

*THE USE OF STIMULUS CONTROL OVER
LITTERING IN A NATURAL SETTING*

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A conventional litter receptacle (55-gallon drum) and a specially designed receptacle consisting of a 55-gallon drum adorned with a plywood "hat" were alternated in two areas of a football stadium over a period of four games. A frequency count of several types of litter articles showed that more than twice as many items were deposited within the experimental container than the conventional one (an average of 52.5 and 21.5 items per game, respectively). The weight of litter deposited within each container showed a similar relationship. An average of 0.65 kg of litter per game were deposited within the conventional receptacle compared with an average of 1.3 kg per game for the experimental receptacle.

DESCRIPTORS: ecology, littering, environmental problems, stimulus control

In recent years there has been a growing concern in this country over the quality of the environment. One of the most obvious examples of environmental degradation is litter. Not only is litter an eyesore, but it also requires significant expenditures of both public and private monies.

Although reinforcement has been found to reduce littering and to encourage the picking up of litter (Baltes & Hayward, 1976; Burgess, Clark, & Hendee, 1974; Clark, Burgess, & Hendee, 1972; Kohlenberg & Phillips, 1973; Powers, Osborne, & Anderson, 1973), it is often impractical in natural settings because of cost, as well as logistical problems encountered in distributing the reinforcers. The solution to the litter problem may have to come from stimulus control techniques (see Geller, 1974 and Geller, Farris, & Post, 1973, for examples).

Finnie (1973) performed a series of experiments assessing the effects of the stimulus control produced by the presence of litter receptacles. In one experiment, the presence of litter cans on the highway reduced ground litter by 28.6% (i.e., litter was at 71.4% of the level

obtained without cans). Another experiment compared "Clean City Square" cans (large square cans with attractive advertising on the sides) to 55-gallon drums. The 55-gallon drums produced a 3.2% reduction in litter, whereas the "Clean City Square" cans produced a 14.7% reduction in litter.

The present study was designed to replicate systematically Finnie's (1973) results comparing conventional trash receptacles to ones designed to provide a higher degree of stimulus control over littering. The present study differs from Finnie's in several respects: (1) Instead of "Clean City Square" cans, the present study used a receptacle designed to attract attention when litter was deposited within; (2) The present study was conducted in an area (football stadium) which generally promotes a great deal of littering and where litter receptacles are typically not available; (3) In addition to counting number of items, the present study also used weight of litter as a dependent variable.

METHOD

Setting

This experiment was conducted at a college football stadium, in a general admission area located behind one of the end zones. This area was

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devoid of bleachers; spectators sat informally on a hill sloping down to the field.

Independent Variables

Littering was assessed under two conditions:

Can. A bright orange (the school color) 55-gallon drum, similar to those used elsewhere on campus, was placed in the experimental area. Fifty-five gallon drums are commonly used throughout the country as litter receptacles (U.S. Department of Transportation, 1974).

Mechanical receptacle. A 55-gallon drum was modified to provide stimulus control by adorning it with a plywood "hat" modeled after hats commonly worn by many spectators at this stadium. The word "PUSH" was painted on a 12" × 14" (30 cm × 36 cm) door affixed to the front of the hat. A mechanical device lifted the top of the hat when the door was pushed, exposing the word "THANKS!" painted on the underside of the top. The materials required to build this "hat" consisted of plywood, hinges, nuts, bolts, and paint. The total cost was under \$10.00.

Dependent Variables

The effects of the two conditions were assessed by counting the number of certain items, such as cups or candy bar wrappers, deposited in the trash receptacles. Also, since other indefinable items made up a significant portion of the litter, the total weight of litter deposited in the trash receptacles was also measured. Both trash receptacles were placed about 70 feet (21 m) apart along a fence separating the spectator area from the playing field.

Procedure

Data were collected at four home games during a football season. Approximately 20 min after the completion of each game, the experimenters collected the litter in the trash containers and placed it in marked plastic bags. All items found in the containers, with the exception of liquor bottles, were included. Liquids and ice

in cups were poured out before placing cups in bags. Liquor bottles (found only once) were not included because their heavy weight relative to other litter would have given a distorted appearance to the data. Later the plastic bags were weighed on an electric scale and the weight recorded (two experimenters read the scale and the third recorded the data). Then each litter item was removed and tallied on a data sheet. All three experimenters were active in the tallying (i.e., all three observed each item as it was removed, but only one experimenter did the actual recording) to ensure an accurate count.

Comparisons between the two types of cans were made within games as opposed to between games to control for between-game differences, such as attendance and weather. The positions of the drum and mechanical receptacle were alternated over the four games to control for any effects due to position.

RESULTS

Table 1 shows the number of certain litter items and weight of litter deposited in each receptacle for each game. In all but two cases ("trays" and "hot dog wrappers" in Game 4) more items were deposited in the experimental receptacle than in the standard drum. The totals show that the experimental receptacle contained at least twice the number of each item than did the 55-gallon drum. The weight data shown in Table 1 include the counted items as well as litter that could not be counted (indefinable items and shredded items). Except for Game 3, when the weight of litter was nearly equal in both containers, the experimental receptacle contained more than twice as much litter by weight than did the standard receptacle.

DISCUSSION

The data presented here indicate that littering can be reduced in situations (such as sports events) where depositing refuse on the ground

Table 1
Number of Specific Items and Weight of Litter Deposited within the Containers

Game	Candy bar wrappers		Concession stand trays		Hot dog wrappers		Cups		Weight	
	E	C	E	C	E	C	E	C	E	C
1	14	4	6	1	11	4	44	12	2.3	0.9
2	6	5	2	1	5	3	34	26	1.3	0.6
3	5	4	3	1	11	0	31	9	0.7	0.8
4	8	2	1	1	0	2	29	11	0.9	0.3
Total:	33	15	12	4	27	9	138	58	5.2	2.6

Note: E = Experimental trash container, C = Conventional trash container. Weight expressed in kg.

appears to be the norm and carries little if any social condemnation.

The present study supports the conclusions made by Finnie (1973) indicating that regular trash receptacles provide some control over littering, but receptacles can be designed to increase proper litter disposal. The data presented here indicate that more than twice as much litter can be expected in containers designed to provide stimulus control when compared to typical refuse containers.

The specially designed container used in the present study provided movement (tipping of the "hat") which probably focused attention to proper litter disposal. Modeling may have also been an important factor as attention was brought to the proper throwing away of trash whenever it occurred.

Cost-effective comparisons now need to be made between the use of stimulus control and the use of extrinsic reinforcement for proper litter disposal. Building a special trash receptacle is certainly easier, cheaper, and less time-consuming than directly consequating proper litter behavior. Also, cost-effective comparisons need to be made between regular trash receptacles and trash receptacles especially designed to increase proper litter disposal.

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