 2-3 feet away from the experimenter. After three weeks, their confidence had been won to the point where they could be handled. One day another animal in the run developed an ulcer on his abdomen and had to be caught and treated. This procedure created some disturbance which so severely disturbed Dogs 59 and 61 that they never again voluntarily submitted to patting.

The analysis of the genetic relationships between the shy dogs revealed a remarkable fact. They were all related to other animals which had been known to be shy. Forty of the shyest animals were second, third, and fourth generation descendants of a single bitch who was known as a fear-biter. The question arises as to whether the negative behavior represented an innate tendency, or was the result of previous conditionings. Although quantitative data are not available, observations on newborn litters suggest that the shyness and negative behavior may be noted soon after birth, and is not modified by conditionings. We have seen shy animals raised from birth with friendly animals without any change in their negativity. The behavior appears in spite of conditionings which should result in positive friendly behavior. In several instances, deliberate attempts were made to produce conditioned fears or neuroses by frightening

stimulation, but it only succeeded in shy animals. Animals that were originally friendly, remained so in spite of severe trauma.

Summary and Conclusions

Three simple tests were devised for measuring the friendliness of untamed dogs to an unknown person. An experimental group of 178 dogs was studied at the Cornell University Morphology Station. The dogs were rated according to the degree to which they became friendly during a 30-day period in which each animal was offered food three times daily. Although most dogs rapidly became friendly, about 25 per cent of the animals showed varying degrees of unfriendliness which was not modified by the taming. These animals showed a persistent fear response which was not altered by offering more attractive incentives to be friendly.

Conditioning in friendliness was demonstrated to be specific to the experimenter alone. The animals were no more friendly to unknown persons at the end of the taming experiment than they were at the beginning.

The unfriendly dogs were subjected to another experiment in which they were caught and forced to submit to handling. A few dogs became friendly with this technique, but most animals fell into two types. One group of dogs became excited, and became increasingly refractory to any attempt to touch them. The other group appeared to be paralyzed by fear and submitted passively to the handling. Although two inhibited animals became excited when severely frightened, the two types of reaction were distinct.

Indirect observations suggest that the fear response underlying unfriendliness is hereditary, in the sense that the animal has an abnormally low threshold. Unfriendliness could not be produced by conditioning in animals who were initially friendly. Because of the large number of genetic strains which were studied, an analysis of the relationships between breed and neurotic tendency could not be made.

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