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# "ALTRUISM" IN THE ALBINO RAT[1]

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Cooperation has to date been demonstrated repeatedly in experiments with animals. Tsai (1950) and Daniel (1942, 1943) found this in rats, Crawford (1936, 1938) and Nissen and Crawford (1936) in chimpanzees, and Winslow (1944) in cats. It seems fairly clear that cooperation can exist at the infrahuman level, and, if so, it is conceivable (albeit a long jump) that behavior homologous to altruism in humans might be exhibited in animals. Webster (1941) defines altruism as "regard for and devotion to the interests of others." The authors felt that altruism could be operationally defined as "behavior of one animal that relieves another animal's 'distress.'" Further, if an animal exhibited visual and auditory signs of discomfort such as squealing and convulsive wriggling, the animal was assumed to be "distressed."

It was felt that this concept could be tested using albino rats as *S*s if one "distressed" rat was suspended by a harness so that it hung free of the floor in full view and hearing of a second rat. The second or operating rat would be in a compartment with an accessible bar that, if depressed, would automatically lower the "distressed" or hanging rat to the floor, thus presumably relieving the "distress."

## METHOD

### *Subjects*

The *S*s were 40 experimentally naive albino rats of the Wistar strain, half male and half female. All were about 12 weeks old at the onset of training.

### *Apparatus*

The apparatus was a two-compartment plywood and Lucite box 21 in. long, 7 in. wide, and 8 in. high. The larger of the two compartments was 13 in. long, and one of the 13-in. sides was made of Lucite to facilitate observation of the rat. This compartment was equipped with a 3-in.-long depressable bar located below a signal light. Both were at the end near another Lucite panel separating the two compartments. This compartment was covered to prevent the occupant's escape. The smaller compartment was bare except for a hoist mechanism which lowered the "distressed" rat to the floor and subsequently returned this animal to a suspended position. A grid floor wired for shock was beneath both compartments although shock was administered only to the experimental animal in the larger compartment. A geared Erector set motor powered the hoist, and raising or lowering of the hoist was accomplished by shifting gears. An aluminum tray for wood shavings was inserted below both compartments.

### *Procedure*

From the age of 2 to 12 weeks all *S*s were handled and petted 10 min. daily. Following this a Styrofoam block 2 in. by 2 in. by 5 in. was suspended from the hoist while 1 of the 10 male and 10 female *S*s to be trained was placed in the larger compartment. Ten seconds after placement in the test chamber the signal light was turned on, followed 5 sec. later by a mild electric shock to the *S* which continued until the bar was pressed. Pressing the bar before the 5-sec. time limit prevented the onset of shock. Upon bar depression, the signal light went off and the hoist mechanism lowered the block to the floor, where it remained for 15 sec. At the end of that time, the block was again raised, and 10 sec. after the block reached its zenith, the signal light came on, thus starting the entire training cycle again. Each experimental *S* remained in the training situation for 10 min. at a time and for five separate training periods approximately equally spaced over a three-day period. All *S*s that had not reached the minimum criterion of either pressing the bar before the onset of shock or within 3 sec. following the administration of shock were discarded, and others were trained to bring the total of trained *S*s to 20. All trained animals were then subjected to CR extinction procedures by being placed in the same situation with the exception of shock. This training continued until the bar-pressing response disappeared, which usually occurred within another three-day period.

The trained rats were then randomly distributed between Experimental Group 1 and Control Group 1 with five males and five females in each group. The *S*s from Experimental Group 1 were placed individually in the test chamber with a "distressed" rat suspended from the hoist by means of a "corset" sewn from a 2-in. elastic band which allowed the legs to hang free through apertures in the harness. This animal typically squealed and wriggled satisfactorily while suspended, and if it did not, it was prodded with a sharp pencil until it exhibited signs of discomfort. When the hoist lowered this rat to the floor, it was able to stand on its own four feet and signs of discomfort ceased. Each experimental *S* remained in the chamber for five 10-min. trials distributed equally over a three-day period. In this and in all subsequent conditions, the total number of bar presses and the general behavior of the rat being tested were noted.

The *S*s from trained Control Group 1 were subjected

[1] Based upon a paper read at the Southeastern Psychological Association, 1959.

to the same conditions except that the Styrofoam block was on the hoist in place of the "distressed" rat.

Experimental Group 2 consisted of 10 rats with no prior training. Each *S* was placed in the experimental situation identical to that of Experimental Group 1 with a "distressed" rat in the suspension chamber.

Control Group 2, 10 untrained rats, was tested with the suspended Styrofoam block as was control Group 1.

## Results

Experimental Group 1 pressed the bar a mean of 14.7 times per rat, Control Group 1 pressed the bar a mean of 0.8 times, Experimental Group 2 achieved a mean of 17.6 bar presses, and Control Group 2 pressed the bar 5.4 times per *S*.

It is to be noted that in every case the difference between the bar presses of the experimental *S*s confronted with a "distressed" rat and the control *S*s faced only with a suspended block was beyond the .01 level of chance expectancy.

The critical ratio between the two experimental groups, however, was not a significant or noteworthy difference.

The *S*s of the control groups typically either did not press the bar at all or pressed the bar with any frequency only during the early trials and subsequently not at all, while it was typical of animals in the experimental groups to increase in bar-pressing rate throughout the trials. Another noteworthy result is that the untrained *S*s of Experimental Group 2 actually pressed the bar more frequently and in addition exhibited more signs of interest in the suspended rat than did the conditioned rats of Experimental Group 1. This result was evidenced by the fact that the *S*s of Experimental Group 2 remained at the end near the suspended rat most of the time and usually remained oriented toward that rat.

## Discussion

The outstanding fact of these findings was that the rats confronted with a rat exhibiting auditory and visual signs of distress acted in a manner very different from those closeted with a block. The behavior of the former resulted in what might be termed relief of the distress signs, and it is suggested that this behavior might be homologous to altruism.

It does not seem that the increased bar pressing in the experimental groups could be due to conditioning since this response was extinguished in the trained animals and the *S*s that had not been conditioned exhibited the highest number of bar presses; nor does it seem that the difference was due to the *S*'s curiosity about the bar because of the significant difference between the experimental and the control groups. If curiosity had been the prime motive for bar pressing per se, the *S*s lowering a block might have been expected to press the bar as often as those lowering a rat. However, it is worth noting that, not only did the groups differ in their bar pressing, but that often when the suspended animal had been quiet and then squeaked, the experimental rat promptly pressed the bar. Also, often the experimental *S* would approach the Lucite barrier between the chambers and would then press the bar.

One possible difficulty with the interpretation of this behavior as altruistic is that the experimental rat may not have been aware of any "distress" although it is hard to see what benefit the experimental animal received from its response. Of course, it is possible that distress calls may generate distress in other members of the species. It also may be that the presence of another rat was sufficient cause for increased activity and subsequent bar pressing. A follow-up control group of untrained animals placed in the apparatus with a nonsuspended rat in the distress chamber is planned for a future study.

## Summary

Forty albino rats were placed individually in a compartment equipped with a bar which, when pressed, lowered either a "distressed" rat or a plastic block to the floor of an adjoining compartment, thus apparently relieving the suspended animal's "distress." Half the *S*s learned to press the bar by avoidance conditioning, followed by extinction procedures. Half of these were confronted with the suspended rat and half with the block, and the former pressed the bar significantly more often than the latter. Another 20 untrained animals, similarly divided, performed according to the same pattern. It is suggested that this behavior might operationally be termed altruistic.

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