*RATE OF RESPONSE AS A VISUAL SOCIAL STIMULUS*¹CARL DANSON² AND THOMAS CREED

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In Exp. 1, a high rate of responding (chain pulling) of a stimulus monkey was established as a visual positive discriminative stimulus for the operant behavior (bar pressing) of an observer monkey. The terminal performance of the observer under conditions in which a high rate of response of the stimulus monkey alternated in a variable temporal arrangement with a zero rate of response of the stimulus monkey (negative discriminative stimulus) was essentially the same as when nonbehavioral stimuli are correlated with the availability of reinforcement. By manipulating the schedule of reinforcement to change the rate of responding of the stimulus subject without changing its rate of reinforcement, Exp. 2 showed that the effective behavioral stimulus for the observer was the rate of chain pulling by the stimulus subject. A novel intermediate rate of responding by the stimulus monkey resulted in an intermediate rate (generalization) on the part of the observer during an extinction test. These experiments demonstrated that the rate of responding of one organism can function as a discriminative stimulus to control the rate of responding of another organism; and that the rate of responding is similar to other physical stimuli in terms of discrimination and generalization.

Social stimuli are a class of physical stimuli emanating from the behavior of one organism that affect the response of another. Two views of social stimuli seem to be prevalent: the first position assumes such stimuli to have the same characteristics as stimuli arising from other sources (*e.g.*, Millenson, 1967, p. 254); the second position suggests that "simple" physical dimensions such as pure tones or visible wavelengths may not adequately represent events that arise in social settings (*cf* Asch, 1959, p. 378). The former viewpoint eliminates the necessity for new concepts when incorporating social stimuli in a general analysis; on the other hand, the latter position might lead to the less parsimonious conclusion that new principles will have to be invoked when dealing with social stimuli. Neither position has been clarified by extensive empirical evidence.

One contributing factor to the current am-

biguity is that social stimuli heretofore have not typically been controlled or manipulated as have other stimulus events. Social stimuli usually do not lend themselves to precise control with respect to onset-offset properties, continuous and constant presentation, nor independence from other behavioral and non-behavioral events. For example, Miller, Murphy, and Mirsky (1959) concluded that behavioral cues in isolation were not as effective as multiple cues and speculated that additional reductions in stimuli would result in further decreases in their "communication-of-affect" phenomena between monkeys. Similarly, Husted and McKenna (1966) discussed the probable presence of several different sources of stimuli in their research with rats, and Wiest (1968) experimentally demonstrated that the discriminative performance of one pigeon based on stimuli from another pigeon was facilitated when stimuli in different sensory modalities were simultaneously available to the observer. The inability of the experimenter to control the stimulus, or at least various aspects of it, seems to be partially responsible for the difficulties in identifying the specific effective stimulus and thus might even call into question the presumed social nature of the episode. That is, the origination of stimuli from the behavior of another organism may at times be irrelevant or incidental.

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EXPERIMENT I

The purpose of the present investigation was to develop an experimental situation that would isolate a visual behavioral stimulus, allow the experimenter to vary that stimulus, and permit a quantitative analysis of its control over the behavior of a second organism. The experimental plan was to develop control of the behavior of the stimulus organism so that its behavior could be presented to the observing organism reliably at the experimenter's demand. The response chosen to serve as the behavioral stimulus was a free operant (chain pull) that allowed the stimulus to occur relatively continuously during an extended presentation.

METHOD

Subjects

Two naive male squirrel monkeys were maintained at approximately 80% of free-feeding body weight by food deprivation. One subject served as the behavioral stimulus subject (SS) at all times and the other exclusively as the observing subject (OS).

Apparatus

The experimental environments consisted of two separate but adjacent enclosures. Figure 1 shows a schematic of each environment and the position of each with respect to the other. The chamber housing the stimulus animal was constructed primarily of sheet metal and was 24 by 22.5 by 18.5 in. (61 by 56.8 by 46.7 cm) with a guillotine door (A). The wall corresponding to the adjacent environment had a rectangular piece 8 by 13.75 in. (20.6 by 34.9 cm) removed from it and was covered with a clear piece of Plexiglas (B) to allow visual inspection of its interior by OS. The wall opposite the Plexiglas, *i.e.* the rear wall, was painted flat black with the exception of an area approximately 6 by 5 in. (15.2 by 12.7 cm) which was constructed of clear Plexiglas (C) to permit a direct view from the interiors of both environments of a 117 v ac yellow lamp (response light D) mounted on the outside of the wall. A side wall contained a feeding trough 4.5 in. (11.4 cm) above the floor and 8.75 in. (22.2 cm) from the front into which a Foringer #1284 dispenser (E) deposited food pellets. A

Lightolier high-intensity lamp served as a session light (F) that provided general illumination in the environment through a 1 in. (2.5 cm) diameter hole covered with a frosted plastic cover that was located 5 in. (12.7 cm) to the front of and 3 in. (7.6 cm) above the trough. Extending 6.75 in. (17.1 cm) approximately from the center of the roof was a link chain (G) which when pulled with a minimum of 40 g (0.36 N) force activated a microswitch mounted on the environment's exterior. Three 6 v ac pilot lamps (H) were also mounted on the roof 1.25 in. (3.2 cm) apart starting 1.85 in. (4.7 cm) from the side and 1.5 in. (3.8 cm) from the front of the environment. A three-sided shield extending 6 in. (15.2 cm) from the roof into the animal space prevented direct observation of the lamps from the adjacent experimental enclosure, and a Variac in series with the lamps was used to decrease the amount of illumination. This was done in order to present visual stimuli to the stimulus monkey without concurrently presenting them to the observer. The environment for SS rested on a wooden platform (I).

The observer's environment (J) with a guillotine door (K) was 16 by 10.5 by 16 in. (40.6 by 26.7 by 40.6 cm) and was constructed of black phenolic with the exception that the side corresponding to the adjacent environment had a 13 by 7.25 in. (33 by 18.4 cm) clear Plexiglas window (L). Mounted on the Plexiglas 2 in. (5.1 cm) from the side and 8 in. (20.3 cm) from the floor was a Lehigh Valley Electronics #1352 rat lever (M) that served as the response lever for OS, and a feeding trough 4 in. (10.2 cm) below it received pellets from a Foringer #1284 feeder (N). The animal enclosure and a 15-w bulb for illumination were housed in a refrigerator shell (O) in order to maintain acoustical separation of the two monkeys. An exhaust fan in the experimental room and a blower housed in the refrigerator provided masking noise. A rectangular hole 11.25 by 9.5 in. (28.6 by 24.1 cm) cut in the wall of the refrigerator and fitted with two 1 in. (2.5 cm) thick glass windows (B) corresponded to the Plexiglas windows of each environment and allowed visual inspection between environments.

Relay equipment was located in a separate room. Behavior was recorded on digital counters, a cumulative recorder, and an event recorder.

Fig. 1. Schematic drawing of the experimental environment of the stimulus subject (left side) and the observing subject (right side) and the positioning of the chambers (one foot = 30.5 cm). See text for details.

General procedure: Stimulus Subject (SS). The SS was trained on a *mult* FR 6 EXT schedule of reinforcement in which every sixth response (chain pull) in the presence of an illuminated red jewelled pilot lamp (S^D) produced a 45-mg Noyes food pellet; responses in the absence of the light (S^A) were not reinforced. The average S^D duration was 1.75 min, which varied between the limits of 1 min and 2.5 min. The S^D was terminated with the first reinforcement after the variable duration had elapsed. The S^A duration was arranged by a separate VI schedule with an average of 2.66 min, which varied between the limits of 1 min and 4.33 min. The duration of S^A was extended for 1 min if SS responded during the last 1 min of S^A . The schedule resulted in a rate of chain pulling that averaged about 75 responses per minute during S^D and approached 0 responses per minute during S^A .

Observing Subject (OS). After establishment of the lever-press response and several preliminary adjustments of the apparatus and schedule, OS was placed on a discrimination schedule similar to the one described for SS, except that every second response was reinforced (FR 2) with a 45-mg Noyes pellet. The S^D for OS was the characteristic behavior of SS during its S^D , and the extinction component of SS's schedule served as S^A . Since SS had been trained before introducing OS, the regularity of its behavior had been accomplished before discrimination training for OS began. Nevertheless, an added contingency insured the temporal correlation of the behavior of OS and SS by requiring OS to respond within 5 sec of the last response of SS. Thus, if for any reason SS stopped responding for 5 sec or more, OS would not receive reinforcement even if the FR requirement had been met. Each session was 1 hr in duration, and five sessions, administered at approximately the same time on successive days, were conducted weekly.

A number of procedural details were changed for OS during the course of acquisition (Exp. I). These procedural matters are described below, together with an account of the development of performance.

RESULTS

Sessions 1-7. The S^D for OS during these sessions was the characteristic behavior of SS during its S^D and a 50-msec flash from the yellow response light that accompanied each

chain-pull response. The extinction component of SS's schedule without the response light served as S^A . The chain-pulling performance of SS was accompanied by the yellow response light because of the speculation that the appearance of the response light would increase the likelihood of OS "looking at" SS and therefore increase the probability of SS's performance gaining discriminative control of OS's performance.

The ratio of the rate of response during S^D /rate of response during S^A was used as the index of discrimination. The ratio is at unity when the rates of response are equal and increases in magnitude as the rate of response during S^D increases relative to the rate of response during S^A . The discrimination index was 1.2:1 during Session 1, indicating that the rates of response during S^D and S^A were approximately equal at the beginning of training. In Session 7, the last day that each chain-pull performance of SS was accompanied by the response light, the index was 2.4:1.

Sessions 8-10. During these sessions, the response light was eliminated (faded), so that the performance of SS was the only S^D for OS. The fading procedure was accomplished by progressively increasing the ratio of responses of SS to response-produced yellow flashes in the following sequence: 1:1, 2:1, 6:1, and none over three sessions. The fact that the discrimination ratio was greater during each of the fading sessions than during Session 7 indicates that the elimination of the response light did not impair the discrimination. In Session 10, the index was 4.7:1.

Sessions 11-17. The chain-pulling performance of SS served as the only S^D during these sessions. The discrimination ratio remained about the same as in Session 10.

Sessions 18-20. In an effort to increase the discrimination ratio, the FR 2 component of OS's multiple schedule was increased to FR 6. In Session 18, the discrimination index increased to 8.2:1. The cumulative record for that session showed that commencing with the first S^D period in which FR 6 was in effect, the rate of response during S^D increased. The immediate change in rate of response suggests that the characteristics of the reinforcement schedule and not the behavioral stimulus had until this manipulation limited the difference between the rate of response during S^D and S^A . Further, the immediate increase in responding

indicates that the occurrence of reinforcement to OS, which may have acquired discriminative properties due to its frequent occurrence on the FR 2 schedule, was probably not a major determinant in the discrimination at this point. If reinforcement to OS had acquired discriminative characteristics, then decreasing the frequency of reinforcement should have disrupted the differential responding of OS.

The increase in the discrimination index was followed by a decrease in overall responding during Sessions 19 and 20. A general inability to maintain the operant followed the increase in the discrimination index. Since a similar effect was averted in the training of SS by ending the S^D period with a response-contingent reinforcement, a similar set of conditions were approximated for OS by providing a 10-sec "grace" period. With this added contingency, OS would usually meet the FR 6 requirement within 10 sec, and thus S^A would not appear in the middle of a high-rate sequence of responses.

Sessions 21-30. In Session 21, behavior was reestablished by reducing the FR requirement from FR 6 to FR 3. Stimulus control approximated the degree maintained during Session 18. In Session 22, *mult* FR 6 EXT was reinstated in conjunction with the grace period. The discrimination index showed an immediate and substantial increase to a level above 10:1 in each of the last five sessions of the experiment.

A portion of the cumulative and event records of responding during Session 30, the final session of the experiment, is shown in Fig. 2. The records show the characteristic onset and offset of responses of OS with the initiation and cessation of responding of SS. Stimulus

control was indicated by the abrupt moment-to-moment changes in responding as well as by the overall discrimination index. Although reinforcement presentations are not indicated on the cumulative record, the pauses following short bursts of responses were usually correlated with the reinforcer. The event record in frame (b) of the figure shows the usually consistent response rate of SS that approximated 75 responses per minute and the correlated responses of OS.

One session in the training sequence was omitted from discussion for the sake of exposition. After Session 17, a control test was performed in order to assess the effect of various nonbehavioral stimuli that may have unintentionally gained control of the behavior. The control test was conducted in four phases during a single session with SS absent from the environment at all times. No reinforcement occurred throughout the test. Each phase consisted of presenting some of the nonbehavioral events that accompanied the behavioral S^D. The S^D alternated with the S^A according to the same program as had occurred during training. The four phases were: (1) presentation of the visual S^D (red pilot lamp) for SS, (2) presentation of S^D for SS and operation of the scheduling equipment in the adjacent room and the feeder on the cage for SS, (3) operation of a microswitch positioned above the cage for SS at a rate approximating the rate that a chain pull by SS operated its microswitch, and (4) combined phase 1 and 2 with the external operation of the chain (the experimenter was not observable but movement of the chain within the environment was detectable). Starting with phase 1, each stimulus condition was presented three times before the next phase was administered. The results of

Table 1

Number of responses during S^D and S^A for the control period and the adjacent training sessions.

Session	Conditions	Responses		Time (Min)	
		S ^D	S ^A	S ^D	S ^A ^a
Number 17	<i>mult</i> FR 2 EXT	330	109	23.6	36.4
Control Session ^b	Pilot Lamp	26	132	5.2	12.4
	Pilot Lamp + Programming	23	25	4.2	7.7
	Micro Switch	5	10	4.4	5.9
	Pilot Lamp + Programming + Chain	20	23	4.2	7.3
Number 18	<i>mult</i> FR 6 EXT	555	103	24.2	35.8

^aTime during S^A for the control test was estimated from the cumulative response record.

^bA more complete description of the conditions of the control session is presented in the text.

Fig. 2. A portion of the cumulative record of responses (a) of the observing subject (OS) and the corresponding portion of the event record (b) of responses of OS and the stimulus subject (SS) during the final session of training. Both records are shown starting with the third S^D presentation because ink smears obliterated fragments of the record during the earlier segment of the session. The successive S^D periods are numbered 3 through 12 on each record to facilitate a comparison between the records. The cumulative record had the response pen offset downward during S^A periods and the "pip" at the end of each S^D signified the start of the grace period. The event record recorded responses of SS (pen A), responses of OS during S^D (pen B), responses of OS during S^A (pen C) and the occurrence of the S^D by an upwards offset (pen D). Each response of OS and SS deflected their respective pens for 30 msec, but the combination of a rather high rate of response and slow chart speed produced a thick, solid-appearing pen deflection and usually does not permit the detection of an individual response on the record.

the control test summed for each phase and compared to the adjacent training sessions are shown in Table 1. The table shows a greater number of responses during S^D than S^A for each of the training sessions but a greater number of responses during S^A than S^D for each of the control conditions. The reversal of the number of responses obtained in S^D and S^A during the control manipulations indicates that these nonbehavioral events were not effective stimuli. The fact that the duration of S^A was always greater than S^D probably does not detract from this conclusion, since each

S^A period required 1 min of not responding before the presentation of the next stimulus in the test. Thus, the total S^A time for each phase includes 3 min of not responding. Further, during some of the training sessions, direct observation of both subjects by means of a mirror arrangement revealed that during S^A SS would occasionally move toward and reach for the response chain. Although SS did not necessarily come in contact with the chain, the "fractional" response was sometimes sufficient to produce responses by OS. In other words, the behavior of SS was such an effective

stimulus that approximations of typical S^D behavior during S^A yielded responses by OS.

EXPERIMENT 2

The purpose of this experiment was to examine the nature of the effective behavioral stimulus. Since operant behavior involves a sequence or chain of responses, the segment of the chain that had gained control of the behavior of OS was not clearly identified. For example, releasing the response chain and reaching in the food trough or retrieving the reinforcer and performance of consummatory behaviors rather than chain pulling may have been the effective stimulus. The only evidence to the contrary was the anecdotal observation that reaching for the chain by SS sometimes preceded responding of OS.

The plan of Exp. 2 was to test the control of OS due to the chain pulling of SS by varying SS's rate of response during an extinction test while keeping rate of reinforcement to SS, and thereby presumably the rate of consummatory behaviors, constant. The question was if chain pulling itself at least in part controlled the operant behavior of OS, then a variation in the rate of the chain pulling of SS should be reflected in variations of operant rate of OS. Accordingly, a rate of response that was considerably lower than the rate that had served as S^D , but which yielded approximately an equal rate of reinforcement, was established in the repertoire of SS. This low rate and the high rate of response that served as S^D were then sequentially presented during extinction, after the fashion of a generalization test.

METHOD

Subjects

The subjects of Exp. 1 served.

Apparatus

The animal environments and the associated scheduling and recording equipment were the same as those described in Exp. 1.

Procedure

The major portion of training SS was accomplished when OS was not present in the adjacent environment in order to insure unfamiliarity with the low-rate behavioral stimulus. SS received a total of 52 sessions of *mult*

FR EXT, *mult* DRL EXT, or *mult* FR DRL EXT. The DRL component of the multiple schedules refers to differential reinforcement of low rates of response, a schedule in which a minimum time must elapse before the next response will be reinforced. The exact value of the DRL and the FR schedules varied somewhat during different sessions until it was found that an FR 7 and DRL 4-sec produced nearly equal rates of reinforcement, but highly divergent rates of response (see Table 2). A red pilot lamp served as S^D for the FR component, a white pilot lamp was correlated with the DRL component, and the absence of either stimulus was associated with S^A . The alternation of S^D and S^A in each multiple schedule was according to the contingencies described in Exp. 1. The DRL and FR components were randomly presented during the *mult* FR DRL EXT schedule with the EXT segment following each S^D presentation.

Social training. OS was reintroduced into the environment and retrained for six sessions on *mult* FR 6 EXT. In the presence of SS's high rate of response maintained by FR 7, OS received reinforcement according to FR 6, and in the presence of SS's extinction component OS could not obtain reinforcement. The only alteration of the contingencies described in Exp. 1 was that the schedule of reinforcement for SS was now a *mult* FR 7 EXT rather than *mult* FR 6 EXT. Since approximately three months had elapsed between the last session of Exp. 1 and the extinction test of Exp. 2, these retraining sessions were intended to insure adequate stimulus control before the test.

Extinction test. After a warmup consisting of six S^D presentations of SS and six S^A presentations, an extinction sequence for OS was initiated in which the responding of SS during its FR 7 (high rate), DRL 4-sec (low rate), and S^A (almost zero rate) were sequentially presented to OS. The high and the low rate were presented in a varying order during six replications with a replication including one presentation of each rate and with S^A appearing after each presentation. Each rate of responding was presented for 1 min plus the time required for SS to obtain the first reinforcement thereafter (*cf* Exp. 1), and S^A was presented on a VI 2.66-min as during training. Note that until this test, Subject OS had never been presented the low rate of response main-

tained by the DRL 4-sec schedule of reinforcement.

RESULTS

The results of the extinction test are presented in Table 2. The number of responses during each stimulus presentation is shown for both OS and SS, as well as the number of reinforcements received by SS, and the duration of each presentation. The left section of the table shows that each high-rate presentation (FR) to OS was greater than each low rate (DRL), which in turn was always greater than the rate of response during extinction (S^A). The time of each presentation of high and low rate varied due to the fact that the duration was in part contingent upon the behavior of SS. The total number of reinforcements presented was somewhat greater when the high rate maintained by the FR 7 served as the stimulus than the low rate controlled by the DRL 4-sec but as many or more reinforcements occurred on several occasions when the DRL 4-sec was in effect. In terms of rate, the differences between reinforcement were small and inconsistent in comparison with response differences. These results indicate that differences in behavioral stimuli during high and low rate of response presentations were primarily differences in some aspect of rate of response rather than rate of reinforcement. One difference in rate of response is revealed by the result that approximately 85% of the intervals between successive responses were at or greater than 4 sec when the DRL schedule

was in effect, a result that could not have been approached during the high rate of response maintained by the FR 7.

Corresponding to changes in behavioral stimuli are changes in the number of responses of OS shown in the right-hand section of the table. In general, a greater number of responses occurred in the presence of the high rate of response (FR) than the low rate (DRL), and the low rate usually resulted in responses more frequently than the extinction component (S^A). The intermediate response rate of SS between its high and extinction rate resulted in an intermediate rate of response on the part of OS. During five of six comparison presentations, OS emitted a greater or equal number of responses in the presence of the high rate with a decrease in the difference between responses occurring across successive stimulus presentations. Inspection of the cumulative record of responses obtained during the generalization test showed that the rate of response of OS was usually an average of short bursts of responding at a high rate, at the onset of the stimulus presentation, followed by a long period without responses. Thus, the greater number of responses of OS during the high rate of response of SS than in the presence of SS's low rate was due to a longer burst of responses under the former condition. In other words, while a change in rate of SS yielded a change in overall rate of OS, the intermediate rate of response of OS did not match in detail the intermediate steady rate of response of SS.

Table 2

The number of responses of OS during extinction in the presence of the number of responses and reinforcements by SS. The performance of SS during its FR schedule of reinforcement and during its S^A had served as S^D and S^A respectively for OS. The sequence of FR and DRL presentations varied across orders (replications).

Order of Presentation	Duration of Presentation (in Minutes)		Stimulus Subject (SS)						Observing Subject (OS)		
			Responses			Reinforcements			Responses		
	FR	DRL	FR	DRL	S^A	FR	DRL		FR	DRL	S^A
1	1.12	1.06	101	9	1	13	9		64	39	0
2	1.01	1.06	83	11	0	11	9		37	12	0
3	1.07	1.03	64	11	1	8	9		33	15	0
4	1.12	1.10	78	14	0	10	10		1	4	0
5	1.03	1.07	93	12	5	12	10		24	24	0
6	1.04	1.04	104	10	0	13	10		1	0	0
Sum	6.39	6.36	523	67	7	67	57		160	94	0
Mean	1.06	1.06	87.17	11.17	1.17	11.17	9.50		26.67	15.67	0

*Each S^A cell shows the sum of responses during two S^A periods since S^A appeared after each FR and DRL presentation.

DISCUSSION

The experimental use of one organism as a controlling source of stimuli for another (*i.e.*, as a social stimulus) has a lengthy history (*cf* Watson, 1908). Despite the major work of Miller and Dollard (1941), the study of social stimuli only recently has begun to receive major attention in varying situations from field observation (*e.g.*, DeVore, 1965) to highly artificial interactions between organisms (*e.g.*, Boren, 1966; Church, 1959; and Skinner, 1962).

The present experiments are obviously in the latter tradition, and although the subject matter is not generally new, these investigations suggest a number of extensions of previous work. The studies demonstrated that a relatively limited aspect of one organism's behavior may serve as an effective visual stimulus for another organism in an experimental situation where incidental sources of control were not prevalent. Although the function of the fading procedure in generating the stimulus control was not determined, the role of this technique in establishing social control would seem to warrant additional analysis, since attending to the behavior of another organism is essential in many if not all social interactions (*e.g.*, imitation, cooperation, *etc.*). Further, the ability to manipulate automatically the behavioral stimulus permits improved experimental control. For example, the unintentional influence of the experimenter that may arise from his interaction in the social episode may largely be averted because his presence or action is not directly required. Additionally, the precise control of a behavioral stimulus should allow a more exhaustive employment of these events in other studies. In this regard, Exp. 2 applied some of the known effects of schedules of reinforcement in order to vary rate of response as other physical stimuli are manipulated. The results indicated that rate of response was a major contributor to the social control of OS, since the decrease in rate of response of SS resulted in a corresponding decrease in the rate of response of OS. Experiment 2, therefore, gives additional support to the view of functional equivalence between behavioral and other physical stimuli by yielding a generalization effect, a phenomenon frequently reported in experiments that alter nonbehavioral stimuli.

Generalization in a social situation has been reported in a number of investigations, including Exp. 2 and 8 of Miller and Dollard. Generalization in these studies was said to occur if an imitator performed the same response in the presence of a different model. In one test, a black rat was exchanged for an albino and the frequency of a matching response following the new leader was measured. In a second experiment, the generalization of performance of children was tested by altering the prestige of the model. Prestige in the latter experiment refers to the age (size) of the model whose behavior was to be imitated. In both experiments, similar models' performances were matched by the imitator, indicating the existence of generalization. Generalization in Exp. 2 of this investigation, in comparison, appears to be based on the on-going behavior of the stimulus subject and not some fixed characteristic (*e.g.*, its color), quantifiable in a continuous manner, and subject to the precise control by the experimenter.

Although the above results are consistent with findings using nonbehavioral stimuli, several questions and implications of the data have not been explained. The interpretation that rate of response served as the effective stimulus may not be entirely satisfactory. The control for reinforcement-related behaviors only eliminated one possible source of control. Was the effective stimulus some concomitant of rate of response or some specific aspect of rate (*e.g.*, time between responses)? A second question is related to the effect of a behavioral S^D on other behavior of the observer. Is the establishment of a behavioral S^D sufficient to produce similar behavior (modeling) on the part of the observer? If so, under what conditions?

In conclusion, these experiments demonstrated that differential reinforcement may be effectively used to control the rate of response of two organisms in a visual social situation and that a behavioral stimulus yields similar results in terms of discrimination and generalization to other physical stimuli. The fact that rate of response appears to be the effective stimulus is important due to the experimenter's ability to control it and because of the potential of observing moment-to-moment changes of the interaction between organisms.

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