AN OPERANT ANALYSIS OF HUMAN ALTRUISTIC RESPONDING¹

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Human altruistic responding (called give responding), which delivered a reinforcer to someone other than the responder, was compared to responding where the responder was the recipient of the reinforcer (called earn responding). The same type of response (button pressing), the same reinforcer (a point representing a penny), and the same reinforcer contingency (a 40-response fixed-ratio schedule) were used for both give and earn responding. Since points representing pennies were used to reinforce give and earn responding, responding for points not worth money was also assessed. Give, earn, and point responding were arranged as concurrent incompatible operants. Lowest rates were obtained for point responding. Compared to earn responding, give responding occurred at lower rates, was more susceptible to cessation when point responding was possible, extinguished more rapidly in the absence of money, and produced less responding during reconditioning compared to conditioning when reconditioning followed a period of nonreinforcement. Give responding was less when it reduced the giver's opportunity to earn. Finally, histories of getting reinforcement from others were shown to determine give responding.

Key words: altruism, giving, earning, point responding, extinction, concurrent incompatible operant, past getting, confederate, humans

Although reinforcers in operant research are varied, they have tended to have a common characteristic. Typically, the organism whose responding produces the reinforcer is also the recipient of the reinforcer. Such responding is hereafter referred to as earn responding. Organisms also emit responses that either enable or deliver reinforcement to someone else. These are referred to as give responses.

Whereas earn responding has been extensively studied in operant research, give responding has received relatively little attention. Unlike earn responding, give responding, of course, involves more than one subject. Multi-subject operant interactions have been studied, particularly in the context of human cooperation (*e.g.*, Hake, Vukelich, and Olvera, 1975; Marwell and Schmitt, 1975; Shimoff and Matthews, 1975). Cooperation has been defined as a procedure "in which the reinforcers of each member of a pair are at least partly dependent upon the responses of the other member" (Hake *et al.*, 1975, p. 63). In cooperation, therefore, give responding might also be considered as earn responding, especially if responding is shown to be under the control

of the reciprocal nature of the cooperation contingency.

When a subject gives more reinforcement than he/she gets, and such getting or more getting could have been obtained without giving, the responding may be called "altruistic". The greater the amount of giving relative to getting, the greater the altruism. Thus, giving without getting is more altruistic than giving with getting, but is less altruistic than giving that occurs despite reinforcement loss for the giver.

According to Krebs (1970), altruism is a problem for those who attempt to account for human behavior in reinforcement terms. To Krebs, reinforcement theory suggests that "human behavior is essentially egoistic" (pp. 258-259). Whether or not man is egoistic is an open question that can be assessed in part by comparing relative rates of altruistic responding *versus* earn responding. To date, no such comparison has been conducted within an operant conditioning framework. The fact that earn responding has been the major focus in operant research should not necessarily lead one to conclude that individuals are egoistic. It means only that a certain type of response has been of particular interest. Nothing in reinforcement theory is at odds with the occurrence of altruistic responding.

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Altruistic responding has been noted in human operant cooperation research (Shimoff and Matthews, 1975). However, the incidence of such responding was low and systematic analyses were not conducted. Such analyses would have been complicated by the inter-subject response and reinforcement dependencies characteristic of cooperation procedures.

It is possible to study altruistic responding as a simple operant, much as earn responding has been investigated. Further, the operant characteristics of altruistic responding can be compared directly to those of earn responding, since response and reinforcement variables can be made identical for both types of responding.

In the present research, altruistic responding consisted of give responding that produced either no or adverse additional reinforcement consequences for the responder. Such altruistic responding was compared to earn responding using the same response (button pressing), the same reinforcer (a point representing a penny), and the same reinforcer contingency (a 40-response fixed-ratio schedule). Only the recipient of the reinforcer differed. For altruistic responding (hereafter called give responding or giving), an individual other than the responder was the only recipient of pennies. In the case of earn responding, pennies were delivered to the responder.

A series of experiments compared relative rates of give and earn responding under various conditions. Experiments were also conducted to ascertain how histories of getting and giving reinforcement affect give responding.

METHOD

Subjects

Normal adult humans, ages 18 to 30 yr, were recruited from a variety of sources (*e.g.*, unemployment services, educational institutions, shopping centers) using advertising bulletins and telephone contacts. Most of the subjects were unemployed, so that the money promised for participation in the research was attractive. Neither the amount of money that could be earned nor the duration of the research was specified in the bulletins or during the telephone contacts.

Approximately 60% of the subjects were females, predominantly black. White males outnumbered black males. Whenever possible, subject assignments were made, making groups

of subjects as comparable as possible with regard to sex, race, and age.

For experiments involving give responding, each subject was paired with the same partner. This partner was a 50-yr-old black woman and hence of the same sex and race as the majority of the subjects.

Apparatus

Each subject sat alone in an experimental room facing a Bud inclined cabinet rack (Series 60-2309) consisting of a display and a desk top. The desk top had three holes, labelled either give, points, or earn. A microswitch was mounted beneath each hole. The subject was given a button plunger that could be inserted into only one of the holes at a time. A response occurred when the plunger was depressed sufficiently to activate the microswitch. A give, points, or earn button-pressing response in the appropriately labelled hole required a force of approximately 20 g (0.20 N) through a distance of 1 cm to close the microswitch mounted underneath it. A light above each response hole was lit to indicate that the hole could be used for responding. The types of responding permitted varied with the different experiments.

The display of the apparatus had Lehigh Valley rack-mounted panels containing Sodeco counters. Feedback for the various types of responding appeared as scores on these counters. Small lights, mounted to the left of each counter, lit up each time the counter operated. A label above each counter indicated what the counter points represented. There were six types of labels: pennies you gave, pennies you earned, points you produced, pennies partner earned, pennies partner gave you, points produced by partner. The counters and labels used, like the types of responding, depended on the experiment.

The display also included a Sony 22.5-cm black and white TV monitor, which enabled subjects to view their partner during the first experimental session, an on-off light to signal the beginning and end of an experimental session, and a "call" button and microphone, which enabled communication between the subjects and the research technician in charge of the experiment.

General Procedure

In all experiments, a counter point representing a penny was used to reinforce give or

earn responding. Every fortieth give or earn button-pressing response was reinforced (an FR 40 schedule). In some experiments, subjects were given the option of responding for counter points not worth any money on a 10-response fixed-ratio (FR 10) schedule.

Whenever give responding was a response option, each subject was told that he/she was Subject A in a two-person team and that the other person was Subject B. To avoid interaction between subjects outside of the experimental room, Subject A was informed that Subject B was in another part of the building. Subject A was also told that Subject B would be seen on the TV screen but only before the first session, in order to minimize interactions during the experiment.

As indicated previously, Subject B was always the same 50-yr-old black woman. She was a confederate of the experimenter, rather than a "real" subject. She was never actually present during experiments. Subject B's appearance at the beginning of an experiment was via videotape. The videotape showed Subject B entering a room and taking a seat in front of an apparatus. Subject B wore a plain, short-sleeved dress. It could be ascertained that she was middle-aged, female, and black. She had a neutral facial expression, *i.e.*, neither smiling nor frowning.

Except for one experiment, Subject B was not allowed to respond. Thus, she was not provided with a button plunger for responding and the desk top of her apparatus had no response holes. A single counter labelled "pennies partner gave you" appeared on the display of her apparatus.

Subject B "responded" only during Phase 1 of Experiment V. Automated equipment produced Subject B's responding as required for this purpose. During Phase 1 of Experiment V, Subject B's apparatus was identical to the one used by Subject A, which was described in the Apparatus section.

Subject B's apparatus was angled in such a way that Subject A could not ascertain whether he/she was being seen on TV. To ensure that Subject A would not become aware that Subject B was on videotape, Subject A was asked not to gesture or try to talk to Subject B over the TV. The reason given to Subject A was that interactions between partners had to be reduced to a minimum, as required for research purposes.

Instructions given to Subject A and B are described later for the different experiments. Subjects were required to repeat their instructions and were allowed to ask questions only at this time.

Subjects were not designated as Subject A when earn responding was an option without give responding because no partner (Subject B) was involved. Instructions for earn responding differed from those for give responding and are described later.

Subjects were told they could use the call button to talk to a research technician at any time, but could not ask further questions about the purpose of the experiment or the nature of experimental conditions. As a result, the call button was used infrequently, usually only when experimental conditions changed for the first time and subjects said the equipment had malfunctioned. When this happened, subjects were told that conditions had changed, that they would be informed if the machine malfunctioned, and that they were to follow their instructions unless told otherwise.

After subjects received instructions, their TV screens went blank. Subject B was never seen again. In Experiment V, subjects received two sets of instructions. Subject B was seen only during the first set of instructions.

In each experiment, subjects received four 45-min sessions per day with a 5-min break between sessions. Subjects received \$3 per session, plus whatever money they obtained during a session. Thus, for example, subjects who responded at 400 earn responses per minute during a session (not an unusual rate given the characteristics of the response key) would receive \$7.50 per session or \$30 per day. Payment was made not on the day earned, but at the beginning of the next session (day).

With one exception, each phase of the various experiments consisted of six sessions. Thus, subjects could complete an experimental phase in one and a half days. Phase 1 of Experiment VI consisted of 18 sessions and required four and a half days.

A group design was employed in most experiments to minimize the limitations imposed by histories or sequences of experimental conditions (*cf.* Weiner, 1969) and to reduce the number of different instructions given to any one subject. Intra-subject designs were also employed for some experiments when replication of findings was desired.

EXPERIMENT I

One purpose of this experiment was to demonstrate that giving is an operant, *i.e.*, that responding is enhanced by the delivery of points representing pennies (a known reinforcer) to someone other than the subject emitting the response. A second purpose was to compare the relative rates of give and earn responding. To achieve both purposes, comparisons were made in the presence and absence of an option of responding for points. Given previous findings (Weiner, 1969, 1972) that points can be reinforcing with human subjects and that humans have a tendency to respond in operant tasks irrespective of the contingencies of reinforcement, a response alternative involving the procurement of points was provided as a baseline against which rates of give and earn responding could be evaluated. Points were not worth money. An attempt was made via instructions (described later) to divest point responding of all meaning other than mere activity. It was described as simply an alternative to nonresponding.

Procedure

A. Inter-group comparisons. Four independent groups (10 subjects per group) were used. One group had the option of making give responses, a second group could make earn responses, a third group could make either give responses or respond for points, the fourth group could earn or respond for points. All subjects were told that nonresponding was also an option.

At the beginning of the first experimental session, each group received a set of instructions. The instructions for give and earn groups were identical to those of the give-points and earn-points groups, except that the latter two groups received additional instructions about responding for points. Subjects in the give and give-points groups were the only ones who had a partner (Subject B).

The instructions given to subjects in the give-points group were as follows:

Subject A. "Pick up the button on the desk top in front of you. Placing this button into the hole marked "Give" and pressing 40 times gives your partner, Subject B, a penny as indicated on your top-left counter. As long as the light above the give hole is lit, you may use it to make button presses. Don't use it if the light

goes off. You can give as much or as little as you want. If you don't want to give, you don't have to. It is completely up to you. In addition to any pennies you give, your partner will be paid \$3 per session. Notice the light and hole labelled "points" located in the center of the desk top. Placing the button into this hole and pressing 10 times puts a point on your bottom-left counter. These are just points on a counter. They have no other meaning. We let you put points on a counter because some people prefer to do something rather than nothing when they are not giving. There are four things you can do: (1) you can give pennies to your partner; (2) you can put points on a counter; (3) you can do both by switching the button from one hole to another; (4) you can do nothing."

Subject B. With Subject A viewing and listening to his TV, Subject B "received" the following instructions: "The top-center counter indicates the number of pennies you have been given. There is nothing you can do to earn pennies. Your partner will have complete control over how many pennies you will be given for each session. Your pay for each session is the number of pennies which appears on the top center counter when the session is over plus \$3 per session."

In addition to the above instructions, Subject A and B were told that a session begins when the "ON" indicator light comes on and ends when this light goes off. Further, they were told how and when they could use the "call" button (*cf.* General Procedure for more information).

Instructions for subjects in the earn-points group were the same as the give-points instructions given to Subject A's, except the word "earn" was substituted for "give" and reference to a partner (Subject B) were deleted.

B. Intra-subject comparisons. Using an A-B-A type of design, two new subjects received the following sequence of response options: give (Phase 1), give-points (Phase 2), and give (Phase 3). Two other new subjects received an earn (Phase 1), earn-points (Phase 2), earn (Phase 3) sequence. Instructions were similar to those employed for the inter-group comparisons.

RESULTS

A. Inter-Group

Session-to-session response rates (all subjects combined) for the four experimental groups

are presented in Figure 1. Table 1 shows response rates (all sessions combined) obtained from each subject in each group.

The earn and give groups (Figure 1A) responded at fairly comparable levels, with earn response rates only slightly higher than give rates. When subjects were given the additional option of responding for points (Figure 1B and 1C), this difference between earn and give responding was markedly enhanced.

Point responding was greater when give was the alternative response. There appeared to be a reciprocal relationship between point and give responding. As point responding increased, give responding tended to decrease, and *vice versa* (Figure 1B). There was relatively little responding for points when it was paired with earn responding (Figure 1C).

Table 1 shows that a number of give subjects had higher response rates than some earn subjects when point responding was not an option (e.g., Subjects 10 and 18). When point responding was permitted, no give subject had a higher rate of responding than an earn subject. A few give-points subjects had either comparable give and point responding (e.g., Subject 27) or higher rates of point responding than give responding (e.g., Subject 29). All earn-points subjects had higher rates of earn responding than point responding.

Intra-Subject

Figure 2 presents intra-subject effects of responding for points on give and earn response rates. In concert with the inter-group data, point responding tended to reduce give responding but had little or no effect on earn responding. Point responding, therefore, increased the difference between earn and give responding.

Fig. 1. Responses per minute over sessions for the give and earn groups (A), the give-points group (B), and the earn-points group (C).

Table 1

Response rates per minute for the give, earn, give-points, and earn-points conditions.

Subject No.	Give	Subject No.	Give	Points
1	335	21	107	53
2	278	22	82	5
3	341	23	109	133
4	140	24	105	95
5	227	25	53	27
6	331	26	106	14
7	248	27	98	97
8	338	28	183	12
9	357	29	0	233
10	422	30	79	78

	Earn		Earn	Points
11	412	31	309	18
12	330	32	275	8
13	251	33	331	2
14	265	34	279	0
15	314	35	227	26
16	284	36	255	54
17	390	37	352	0
18	243	38	307	0
19	305	39	284	0
20	383	40	256	0

EXPERIMENT II

This experiment sought to add information to that obtained in Experiment I concerning the reinforcing properties of delivering reinforcers to others by comparing the characteristics of give and earn responding during conditioning, extinction, and reconditioning. Such comparisons were made in the absence of an option of responding for points in order to obtain subjects with more comparable give and earn response rates during conditioning.

Procedure

In the conditioning phase, four subjects could give and four others could earn. One of the give subjects (Subject 2) and two of the earn subjects (Subjects 11 and 18) were also used in Experiment I. Instructions were the same as those used for the give and earn groups in Experiment I.

Following conditioning and without additional instructions, an extinction phase commenced. During extinction, the give and earn counters were inoperative, so that subjects could not give money to Subject B or earn money for themselves. The lights above the give and earn holes on the desk top of the

Fig. 2. A comparison of responding for subjects during the give, give-points, give *versus* earn, earn-points, earn conditioning sequences (Phases 1 to 3).

apparatus remained on, thus enabling responding during the extinction phase (*cf.* instructions concerning these lights given to the give-points subjects in Experiment I).

After extinction, and again without additional instructions, subjects were reconditioned under the conditions that were operative during the conditioning phase.

RESULTS

Figure 3 shows session-to-session give and earn response rates (all subjects combined) during conditioning, extinction, and reconditioning. Table 2 presents response rates per minute and standard deviations obtained from each subject during the three experimental phases.

Differences in the rate and pattern of earn *versus* give responding were relatively small during conditioning. Both give and earn response rates increased over sessions (Figure 3). Some give subjects responded at a higher rate during the final three sessions of conditioning than some earn subjects (*cf.* Subject 45 *versus* Subject 18 in Table 2).

Inspection of Figure 3 and Table 2 reveals that responding for both give and earn subjects declined during extinction. A larger difference between give and earn responding appeared during extinction compared to conditioning. Give responding decreased more during extinction than earn responding, especially during the first three sessions.

Rates of give and earn responding increased during reconditioning. The difference between earn and give responding was greater during reconditioning than conditioning. As shown in Table 2, only two of the four give subjects (Subjects 46 and 2) produced a higher rate of responding during reconditioning compared to conditioning. The response rates for all four earn subjects were higher during reconditioning than conditioning.

EXPERIMENT III

Point responding was differentially affected when it was paired with giving or earning (Experiment I). The present experiment sought to determine whether a history of association with give or earn responding would also affect rates of point responding.

Procedure

In Phase 1, 10 new subjects were given the option of giving or responding for points. Ten other subjects could earn or respond for points. From these 20 subjects, four give-points and four earn-points subjects were selected for further experimental sessions. These subjects were selected because they had comparable low rates of point responding. Such comparability was deemed desirable in order to assess performances during Phase 2. The give-points and earn-points subjects received the instructions that were given to similar subjects in Experiment I.

In Phase 2, the selected subjects could obtain only points. Give and earn reinforcers were discontinued and the lights above the give and earn response holes were turned off.

Fig. 3. Session-to-session responding for give versus earn subjects during conditioning, extinction, and reconditioning (Phases 1 to 3).

Subjects were told not to use response holes when their lights were off.

For Phase 3, the conditions operative in Phase 1 were re-instated.

RESULTS AND DISCUSSION

Session-to-session response rates for each subject during Phases 1 to 3 are shown in Figure 4. Despite comparable low rates of point responding during Phase 1, point responding for the give-points subjects was lower during Phase 2 than the point responding of the earn-points subjects. These data suggest that a response (point responding) can acquire differential strength as a result of past associations with other responses (give or earn responding).

Give response rates of each subject during Phase 3 (reconditioning) tended to be either equal to or below their respective rates during Phase 1 (conditioning). In contrast, earn rates

during Phase 3 were either equal to or above rates established during Phase 1. A similar finding was obtained in Experiment II during reconditioning following extinction of give and earn responding. In Experiment II, however, earn responding was relatively high during extinction, while in Phase 2 of the present experiment it was virtually nonexistent. This suggests that enhanced earn responding during reconditioning was related more to the cessation of earn reinforcers than to earn responding *per se*.

The finding of enhanced earn responding compared to give responding during Phase 3 cannot be ascribed simply to increasing response rates over sessions shown by three of the earn-points subjects during Phase 1. One of the give-points subjects (Subject 52) also produced an increasing rate of response during Phase 1 and yet, had a somewhat lower rate of give responding during Phase 3 compared to Phase 1. Furthermore, a similar finding of enhanced earn responding during reconditioning was obtained in Experiment II, despite fairly comparable increasing rates for both give and earn responding during conditioning (*cf.* Figure 3).

EXPERIMENT IV

This experiment attempted to replicate findings in Experiment I by using an intra-subject design to assess relative rates of give, earn, and point responding. All three of these response options were arranged as incompatible concurrent operants (Catania, 1966). Under these con-

Table 2

Performances for each give and earn subject during conditioning, extinction, and reconditioning.

Subject No.	Conditioning (Last 3 Sessions)		Extinction				Reconditioning (Last 3 Sessions)	
	Resp/Min	SD	(First 3 Sessions)		(Last 3 Sessions)		Resp/Min	SD
			Resp/Min	SD	Resp/Min	SD		
GIVE								
45	362	21	58	32	25	23	326	31
46	357	18	36	22	7	2	407	140
47	290	117	103	20	158	64	207	64
2	239	65	164	84	30	41	401	145
EARN								
11	498	24	305	46	229	108	512	46
48	359	4	194	162	4	4	408	37
49	310	29	269	44	252	41	363	7
18	263	46	201	47	79	72	482	14

Fig. 4. Changes in point responding when reinforcers and response-hole lights for give or earn responding were discontinued.

ditions, the occurrence of one type of response was "costly", in that it reduced the opportunity to emit the other two. Responding under such cost conditions was compared to responding under less costly conditions, *i.e.*, when subjects could either give or respond for points, earn or respond for points, or respond for points only.

Procedure

Three groups, 10 new subjects per group, were used. In Phase 1, subjects in each group had the options of giving, earning, or responding for points. Given only one response plunger, these options were mutually exclu-

sive, *i.e.*, the occurrence of one precluded the other two. Since the duration of each experimental session was on a fixed-time basis, reinforcers from one type of response tended to reduce the opportunity for reinforcers via the other two types of responding. Instructions for give, earn, and point responding were similar to those described for Experiment I, except that the mutually exclusive nature of these three types of responding was made clear.

In Phase 2, for certain groups, apparatus counters labelled "pennies you gave" and/or "pennies you earned" ceased to operate, *i.e.*, pennies reinforcements for give and/or earn responding terminated. In addition, response-

hole lights in the apparatus were turned off when pennies were terminated. In their instructions, subjects were told not to respond when response-hole lights were off. For Group 1, pennies and response lights were discontinued for give responding, for Group 2, they were discontinued for earn responding, and for Group 3 they were discontinued for both give and earn responding.

In Phase 3, the conditions in effect during Phase 1 were re-instated.

RESULTS

Two types of responding were obtained during Phase 1. Twenty-three subjects had high earn rates, followed by relatively low give rates, and still lower rates of point responding. Seven subjects also had low point rates, but produced high-rates of give responding that were fairly comparable to their earn rates.

Performances of each low-rate and high-rate give subject are presented in Tables 3 and 4 respectively. For both types of give subjects, earn responding increased during Phase 2 when give responding decreased (Group 1), as did give responding when earning decreased (Group 2). Point responding remained relatively unaffected until both give and earn responding decreased during Phase 2, whereupon responding for points also increased (Group 3).

Comparing across groups in Phase 2 for those types of responses that did not have their pennies and response lights discontinued, it will be noted that, for both low-rate and high-rate givers, the relative order of magnitude for give, earn, and point responding was similar to that which occurred during Phase 1. For the low-rate givers in Phase 2, earn rates for Group 1 tended to be greater than the give rates in Group 2. Both earn and give rates were higher than rates of point responding, either when each was paired with point responding as a response option (Groups 1 and 2) or when responding for points was the only reinforced response option (Group 3). For the high-rate givers in Phase 2, fairly comparable earn rates (Group 1) and give rates (Group 2) were obtained during Phase 2, both of these rates being higher than rates of point responding (Groups 1 to 3).

For both low-rate and high-rate givers, Tables 3 and 4 show that earn rates relative to give rates were greater during Phase 3 com-

pared to Phase 1. For the low-rate givers, this occurred irrespective of experimental conditions during Phase 2. For the high-rate givers, however, this occurred only when give or earn responding decreased during Phase 2. High-rate givers who decreased both give and earn responding during Phase 2 produced similar patterns of give and earn responding during Phases 1 and 3.

EXPERIMENT V

The finding that responding that delivers reinforcement to others can be maintained without additional reinforcement for the responder is not sufficient to conclude that giving is totally unrelated to getting. Historical events could maintain giving without getting for extended periods of time. Histories of reinforcement commonly induce extended human responding in the absence of reinforcement during extinction (Weiner, 1964), when behavior is in transition from one steady state to another (Weiner, 1969), or under delay of reinforcement conditions (Trenholme and Baron, 1975). Certain histories may produce human responding that persists in the face of reinforcement loss, even though such loss is unnecessary for positive reinforcement (Weiner, 1970).

The present experiment investigated the relationship between past getting and present giving. Experimentally-induced histories were arranged during which Subject A's received different amounts of points representing pennies from their partner Subject B. The amount of give responding in return by Subject A was then examined.

Procedure

Four groups, five new Subject A's per group, were used.

Phase 1 involved "responding" by Subject B only. At the beginning of this phase, Subject A saw and heard Subject B receive give-points-earn instructions. These instructions were the same as those given to Subject A's in Experiment IV. After Subject B received her instructions, Subject A's received the same instructions that were given to Subject B in Experiment I.

Subject B "gave" points representing pennies to Subject A groups at either high rates (Groups 1 and 3) or low rates (Groups 2 and

Table 3

Response rates per minute during Phases 1 to 3 for the subjects who produced low rates of give responding during Phase 1*.

Subject No.	Phase 1			Phase 2			Phase 3		
	G	P	E	G/PLD	P	E	G	P	E
GROUP No. 1									
58	65	0	234	0	0	208	26	0	271
59	40	10	184	3	0	266	17	0	306
60	3	0	211	0	0	244	0	0	252
61	6	1	138	0	0	441	0	0	240
62	153	0	246	4	0	417	0	0	442
63	53	0	271	0	0	399	20	1	426
64	79	0	175	0	0	238	0	0	238
GROUP No. 2									
	G	P	E	G	P	E/PLD	G	P	E
65	57	0	104	153	5	0	27	0	243
66	9	0	358	110	1	14	44	0	369
67	83	9	375	230	4	8	0	0	468
68	50	38	243	176	12	27	0	0	384
69	77	0	283	283	0	66	102	0	506
70	30	0	239	304	0	0	0	0	316
71	0	0	316	159	2	0	0	0	352
72	26	4	101	55	8	7	4	0	104
GROUP No. 3									
	G	P	E	G/PLD	P	E/PLD	G	P	E
73	13	0	274	0	88	0	7	0	362
74	0	0	220	0	2	0	0	0	263
75	20	0	453	0	68	0	0	1	528
76	0	0	250	10	10	14	0	0	325
77	6	10	272	0	0	6	21	0	343
78	0	0	264	0	15	20	0	0	287
79	1	0	276	6	12	4	1	0	321
80	19	6	133	0	71	3	0	0	235

*Under each of these phases in this table, "G" stands for give responding, "P" stands for point responding, and "E" stands for earn responding. When a "/PLD" appears next to one of these letters, it means that penalties and response-hole lights were discontinued.

Table 4

Response rates per minute during Phases 1 to 3 for the subjects who produced high rates of give responding during Phase 1*.

Subject No.	Phase 1			Phase 2			Phase 3		
	G	P	E	G/PLD	P	E	G	P	E
GROUP No. 1									
81	165	0	174	4	8	319	17	4	320
82	186	0	188	2	0	374	122	0	306
83	185	0	184	1	0	396	65	0	354
	G	P	E	G	P	E/PLD	G	P	E
GROUP No. 2									
84	184	0	187	336	0	7	0	0	339
85	178	0	178	445	0	0	104	0	377
	G	P	E	G/PLD	P	E/PLD	G	P	E
GROUP No. 3									
86	136	4	164	0	94	0	157	0	160
87	152	3	153	0	90	0	171	0	174

*See footnote under Table 3 for additional information.

4). Subject B's earn and point responding were kept identical for all four groups.

In Phase 2, Subject A's in Groups 1 and 2 received give-points instructions and conditioning; Groups 3 and 4 received give-points-earn instructions and conditioning. Subject B was "given" the same instructions auditorially (without being seen on TV) that Subject A's got in Phase 1.

RESULTS AND DISCUSSION

Figure 5 shows the responding of Subject B in Phase 1 and its resultant effects on the responding of the four experimental groups in Phase 2. Table 5 shows data obtained from each Subject A in the four experimental groups.

Figure 5 and Table 5 show that subjects in Groups 1 and 3, to whom Subject B gave at high rates, had higher give rates than subjects in Groups 2 and 4, who received less from Subject B. Similar to the results obtained in Experiment IV, more was given to Subject B when give-points conditioning was in effect (Groups 1 and 2) than when give-points-earn conditioning was operative (Groups 3 and 4). The give rates of subjects in Groups 1 and 2 under give-points conditioning were higher than the give rates of Subject B. The give rates of subjects in Groups 3 and 4 under give-points-earn conditioning more closely matched the give rates of Subject B (*cf.* Figure 5).

It seems clear that giving may be a function of past getting, and that this relationship need not be 1 to 1. The extent to which giving matches past getting apparently depends on the cost of giving. When earn was precluded by give responding under give-points-earn conditioning, giving tended to match past getting more closely. Subjects tended to give more than they received under give-points conditioning where no reinforcement loss for themselves was involved.

EXPERIMENT VI

Experiment V demonstrated that giving money to Subject B depended on the magnitude of getting money from Subject B. To what extent did the mere acquisition of money induce such giving to Subject B? Said another way, would a history of earning induce as much giving to Subject B? Would a history of earning induce more giving to Subject B than

Fig. 5. Effects of differential histories of give responding by Subject B (Phase 1) on the subsequent give responding by Subject A groups (Phase 2).

a history of giving? The present experiment attempted to answer these questions.

Procedure

In Phase 1, 10 new subjects received give-points conditioning and 10 others received earn-points conditioning. Five subjects from each group were then selected for further training. Criterion for selection was comparability in their respective rates of give and earn responding.

In Phase 2, the selected subjects received give-points-earn conditioning.

RESULTS AND DISCUSSION

Figure 6 shows how histories of give-points or earn-points responding affected give-points-

Table 5

Average responses per minute for each subject in Groups 1 to 4 who had different histories of getting reinforcement from Subject B.

Group	Subject No.	Give	Points	Group	Subject No.	Give	Points	Earn
1	88	226	50	3	98	196	3	199
	89	172	72		99	179	0	190
	90	344	4		100	180	5	174
	91	140	41		101	88	0	181
	92	195	0		102	103	0	106
2	93	70	130	4	103	77	0	354
	94	143	66		104	151	0	396
	95	191	0		105	12	2	379
	96	250	0		106	94	2	201
	97	114	0		107	49	1	216

earn responding. Data obtained from individual subjects are presented in Table 6.

Figure 6 and Table 6 show that, despite the selection of subjects, earn rates were somewhat higher than give rates during Phase 1. Both give and earn rates increased slightly over sessions, but appeared quite stable before give-points-earn responding. As in previous experiments (*e.g.*, Experiment I), more point responding occurred under give-points than earn-points conditioning.

Irrespective of the different histories of subjects, earn rates were markedly higher than give rates and point responding was virtually nonexistent during Phase 2 under give-points-earn conditioning. Similar findings were obtained in Experiment IV in the absence of any conditioning history.

Subjects with the earn-points history had slightly higher give rates than the give-points history subjects during give-points-earn conditioning in Phase 2. Compared to the effects of different histories of getting from Subject B

Fig. 6. Give responding (Phase 2) following histories of give versus earn responding (Phase 1).

(*cf.* Experiment V), extended histories of giving and earning in the present experiment produced comparatively little differential effects on the rate of giving.

More money was obtained by subjects in the present experiment during earn-points responding (Phase 1) than subjects in Group 3

Table 6

Response rates per minute for each subject under the give-points to give-points-earn sequence and the earn-points to give-points-earn sequence.

Subject No.	Phase 1		Phase 2		
	Give	Points	Give	Points	Earn
108	213	49	55	7	237
109	188	86	107	0	234
110	235	45	53	0	282
111	249	13	4	0	304
112	195	28	16	7	337
	Earn	Points			
113	260	8	107	0	227
114	316	1	158	0	178
115	308	7	15	0	356
116	335	0	106	84	201
117	291	0	8	0	296

received from Subject B in Experiment V. Yet, subjects in this experiment gave less to Subject B. It may be concluded, therefore, that the acquisition of money *per se* cannot account entirely for why subjects gave to Subject B in Experiment V.

GENERAL DISCUSSION

The present research demonstrated that human behavior can be reinforced by the delivery of a known reinforcer (money) to another human. Such responding was viewed as altruistic because it was maintained despite no or adverse additional reinforcement consequences for the responder. Altruistic responding (called give responding) did not appear to be a transitory phenomenon. Rather, it was maintained over considerable periods of time without signs of diminution.

It should be emphasized that rates of give responding showed considerable inter-subject differences. Some subjects produced fairly comparable rates of give and earn responding, even when giving adversely affected the opportunity to earn. Such behavior stopped consistently after subjects produced markedly different rates of give and earn responding. This result is in concert with previous data showing that behavioral change may occur when subjects are provided with alternative response repertoires (Weiner, 1970).

Other procedures that affected give responding involved the "cost" of giving and histories of getting reinforcement. Giving was substantially reduced when it adversely affected the opportunity to earn. Give responding was also affected by the amount received in the past from Subject B.

Whether or not past getting is the necessary and sufficient condition for maintaining give responding is an open question to be determined by future research. Past getting may be like food deprivation. Food deprivation is a critical determinant of whether or not food acquisition and consumption will be reinforcing. The reinforcement of others produced by give responding may depend on past getting for its reinforcing properties.

There are, of course, gaps in our understanding of the factors responsible for give responding. Subjects with no scheduled history of getting in the present research may have given to Subject B because of pre-experiment histories

of getting from others in environments sharing common stimulus properties with the laboratory. Giving to someone other than an actual benefactor is not uncommon with humans (Krebs, 1970, p. 297).

Giving without getting may also be related to social norms. There is an existing literature (e.g., Kaufman, 1970, pp. 105-108) which suggests that altruism may be a function of social norms that prescribe helping the needy and dependent.

Modelling may have been a factor determining giving after a history of getting from Subject B. It has been postulated (Mowrer, 1960) that individuals who reinforce others are imitated because such imitation generates reinforcing stimuli. Furthermore, imitation appears to be more likely when the reinforcing model and the imitating subject are similar to each other (Krebs, 1970, pp. 276 and 294). Given the fact that most subjects in the present research were the same sex and race as Subject B, it is possible that in giving to Subject B, subjects were modelling Subject B's prior give responding.

An expectation of further getting from Subject B may also have produced giving after getting. Future research might examine how the likelihood of reciprocity affects give responding.

Finally, giving after getting may have been related to effects produced by the procurement of free reinforcement. Isen and Levin (1972) found that subjects who receive reinforcement noncontingently are likely to help others. The noncontingent reinforcement received from Subject B may have induced subjects to give to Subject B in return.

Compared to earning (responding that delivered money to the responder), give responding occurred at lower rates under a ratio schedule, was more susceptible to cessation in the presence of point responding, was less resistant to extinction, and was less likely to produce enhanced responding after a period of non-reinforcement. Based on these findings, it may be concluded that it is less reinforcing to give than to receive. This finding offers some support for the view that man is essentially "egoistic" (cf. Krebs, 1970).

A factor that might account for the lower rates of give compared to earn responding is the aversiveness of unequal reinforcement. A common finding in cooperation research is that subjects find inequities of reinforcement aver-

sive, particularly when such inequities could have been avoided or rectified (Marwell and Schmitt, 1975; Shimoff and Matthews, 1975). Give responding in the present research produced rectifiable unequal reinforcement. The lower rates of give compared to earn responding observed might have been related to the aversiveness of such reinforcement inequities.

Response-rate differences were enhanced when earn and give responding were paired with point responding or with point responding and each other as concurrent incompatible operants. This finding is consistent with data reported by Catania (1963) with animals and by Weiner (1966) with humans, which showed that response rates are more sensitive to differences in reinforcement conditions when concurrent operant procedures are employed.

In the present research, a point representing a penny was used to reinforce give and earn responding. That money rather than points *per se* reinforced give and earn responding seems clear from the finding that point response rates were less than give and earn rates.

The occurrence of point responding in this research, taken together with previous data (e.g., Weiner, 1969) showing that points can reinforce human behavior, emphasizes the desirability of evaluating responding for points *per se* whenever points are used to represent other reinforcers. Such a use of points is not uncommon in human operant research.

Finally, present results support Catania's (1966) notion and the findings of Hall *et al* (1976) that responding on concurrent schedules may vary with the types of reinforcers used. It has been shown that different recipients of a reinforcer produce different relative rates of responding on concurrent schedules. The recipient of a reinforcer has been a neglected variable in operant research. Hopefully, such neglect will end.

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