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The development of peer influence effects in dyads

Desarrollo por Diadas, de la Influencia de Compañeros de Clase

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ABSTRACT

This study attempted to extend previous research on complex cooperation procedures in order to investigate conditions under which one subject's reinforcement outcomes will affect both his and partner's response choices. The complex cooperation procedures deviated from those of previous studies by 1) increasing the alternatives to include individual, exchange, and cooperative response options, 2) measuring feedback responses to point scores (audits) tabulated on each mode counter, and 3) manipulating response requirements for social or nonsocial modes for only one dyad member, thereby allowing for the study of peer influence effects. Peer inluence effects were defined when partner's response choices were a function of subject's reinforcement contingencies. The manipulation were fixed ratios of 2, 4, 8, or 16 for a single dyad member's nonsocial or social mode during conditions when both subjects had options to work for self, stop partner from working for self, work for partner, and/or work with partner. The effects of these manipulation were 1) task response variations for both members in accordance with the focal subject's FR schedules, 2) feedback response variations for both members which corresponded to these task response changes, and 3) response switches from one social to the other social mode (for one dyad), from a social to nonsocial mode (for one dyad), and from the nonsocial to a social mode (for six dyads).

DESCRIPTORS: cooperation procedures, FR schedules, influence effects, button press, students.

RESUMEN

El presente estudio intentó extender los hallazgos de investigaciones previas sobre procedimientos de cooperación compleja, con objeto de investigar las condiciones bajo las cuales, los efectos del reforzamiento a un sujeto afectan tanto sus respuestas de elección propias como las de su compañero. Los procedimientos de cooperación compleja fueron diferentes de los usados en investigaciones previas en cuanto a: 1) incremento de las alternativas para incluir opciones de respuestas individuales, de intercambio y cooperativas, 2) medición de respuestas de realimentación sobre puntajes (auditorías) tabulados para cada modalidad de conteo, y 3) manipulación de los requisitos de respuesta de modalidades sociales o no sociales para un solo miembro de una diada, permitiendo así estudiar los efectos de la influencia del compañero. Estos efectos se definieron cuando las elecciones de respuesta del compañero ocurrían en función de las contingencias de reforzamiento del sujeto. Las manipulaciones consistieron en razones fijas de 2, 4, 8 o 16 para las modalidades sociales o no sociales del miembro de una sola diada, durante condiciones en que ambos sujetos tenían la opción de trabajar para sí mismos, de detener al compañero que trabaja para sí mismo, trabajar para el compañero y/o trabajar con el compañero. Los efectos de estas manipulaciones fueron: variaciones en las respuestas de tarea para ambos miembros de la diada, de acuerdo con los programas FR focales del sujeto, 2) variaciones de respuestas por realimentación para ambos miembros, que correspondieron a dichos cambios de respuesta de tarea, y 3) cambios de respuesta de una modalidad social a otra (en una diada), de una modalidad social a una no social (en una diada), y de una no social a una social (en seis diadas).

DESCRIPTORES: procedimientos de cooperación, programas RF, efectos de influencia, presión de botón, estudiantes.

The emergence of cooperative patterns in small groups is dependent upon one of several cooperation procedures specified in a recent review and clasification of cooperation studies (Hake and Vukelich, 1972). In a subsequent study the authors specified additional variables that characterize complex cooperative patterns in humans (Hake and Vukelich, 1973). These complex procedures require: 1) that subject and partner be social stimuli for each other; 2) an alternative nonsocial mode for earning reinforcers; and 3) deviations from an equitable distribution for work and/or reinforcers.

A few studies employing complex cooperative procedures have investigated the effects of response requirements on subjects' choices to respond individually or cooperatively. Mithaug (1969), for example, found that children in three person groups worked together for joint reinforcers rather than alone for individual reinforcers when the consequences for working on the group mode were more rewarding. Hake and Vukelich (1973) found that pairs of institutionalized retardates worked cooperatively or individually, choosing the social or nonsocial alternative with the least response requirement. Burgess and Nielsen (1974) reported that college

students, also working in dyads, chose to work cooperatively by exchanging reward points or individually by keeping points for self, according to the reinforcement schedule of the respective modes. When exchanging points produced richer consequences than working for self, subjects exchanged, and when the individual mode was more rewarding, they worked alone.

Also important in complex cooperative procedures is the effect of information on the task. Hake, Vukelich, and Kaplan (1973) defined such feedback behavior as audits when the response class was strengthened or maintained by access to an existing score. The investigators found that audit responses on self and coactor's points increased when the coactor was present and working a comparable task. The data also suggested that subjects were comparing scores as increases in self audits were a function of the presence of coactor's score during parallel work. In a study on competitive behavior, Mithaug (1973) reported findings to establish the importance of auditing behavior in competition. In that study, members of a dyad earned points on electromechanical counters by pressing one button switch, and gained access to self and partner's counter scores by pressing two additional button switches. During the competitive contingency in which subjects earned bonus points (backed by money) for surpassing their partner's score, button responses gaining access to self and partner's score were a function of the information provided. When the score was present, feedback responses increased and when the score was absent, the response levels decreased.

In the present study feedback responses to social and nonsocial task modes were monitored as subjects worked for self, worked for partner, or worked for their group. The relationship between feedback and task responses was observed during different response requirements for the three modes. In addition, the complex cooperative procedures were expanded to include two social and one nonsocial response alternatives. In previous studies, subjects responded in either a social or nonsocial mode. Social conditions more closely represent complex patterns in humans when a second social alternative is available. In natural settings humans participate in multiple social arrangements as they mutually reinforce or punish each other, work together on a common task, or even compete with each other for scarce resources. In some situations, actors may engage in two patterns at the same time. For example, when two men cooperate to change a flat tire, with one holding the tire and the other fastening lugs, the men may also exchange verbal praise by complimenting each other for performing their respective jobs.

The focus of this research on complex cooperative procedures was peer influence effects in dyads. In some social relations the needs of the participants are not mutually shared or interdependent. While person's needs may be satisfied through actions taken by other, other may be able to satisfy his needs independently of person. This condition could subse-

quently reverse, of course, with other being dependent upon person and person independent of other. Exchange studies allow for such dependency reversals over time. Person reinforces other at time 1 and other reinforces person at time 2. In this research dependency reversals were minimized. While subject depended upon partner's actions for maximum reinforcement, partner could maintain maximum reinforcement without assistance from subject. The question under study was whether partner's responses would come under the control of subject's reinforcement contingencies. As subject's outcomes were reduced by increasing decrements over time, would partner's response patterns change in ways that would restore subject's returns to their original levels? Or, would partner ignore subject's condition of increasing deprivation and continue his established patterns of responding?

METHOD

Subjects

Fifteen pupils enrolled in special education classes at the Experimental Education Unit participated in this study. Their ages ranged from 10 to 17 with a median of 11.4 and a mean of 12.1 years. Two subjects were 10 years of age, seven were 11, three were 12, two were 4 and one was 17 years. The students came from three different classrooms and were paired with their classmates to form dyads. The age differences were three years for one pair, one year for three pairs, and zero years for four pairs. Eight of the pupils were diagnosed as learning disabled, three as emotionally disturbed, two as neurologically impaired and two as educably mentally retarded. None was physically disabled or otherwise unable to operate effectively the experimental apparatus. All had numerical skills sufficient for evaluating relative number magnitudes to 10,000. Five of the eight dyads, 1-4, and 6, completed fixed ratio manipulations for both dyad members. Dyad 5 completed FR manipulations for one dyad member. Subject 13 of dyad 7 discontinued the sessions after completing his FR manipulations. Subject 15 took Subject 13's place to work with Subject 14 in a reconstituted dyad, 7a. This dyad completed the manipulation conditions for Subject 14. In summary, a total of thirteen subjects participated in the FR conditions. These included Subjects 1-9 and 11-14.

Apparatus

Figure 1 illustrates the apparatus employed in the experiment. Two consoles were situated at opposite walls of the 2.74 × 3.04 meter laboratory room. Each console housed a response panel consisting of nine button switches, five response indicator lights, four on-off indicator lights; and

a display panel consisting of a one-way mirror which shielded five electromechanical counters located within the console and directly behind the mirror. Situated above each counter was a light that flashed for .1 second when an appropriate button switch on the response panel was depressed. The light flash allowed the person operating the console to see scores on the counters through the one-way mirror.

The response switches, illustrated on the response panel of the console in figure 1, operated selected electromechanical counters on the display panel of self and partner's consoles. For example, self operated counter Nº 1 on his own console by pressing response switch Nº 1; he operated counter Nº 2 in his partner's console by pressing his Nº 2 response switch. Self stopped partner from producing points on his (partner's) counter Nº 1 by holding down response switch Nº 3; and self and partner earned points at the same time on their respective Nº 4 counters when one held down response switch Nº 4 while the other pressed Nº 4 repeatedly.

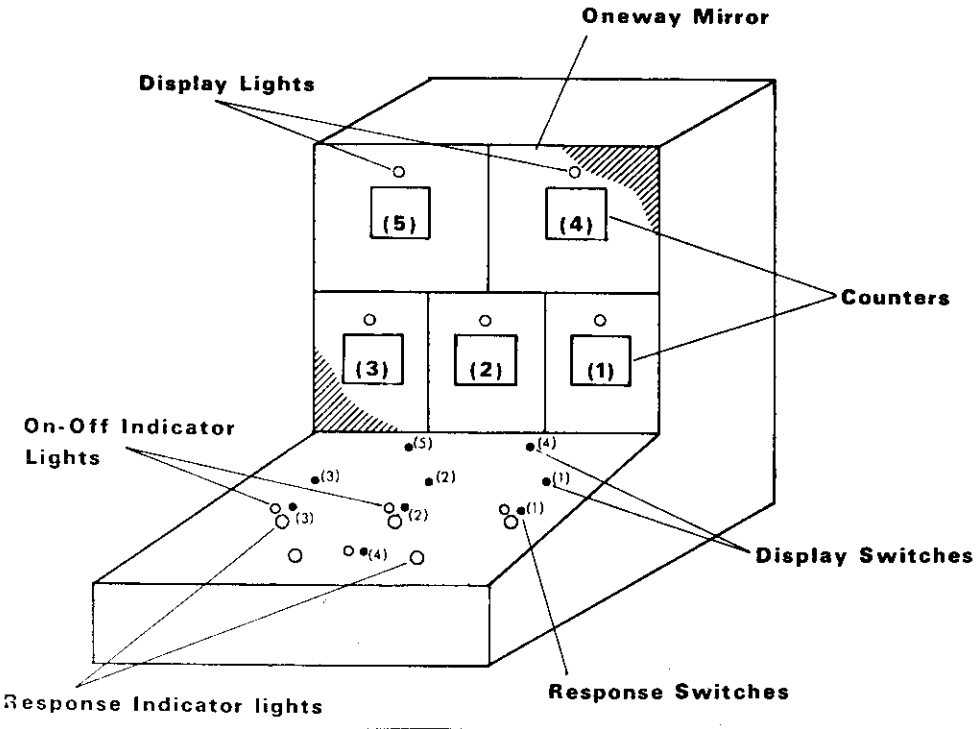


Fig. 1. The console housed a display component consisting of five electromechanical counters labeled (1)-(5), with five display lights above each counter, and shielded by a one way mirror; and a response component consisting of five display switches labeled (1)-(5), four response switches labeled (1)-(4), four response indicator lights located below switches (1)-(3) and to the side of switch (4), and four on-off indicator lights located to the left of each response switch.

Summarizing the counter operations, counter Nº 1 displayed points that self earned for himself when he pressed switch Nº 1. Counter Nº 2 displayed points that partner earned for self when partner pressed response switch Nº 2 on his own console. Counter Nº 3 displayed for self the points that partner earned when partner pressed his response switch Nº 1. Counter Nº 4 displayed points earned when self and partner jointly pressed response switches Nº 4 on their respective consoles. Counter Nº 5 was not operational in this study.

Subjects observed scores on the counters by pressing display switches. Display switch Nº 1 illuminated counter Nº 1, display switch Nº 2 illuminated counter Nº 2, display switch Nº 3 illuminated counter Nº 3, display switch Nº 4 illuminated counter Nº 4, and display switch Nº 5 illuminated counter Nº 5.

Subjects received information about which of the counters were tabulating points by observing the response indicator lights located adjacent to the corresponding response switch. For example, when self worked for himself by pressing switch Nº 1 which tabulated points on counter Nº 1, the green indicator light adjacent to partner's Nº 3 response switch flashed with each point tabulation. If partner held down switch Nº 3 to stop self from earning points, a red indicator light beside self's Nº 1 response switch remained on for the duration of partner's hold, indicating that partner was preventing self from tabulating points on his Nº 1 counter. When partner gave points to self by pressing his Nº 2 response switch, a green light beside self's Nº 2 switch flashed for every point tabulated on self's Nº 2 counter. And finally, when self and partner coordinated their presses by pressing switch Nº 4, a green indicator light adjacent to that response button flashed for every point tabulated on their respective Nº 4 counters.

Subjects learned which response switches were operable by observing the red on-off indicator lights adjacent to the corresponding switches. When the light was illuminated, the response switch was operable. Sessions began and commenced with the appropriate on-off indicator lights flashing on and remaining on for the duration of the response period.

Scheduling and Recording Equipment

All scheduling and recording equipment was located in a room adjacent to the laboratory. Each daily session consisted of two three minute response periods, separated by a one minute period for rest. A Lab K digital programmer scheduled the 3-1-3 minute sequence by switching on the appropriate indicator lights and enabling the corresponding response switches on both subjects' consoles. Following the first three minute response period, the programmer disabled the console lights and switches for one minute, enabled them again for the second three minute response period, and then terminated the session.

A BRS digital programmer scheduled the response requirements for selected response switches during the FR manipulations. The R2 schedule, for example, required that a subject press a given switch twice for a point to tabulate on the corresponding counter.

Electromechanical counters tabulated all button press responses for both subjects which provided rate data for each three minute response period. A twenty-channel Esterline Angus event recorder provided frequency data for all button press responses and duration data for all holding responses (when a subject held down a response switch rather than press repeatedly, as, for example, with the group and stop partner switches). A tape cassette recorder continuously monitored subjects' verbalizations during both response and rest periods of each daily session. A white noise generator was activated during response sessions to mask mechanical noises from the counters located in the student consoles. The masking noise emanated from two speakers located on opposite walls of the laboratory room.

Training

Subject pairs were introduced to their consoles and instructed that points earned on the counters returned money at a ratio of 50:1, 50 points returning one cent. The earnings were recorded each day and accumulated toward the purchase of catalog items specified by the subject. The experimenter provided an explanation of the console functions at the outset of each session of the study or until the subjects indicated they understood (i.e., they recited verbatim the instructions with the experimenter).

"When you press this button (points to response switch Nº 1), you give points to yourself. When you press this button (points to response switch Nº 2), you give points to your partner. When you press this button (points to response switch Nº 3), you stop your partner from earning points. When you hold this button down and your partner presses his (points to response switch Nº 4), you earn points together.

When you press this button (points to display switch Nº 1), you can see how many points you have earned for yourself (points to counter Nº 1). When you press this button (points to display switch Nº 2), you can see how many points your partner has given you (points to counter Nº 2). When you press this button (points to display switch Nº 3), you can see how many points your partner has earned for himself (points to counter Nº 3). When you press this button (points to display switch Nº 4), you can see how many points you and your partner have earned together on the group counter (points to counter Nº 4).

When this light is on (points to response indicator light Nº 1), your partner is stopping you from earning points for yourself. When this light is flashing (points to response indicator light Nº 2), your partner is giving

you points. When this light is flashing (points to response indicator light Nº 3), your partner is earning points for himself. When this light is flashing (points to the right Nº 4 indicator light), you and your partner are earning points together.

When this light is on (points to on-off indicator light Nº 1), this button switch works (points to response switch Nº 1). When this light is on (points to on-off indicator light Nº 2), this button switch works (points to response switch Nº 2). When this light is on (points to on-off indicator light Nº 3), this button switch works (points to response switch Nº 3). When this ligh is on (points to on-off indicator light Nº 4), this button switch works (points to response switch Nº 4)."

The subjects were introduced to the console and switching functions during an eight day period which included two days when only switch Nº 1 was operable, two days when only switches Nº 1 and Nº 3 were operable, two days when only switch Nº 4 was operable, and the final two days when only switch Nº 2 was operable. During the next twelve days of training, subjects were allowed to work several switches at once. During the first and third three days, subjects were permitted to work on switches 1, 3, and 4 (work for self, stop partner, and work for group). During the second and fourth three days, subjects could work on switches 1, 2, and 3 (work for self, work for partner, and stop partner). During a final three days which constituted the baseline for the subjects' response choices, all switches were operable, and subjects could work for self, stop partner, work for partner, and/or work for group. All display switches were operable during each day of training.

During the sessions, the subjects pressed any of the button switches, using any combination of hands and fingers during the two three-minute response periods. However, they were not allowed to trade places and operate each other's consoles. During the one-minute rest period separating response periods, the indicator lights adjacent to the operable response switches were off, indicating that the switch was no longer operable. The display switches similarly ceased functioning at that time. During the periods immediately preceding and following the two response periods, all switches were inoperable. All switches produced point tabulations ata 1:1 press to point ratio.

FR Manipulations

Following the final three day training period during which time subjects worked any of the response switches, one dyad member's response requirements were increased for a single response mode. Generally, the ratio sequence took the following pattern. The manipulations began with FR2 during which two presses produced one counter point. This condition was in effect for three days, and, if no response switch occurred during that time, the schedule increased to FR4, with four presses pro-

ducing one counter point. Following another three days with no change in response choices, the schedule increased to FR8 for three days and then to FR16, provided no change occurred at FR8. If the subjects response choices switched and maintained on an alternative mode for a minimum of three days or six three-minute sessions, the manipulations were established for the new response mode, repeating the FR2, FR4, FR8, and FR16 at three-day intervals. Once this sequence was completed for one subject, the procedure was repeated for his partner.

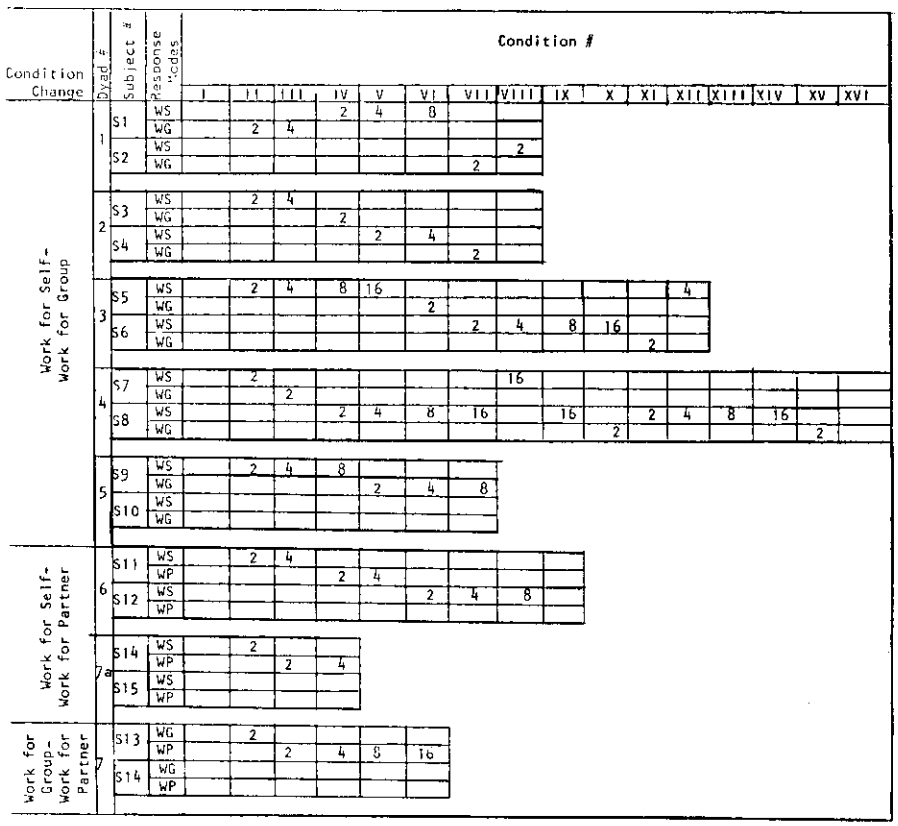
In dyads 1-4 and 6, ratio changes were implemented for both dyad members. For dyads 5, 7a. and 7, manipulations were instituted for only one member. Table 1 summarizes the fixed ratio schedules for individual members. The ratio manipulations are identified as WS for the work for self mode (switch Nº 1 and counter Nº 1), WG for the work for group mode (switches Nº 4 and counter Nº 4), and WP for the work for partner or exchange mode (switches Nº 2 and counter Nº 2). An FR2 for a subject's WS mode, for example, indicated that he pressed his work for self switch (Nº 1) twice to produce one point on his self counter (Nº 1). An FR2 for subject's WG counter indicated that he and his partner jointly pressed their respective Nº 4 switches, or with one holding and the other pressing, two times to produce one point on subject's group counter (Nº 4). These joint presses continued to produce points at a 1:1 ratio on partner's group counter. An FR2 for subject's WP or work partner mode (partner's Nº 2 switch and subject's Nº 2 counter) indicated that subject's exchange counter tabulated a point for every two presses partner made on his work for partner response switch. A 1:1 ratio was in effect for the remaining response switches, with one press returning one counter point. The manipulations varied for each dyad, with FR changes on self and group modes for groups 1-5, self and exchange modes for dyads 6 and 7a, and group and exchange modes for dyad 7.

Sessions were longer than the minimum three-day period when a change in response patterns developed and required additional sessions to stabilize (e.g. the baseline condition 1 for dyads 2 and 3 were four days rather than three). This ocurred in over half of the sessions. For 23 of the extended sessions a new response pattern developed and maintained, and for 14 sessions the emerging pattern did not fully develop and stabilize. Generally, sessions were extended when 1) the response rates on the manipulated mode decreased on the second or third day and the response rates on an alternative mode increased, 2) the response rates on the manipulated mode did not change, but rates on an alternative mode increased on the second or third day, or 3) the response rates on a manipulated social mode (i.e., exchange or group) decreased on the second or third day with no corresponding increases in response rates to alternative modes.

An analysis of the response levels resulting from increased ratios on the same mode or introduced ratios for new modes indicated that 1) when a subject's percent change in the proportion of his responses emitted on

TABLE 1

Fixed Ratio Manipulations for Each Subject and Response Mode



the manipulated mode was less than 50 for the last three days of the condition (as compared with the last three days of the previous condition), the ratio was increased (or doubled) for that mode, and 2) when the subject's change in response proportions was greater than 50, the ratio was discontinued for that mode and instituted at FR2 for an alternative mode. This held for all cases but one, Subject 11 in condition IV. Here the schedule for the exchange mode increased from FR2 to FR4, but the change from the previous condition was 56% less responding on the exchange mode (comparing the last three days of both conditions). This was relative to changes in Subject 11's group response rate which increased dramatically (from 2% to 50% of the total responses) during condition IV while the exchange rate decreased only slightly. Also, the mean exchange rates for the entire five day condition actually increased rather than decreased. The exchange ratio was increased from FR2 to FR4 to establish a more definitive decrease in Subject 11's exchange responding.

RESULTS

Task Responses to Manipulated Modes

For five dyads the fixed ratio manipulations alternated between self and group modes; for two dyads conditions changed from self and exchange modes; and for one dyad manipulations alternated between group and exchange modes. Figure 2 presents response data accordingly. Table 2 presents each subject's mean response rate per condition from which proportions were derived for all figures.

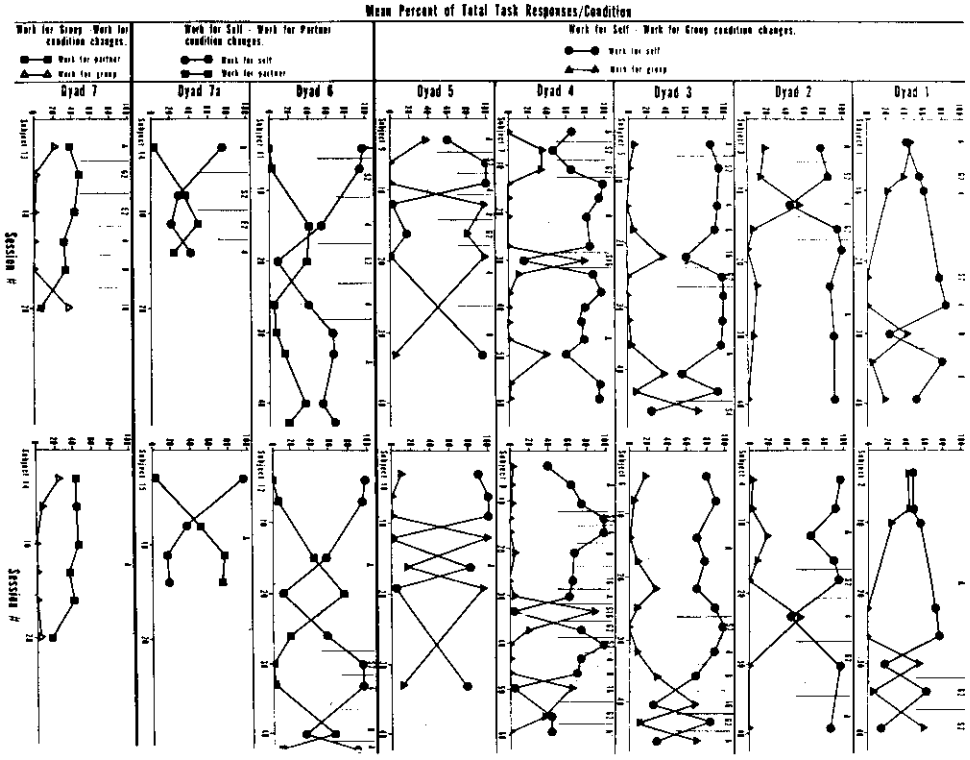


Fig. 2. Each subject's mean percent of total task responses (per FR condition) on the manipulated modes during FR schedules for the self and group modes, dyads 1-5; self and exchange (work for partner) modes, dyads 6 and 7a; and exchange (work for partner) and group modes, dyad 7. Headings for each of the 16 graphs identify response modes as "S" for self, "G" for group, and "E" for exchange, with subsequent numbers as "2" for FR2, "4" for FR4, "8" for FR8 and "16" for FR16. For example, S2 indicates an FR2 schedule on the self mode. During A and A' conditions, no FR schedule was in effect for any mode.

TABLE 11

Average Responses Per Condition for Each Task and Feedback Mode

			Task Responses/Minute			% of Time Hold Stop Partner Switch	Feedback Responses/Minute			
		Condition	Self	Exch.	Group		Self	Exch.	Group	Prtnr.
Dyad 1	S1	Baseline	95	18	106	.00	18	6	9	4
		FR2-Group-S1	110	5	78	.04	31	2	21	1
		FR4-Group-S1	124	47	26	.24	39	8	11	4
		FR2-Self-S1	152	42	0	.14	73	15	0	15
		FR4-Self-S1	156	25	0	.21	87	14	1	20
		FR8-Self-S1	34	47	59	.02	14	20	36	1
		FR2-Group-S2	201	29	12	.04	108*	16	12	11
		FR2-Self-S2	58	31	22	.00	38	21	41	4
Dyad 2	S2	Baseline	116	16	104	.00	13	5	7	0
		FR2-Group-S1	107	8	101	.07	8	1	10	3
		FR4-Group-S1	126	43	57	.29	12	14	3	9
		FR2-Self-S1	190	37	0	.16	21	7	1	11
		FR4-Self-S1	137	20	0	.20	15	9	0	8
		FR8-Self-S1	33	48	107	.02	4	21	7	3
		FR2-Group-S2	152	70	18	.02	18	11	3	11
		FR2-Self-S2	32	57	137	.00	8	9	13	4
Dyad 2	S3	Baseline	126	3	32	.11	42	2	4	31
		FR2-Self-S3	187	2	31	.08	54	9	4	25
		FR4-Self-S3	99	4	126	.08	28	9	21	10
		FR2-Group-S3	238	2	12	.03	68	2	3	33
		FR2-Self-S4	215	6	0	.03	53	7	1	20
		FR4-Self-S4	189	2	25	.00	20	1	8	6
		FR2-Group-S4	183	9	9	.08	49	3	3	24
		Baseline'	206	17	0	.02	46	8	3	12
Dyad 3	S4	Baseline	106	1	3	.03	15	4	2	27
		FR2-Self-S3	182	8	5	.01	28	2	2	7
		FR4-Self-S3	107	23	31	.19	14	4	5	11
		FR2-Group-S3	218	2	22	.03	44	2	1	41
		FR2-Self-S4	166	10	0	.02	15	6	0	19
		FR4-Self-S4	66	1	87	.02	18	1	6	4
		FR2-Group-S4	179	2	0	.17	28	3	0	21
		Baseline'	141	19	1	.02	26	10	1	13
Dyad 3	S5	Baseline	178	0	29	.12	12	1	1	3
		FR2-Self-S4	150	3	5	.33	17	2	1	6
		FR4-Self-S5	92	8	0	.61	11	23	0	9
		FR8-Self-S5	172	9	12	.19	13	5	0	5
		FR16-Self-S5	110	0	68	.42	10	0	9	2
		FR2-Group-S5	238	0	3	.06	19	0	0	7
		FR2-Self-S6	177	1	1	.22	36	0	1	6
		FR4-Self-S6	152	3	2	.04	43	2	0	5
		FR8-Self-S6	119	1	5	.02	51	1	15	4
		FR16-Self-S6	79	5	55	.03	18	12	60	1
		FR2-Group-S6	165	1	13	.12	44	0	10	13
		FR4-Self-S5	23	0	63	.00	5	0	2	3
Dyad 3	S6	Baseline	196	2	47	.10	1	1	0	1
		FR2-Self-S5	152	3	11	.31	6	2	0	5
		FR4-Self-S5	107	10	3	.63	6	8	0	6
		FR8-Self-S5	121	16	15	.10	4	3	0	5
		FR16-Self-S5	94	2	40	.38	4	0	3	6
		FR2-Group-S5	219	0	24	.06	6	0	0	3
		FR2-Self-S6	210	0	0	.20	8	0	0	4
		FR4-Self-S6	172	0	19	.04	6	1	0	4
		FR8-Self-S6	123	0	55	.05	4	0	0	5
		FR16-Self-S6	50	5	128	.22	4	5	30	3
		FR-Group-S6	186	0	26	.18	4	0	3	3
		FR4 Self-S5	28	0	64	.00	1	0	0	9

TABLE II - Cont.

Average Responses Per Condition for Each Task and Feedback Mode

		Task Responses/Minute			% of Time Hold Stop Partner Switch	Feedback Responses/Minute			
	Condition	Self	Exchange	Group		Self	Exchange	Group	Prtnr.
Dyad 4 S7	Baseline	155	75	2	.02	28	24	1	4
	FR2-Self-S7	103	31	78	.02	35	8	25	3
	FR2-Group-S7	144	1	73	.00	58	3	6	4
	FR2-Self-S8	257	0	1	.00	79	1	0	4
	FR4-Self-S8	256	15	0	.01	72	3	1	6
	FR8-Self-S8	178	37	1	.15	30	3	1	8
	FR16-Self-S8	178	29	0	.09	14	3	0	3
	FR16-Self-S7	33	4	160	.01	4	5	13	2
	FR16-Self-S8	214	3	23	.00	12	1	3	1
	FR2-Group-S8	238	0	7	.03	78	0	2	17
	FR2-Self-S8	219	23	0	.00	35	1	0	5
	FR4-Self-S8	218	28	0	.01	49	3	0	1
	FR8-Self-S8	226	27	0	.00	69	8	0	4
	FR16-Self-S8	156	0	101	.01	8	8	7	0
	FR2-Group-S8	232	0	8	.00	88	2	1	4
	Baseline'	253	12	0	.00	79	6	0	4
Dyad 4 S8	Baseline	79	106	5	.00	62	54	1	0
	FR2-Self-S7	83	41	2	.00	55	22	1	6
	FR2-Group-S7	158	40	10	.00	88	4	0	0
	FR2-Self-S8	212	1	0	.00	17	1	0	0
	FR4-Self-S8	196	1	0	.00	63	22	1	6
	FR8-Self-S8	142	28	9	.12	76	22	2	6
	FR16-Self-S8	92	44	0	.09	36	29	0	1
	FR16-Self-S7	96	53	8	.03	18	9	16	1
	FR16-Self-S8	11	11	197	.01	5	10	48	1
	FR2-Group-S8	203	6	57	.01	09	2	3	29
	FR2-Self-S8	177	0	0	.00	86	46	1	15
	FR4-Self-S8	106	34	0	.00	40	97	1	4
	FR8-Self-S8	100	37	0	.00	64	55	1	8
	FR16-Self-S8	9	63	150	.00	6	2	97	8
	FR2-Group-S8	115	52	96	.00	35	1	10	25
	Baseline'	79	101	0	.00	24	26	1	26
Dyad 5 S9	Baseline	162	0	106	.03	22	0	12	30
	FR2-Self-S9	213	0	1	.03	30	0	1	53
	FR4-Self-S9	186	0	0	.01	30	0	0	38
	FR8-Self-S9	3	0	172	.01	2	1	50	0
	FR2-Group-S9	61	0	246	.01	6	0	8	6
	FR4-Group-S9	2	2	185	.00	1	0	54	2
	FR8-Group-S9	204	0	10	.45	53	1	3	16
Dyad 5 S10	Baseline	69	0	7	.00	17	1	4	0
	FR2-Self-S9	197	0	0	.00	43	1	0	0
	FR4-Self-S9	165	0	0	.00	43	0	0	0
	FR8-Self-S9	0	1	93	.02	2	0	23	0
	FR2-Group-S9	92	0	18	.01	21	0	23	6
	FR4-Group-S9	3	0	81	.01	1	1	37	1
	FR8-Group-S9	79	0	9	.61	30	0	2	8

TABLE 11 - Cont.

Average Responses Per Condition for Each Task and Feedback Mode

			Task Responses/Minute			%Time Hold Stop Partner Switch	Feedback Response/Minute			
		Condition	Self	Exchange	Group		Self	Exchange	Group	Prtnr.
Dyad 6	S11	Baseline	205	0	0	.08	216	2	5	9
		FR2-Self-S11	171	8	0	.17	140	8	15	14
		FR4-Self-S11	80	61	4	.46	54	32	2	12
		FR2-Exchange-S11	19	85	104	.28	8	68	9	6
		FR4-Exchange-S11	107	14	134	.24	104	11	12	4
		FR2-Self-S12	205	19	77	.03	253	2	2	6
		FR4-Self-S12	236	53	57	.01	243	4	1	11
		FR8-Self-S12	200	140	20	.02	225	23	2	3
		Baseline'	204	87	16	.00	230	7	4	6
	S12	Baseline	164	2	0	.01	176	1	0	3
		FR2-Self-S11	192	10	0	.03	170	7	0	3
		FR4-Self-S11	100	74	1	.21	89	62	1	10
		FR2-Exchange-S11	18	117	18	.15	10	103	7	4
		FR4-Exchange-S11	88	29	30	.03	65	25	18	2
		FR2-Self-S12	146	2	5	.01	117	3	3	3
		FR4-Self-S12	153	4	2	.00	125	6	1	2
		FR8-Self-S12	45	88	2	.00	24	54	4	4
		Baseline'	169	20	0	.00	113	9	0	7
Dyad 7a	S14	Baseline	215	9	56	.03	96	5	17	11
		FR2-Self-S14	95	110	93	.23	46	22	31	7
		FR2-Exchange-S14	64	144	77	.02	54	49	34	3
		FR4-Exchange-S14	104	64	83	.00	69	40	31	5
Dyad 7	S15	Baseline	178	4	2	.10	47	3	1	4
		FR2-Self-S14	80	109	23	.15	15	21	1	3
		FR2-Exchange-S14	36	162	5	.01	12	53	2	0
		FR4-Exchange-S14	45	176	6	.05	17	71	4	1
	S13	Baseline	152	135	73	.01	108	21	12	1
		FR2-Group-S13	160	157	6	.04	145	43	9	4
		FR2-Exchange-S13	197	156	0	.00	113	19	0	3
		FR4-Exchange-S13	242	111	1	.03	125	6	1	9
		FR8-Exchange-S13	294	161	1	.03	170	3	0	4
		FR16-Exchange-S13	221	34	154	.02	65	2	47	4
Dyad 7	S14	Baseline	87	119	72	.00	19	19	12	1
		FR2-Group-S13	158	136	22	.00	71	56	4	0
		FR2-Exchange-S13	184	153	0	.01	62	46	0	0
		FR4-Exchange-S13	209	113	0	.00	64	46	0	0
		FR8-Exchange-S13	207	134	0	.00	68	53	0	0
		FR16-Exchange-S13	192	42	5	.00	72	14	6	0

Self-Group Alternations: Dyads 1-5. In dyad 1, the FR4 for Subject 1's group counter decreased both subjects' responses to the group mode and increased their responses to the self mode. This pattern reversed at FR8 for Subject 1's self mode. Similar response switches from group to self to group occurred during the FR2 for Subject 2's group and self modes.

Members of dyad 2 switched from self to group and back to self during Subject 3's FR4-self and FR2-group. This also occurred during Subject 4's FR4-self and FR-2-group, though less evident for Subject 3.

Higher ratios were necessary to reverse dyad 3's patterns. At Subject 5's FR16-self and FR2-group, both subjects' responses decreased for self, increased for group, and then reversed. These changes occurred again during Subject 6's FR16-self and FR2-group.

Dyad 4 presented interesting results. The FR2 for Subject 7's self followed by an FR2 for his group first decreased and then increased his self responses, but only increased his group responses. During Subject 8's first FR16-self, both subjects continued working for self. When the same ratio was reinstated for Subject 7's self, Subject 7 switched to group responding. Subject 8 also switched when the FR16 was re-established for his self counter. During Subject 8's R2-group, both subjects responded individually. When Subjcet 8's self ratio reached FR16 for the third and last time, both subjects increased their group responses. The final FR2 for Subject 8's group restored individual responding. During the A' condition, no FR schedule was in effect and individual responding maintained.

In dyad 5 Subject 9's FR8-self increased group and decreased self responding for both subjects. Subject 9's FR8-group restored individual responding and reduced group responding for both subjects.

Self-Exchange Alternations: Dyads 6 and 7a. Fixed ratio schedules for dyads 6 and 7a alternated between the self and exchange (work for partner) modes. For dyad 6, an FR4 for Subject 11's self and exchange counters switched responding from self to exchange and back to self. An FR8 for Subject 12's self followed by an FR1 (A') for all three modes switched patterns from self to exchange and back to self.

In dyad 7a, FR manipulations only occurred for Subject 14. At an FR2 for Subject 14's self, both subjects' switched from self responding to exchanging points. At an FR4 for Subject 14's exchange counter, Subject 14 increased his self responding and decreased his exchange responses. Subject 15's response levels remained unchanged.

Group-Exchange Alternations: Dyad 7. In Dyad 7, manipulations only occurred for Subject 13. At an FR2 for Subject 13's group counter, both subjects decreased their group responding and Subject 13 increased his exchange responses. At FR16 for Subject 13's exchange counter, both subjects decreased their exchange responses and increased their group responses (although Subject 14's increase was slight).

Feedback Responses to Manipulated Modes

Figure 3 presents data on each subject's light switch presses to the different counters. The light switch responses to the self, exchange, partner, and group counters are referred to as self feedback, exchange feedback, partner feedback, and group feedback respectively.

In general, task response changes were matched by corresponding changes in the related feedback responses. For example, a decrease in self task responses usually was accompanied by decreases in the light switch responses to the self counter, self feedback.

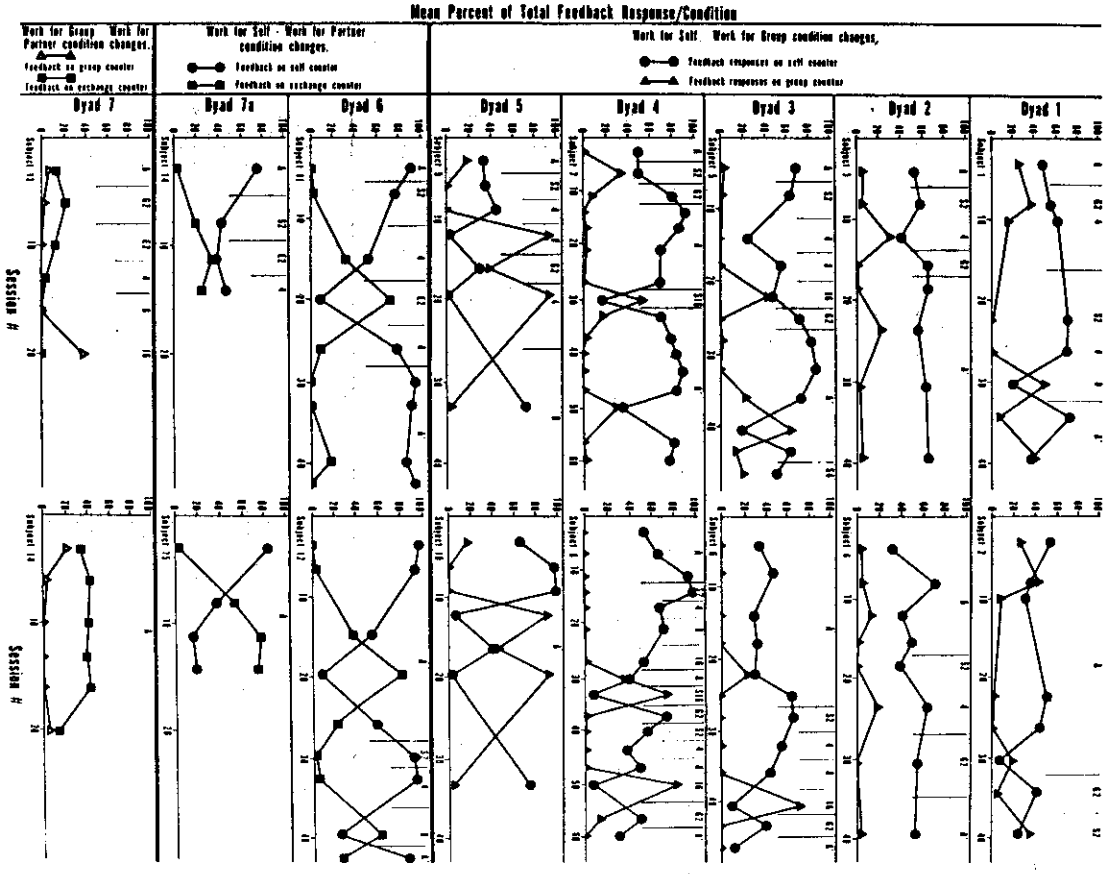


Fig. 3. Each subject's mean percent of total feedback responses (per FR condition) on the manipulated modes during FR schedules for the self and group modes, dyads 1-5; self and exchange (work for partner) modes, dyads 6 and 7a; and exchange (work for partner) and group modes, dyad 7. Headings for each of the 16 graphs identify response modes as "S" for self, "G" for group, and "E" for exchange, with the subsequent numbers as "2" for FR4, "8" for FR8, and "16" for FR16. For example, S2 indicates an FR2 schedule on the self mode. During A and A' conditions, no FR schedule was in effect for any mode.

Task Responses to Control Modes

Table III presents the mean proportion of total responses distributed on the remaining response modes (for which FR1 schedules were in effect.). Exchange (work for partner) was the control mode for dyads 1-5, group was the control for dyads 6 and 7a, and self was the control for dyad 7. In general, task response to the control modes did not change systematically with the fixed ratios of the manipulated modes.

TABLE III

Mean Proportion of Total Responses Per Condition

RESPONSE MODE	Dyad #	Subject #	Condition #															
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
Work for Partner	1	S1	.08	.05	.23	.21	.13	.33	.11	.27								
		S2	.06	.03	.19	.16	.12	.25	.29	.25								
	2	S3	.01	.00	.01	.00	.02	.00	.04	.07								
		S4	.00	.04	.14	.00	.05	.00	.00	.11								
	3	S5	.00	.01	.08	.04	.00	.00	.00	.01	.00	.03	.00	.00				
		S6	.00	.01	.08	.10	.01	.00	.00	.00	.00	.02	.00	.00				
	4	S7	.32	.14	.00	.00	.05	.17	.14	.02	.01	.00	.09	.11	.10	.00	.00	.04
		S8	.55	.32	.19	.00	.00	.15	.32	.33	.05	.02	.00	.24	.27	.28	.19	.56
	5	S9	.00	.00	.00	.00	.00	.01	.00									
		S10	.00	.00	.00	.01	.00	.00	.00									
Work for Group	6	S11	.00	.00	.02	.50	.52	.25	.16	.05	.20							
		S12	.00	.00	.00	.11	.20	.03	.01	.01	.01							
	7a	S13	.20	.31	.27	.33												
		S15	.01	.10	.02	.02												
Work for Self	7	S13	.42	.49	.55	.68	.64											
		S14	.31	.50	.57	.64	.60											

Feedback Responses to Control Modes

Similarly, feedback responses to the control modes did not vary systematically with the FR changes. A review of the data in figure 4 demonstrates the absence of a uniform pattern across subjects. The figure presents data on the feedback to counters which tabulated points received from partner for dyads 1-5; points earned from group responses for dyads 6 and

7a; and points earned for self for dyad 7. In addition, each graph shows the feedback responses to partner's self counter scores.

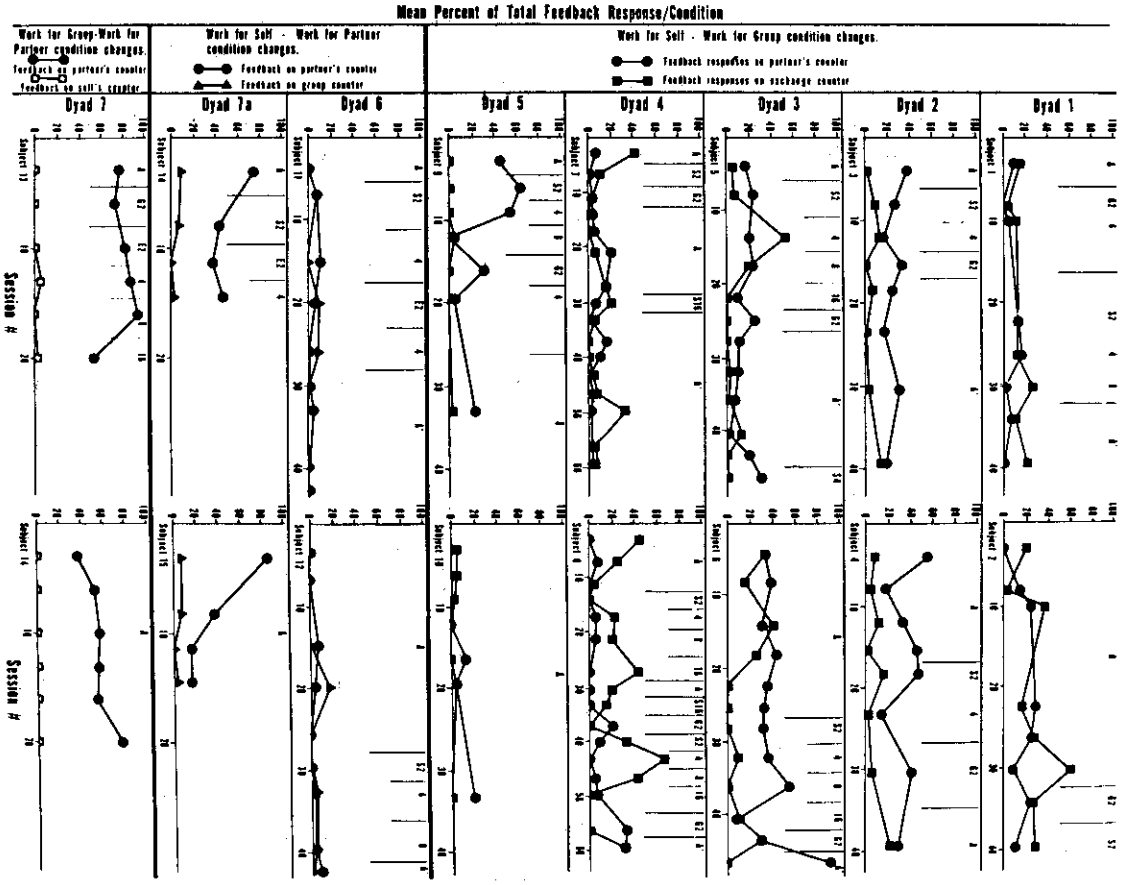


Fig. 4. Each subject's mean percent of total feedback responses (per FR condition) on the control modes when FR schedules were not in effect for the exchange mode, dyads 1-5; group mode, dyads 6 and 7a; and the self mode, dyad 7. Each graph also presents the subjects' feedback responses to partner's self counter (feedback on partner). Headings for each of the 16 graphs identify response modes as "S" for self, "G" for group, and "E" for exchange, with the subsequent numbers as "2" for FR2, "4" for FR4, "8" for FR8 and "16" for FR16. For example, S2 indicates an FR2 schedule on the self mode. During A and A' conditions, no FR schedule was in effect for any mode.

Task and Feedback Response Relationships

Data on the relationship between task and feedback responses indicated a positive correlation between responses that produced counter points and feedback responses (light switch responses) that allowed access to the point scores presented on the counters. Generally, as task re-

sponses to a given mode decreased (as a result of an FR schedule on that mode), a decrease also occurred in feedback responses to that counter. Similarly, increases in task responses were matched by increases in related feedback responding. When self responses increased and then decreased through several FR changes, self feedback similarly increased and then decreased. For example, in dyads 1-5, the self schedules FR2, 4, 8, or 16 produced decreases in both *task* and *feedback* responses on the self counter.

The correlations between task responses and counter scores for all subjects and across all conditions were .63 and .61 for the cooperative and exchange modes respectively. Both were significantly higher than the .40 for the self mode and the .27 for the partner mode. All correlations were significant from zero (at .05 level of confidence).

Holding Responses to Manipulated and Control Modes

For both task and feedback responses subjects pressed and then released a button switch to tabulate a counter point or illuminate a light situated above a counter. For two modes, however, subjects pressed and held down their switches either in coordination with partner to tabulate points on the group counter or in opposition to partner to prevent him from earning points on his self counter. Figure 5 presents the mean percent of time per condition that each subject held down the group and stop partner switches.

The holding data for dyads 1-5 suggest a relationship between the FR-self schedules and the percent of time subjects held down their group switch. Generally, increases in the FR-self schedule also increased the time spent holding, while increases in the FR-group schedules produced the opposite effect. Subject 12 in dyad 6 increased his holding proportions when Subject 11's exchange schedule increased to FR2 and FR4. Subject 15 in dyad 7a increased his holds when Subject 14's exchange schedule increased to FR2 and FR4. Subject 14 in dyad 7 increased his holds during Subject 13's FR-16-exchange.

Also, there were differences between pressing and holding patterns across groups. While some members distributed their holding responses equally (e.g., Subject 7 with an average of 11.25% and Subject 8 with an average of 11.75% across conditions), others consistently held for longer proportions: Subject 1 more than Subject 2 in dyad 1; Subject 4 more than Subject 3 in dyad 2; Subject 5 more than Subject 6 in dyad 3; Subject 10 more than Subject 9 in dyad 5; and Subject 14 more than Subject 13 in dyad 7. Other members did not hold at all (Subject 11 in dyad 6 and Subject 14 in dyad 7a).

Holding down the stop partner button switch prevented points from accumulating on partner's self counter. These data, also presented in figure 5, show a correspondence between self and partner's responses. When self's proportions increased, partner's increased also. This was evident

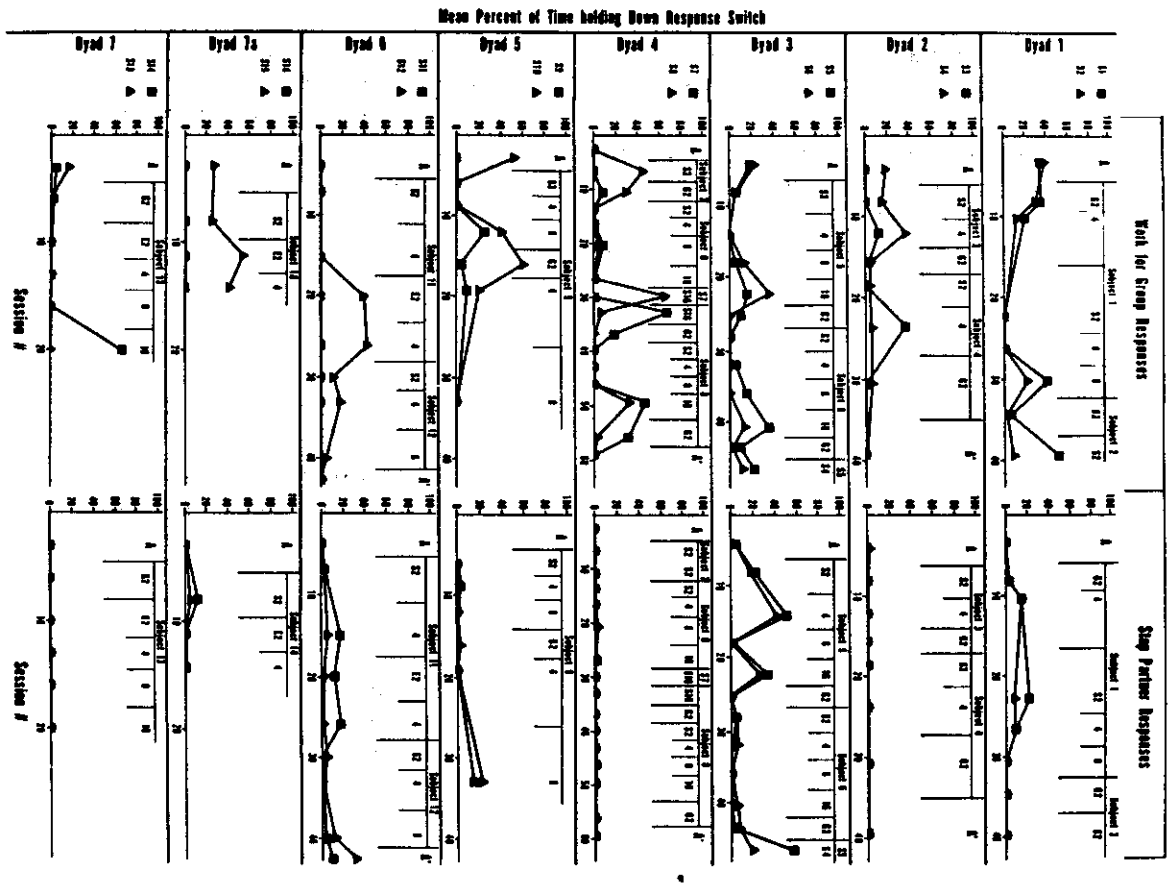


Fig. 5. Each subject's mean percent of time holding down the group response switch, left set of graphs, and the stop partner response switch, right set of graphs, during the FR schedules for the self and group modes, dyads 1-5; the self and exchange modes, dyads 6 and 7a; and the exchange and group modes, dyad 7. Headings for the 16 graphs identify each subject's FR schedule for the three modes as "S" for self, "G" for group, and "E" for exchange, with the subsequent numers as "2" for FR2, "4" for FR4, "8" for FR8 and "16" for FR16. For example, S2 indicates an FR2 schedule on the self mode. During A and A' conditions, no FR schedule was in effect for any mode.

for dyads 1, 3, 5, 6 and 7a. Dyads 2, 4 and 7's use of the stop partner switch was negligible through all conditions.

One event that may have promoted use of this switch was the onset of the FR ratios. This occurred in dyads 1, 3, 5, 6 and 7a when the proportions increased for both subjects, for example, at FR2-group for dyad 1; FR2-self for dyad 3; FR4-self for dyad 5, and FR2-self for dyads 6 and 7a.

Task Response Mode Relationships

The data on subject and partner's use of stop partner switch suggest that when subject held, partner also held. Similar findings were recorded for other modes. In some instances, when subject discontinued working for self because of an increased FR schedule for that mode, partner also discontinued working for self in favor of the chosen alternative (dyads 1-5). The same pattern occurred when subject commenced work on the exchange mode. Partner also commenced work on that mode (dyads 6 and 7a). A different correspondence occurred for the group mode. Although subjects typically chose to work the group mode at the same time as their partner, they distributed their responses differently, with one pressing repeatedly and the other holding down his switch.

The Pearson's r's for subject and partner's responses to the self, exchange, and stop partner modes were .67, .83, and .85 respectively, (all significant from 0 at the .001 level). This did not obtain for the group mode, ($r = .09$), possibly because the work was divided between pressing and holding.

Verbal Interactions during Baseline and Change Conditions

During the sessions subjects talked with each other while working to earn points. These conversations were tape recorded and the contents analyzed. The categories of verbal content included: 1) verbalizations requesting information about points for self, points for self's partner, or points for the group; 2) verbalizations designating which mode to work, e.g., "for ourselves", "for myself", "for yourself", "to each other", "to me", "to you", "for us", "on group", "to both", or "together"; 3) verbalizations that compared earnings or concluded about the status of one's earnings such as "I have more", "I won", or "I have enough"; and 4) verbalizations not included in these categories.

Two data recorders independently analyzed the recordings for all subjects during the baseline conditions and during the FR schedules that altered both dyad members' response choices. The Robinson's Coefficient or Agreement for these observations was .99 (Robinson, 1957).

Summary data for all subjects combined indicated that category IV statements, which were verbalizations unrelated to the task of earning points, were at the highest percent levels during the baseline conditions (45.8) and increased to 53.5% during the change conditions. The second highest content category was comparison statements, which decreased from the 35.0% during the baselines to 27.5% during the change conditions. Statements concerning point distribution choices and requesting point information were at the lowest levels, 9.6% and 9.4% respectively. During the change conditions, these values fluctuated slightly, with a decrease to

6.3% for requests for point information and an increase to 11.9% for statements regarding point distribution choices.

DISCUSSION

In this study complex cooperation procedures deviated from those employed in previous investigations by 1) increasing the alternatives to include individual, exchange, and cooperative response options, 2) measuring feedback responses to point scores tabulated on each mode counter, and 3) manipulating response requirements for social or nonsocial modes for one dyad member, thereby allowing for the study of interpeer influence effects.

During the FR manipulations for single dyad members, both subjects typically commenced working at higher rates on an alternative mode for which no FR schedule was in effect. The schedules producing these changes varied from group to group and from mode to mode within each dyad. Table IV lists the FR schedules that resulted in response switches.

TABLE IV

Summary of FR Schedules That Produced Switches Between Response Modes

		RESPONSE MODE		
Dyad #	Subject #	Work For Self	Work For Group	Work For Partner
1	S1	FR8	FR4	---
	S2	FR2	FR2	---
2	S3	FR2	FR2	---
	S4	FR4	FR2	---
3	S5	FR16	FR2	---
	S6	FR16	FR2	---
4	S7	FR2	FR2	---
	S8	FR16	FR2	---
5	S9	FR8	FR8	---
	S10	---	---	---
6	S11	FR4	---	FR4
	S12	FR8	---	FR1
7a	S14	FR2	---	FR4
	S15	---	---	---
7	S13	---	FR2	FR16
	S14	---	---	---

One difference between the three modes was that FR2, 4, 8 and 16 schedules were more evenly distributed for the self than for the group mode, which had a disproportionately higher number of FR2's. This could mean that higher ratios were necessary to alter patterns already established on the self mode. Data for the exchange mode were less clear as only four subjects worked on FR schedules for that mode. Additional research will be necessary to confirm the conclusions suggested here.

Findings that related task and feedback responses indicated that fluctuations in task responses were matched with similar increases or decreases in corresponding feedback responses. These relationships were evident across all subjects and conditions, and were reflected in positive correlations between feedback rates and counter scores. This suggested that subject and partner's feedback on the manipulated modes were a function of partner's reinforcement contingencies. As task response frequencies decreased for a manipulated mode and increased for an alternative mode, the corresponding feedback responses similarly varied in that pattern.

A third set of findings summarized relationships between subject and partner's task responses to the same mode. As previously reviewed, increases in one member's responding to an alternative mode resulted in corresponding increases in partner's responses to that mode. Correlational data across all subjects and conditions supported this with significant positive correlations for the self, exchange, and stop partner modes. The insignificant correlation for the cooperative mode may have resulted from subjects dividing labor between pressing and holding.

Finally, an analysis of the subjects' verbal interactions indicated that the largest proportions of conversation topics concerned matters unrelated to the button press task. This proportion increased from baseline to the change conditions. The second largest category was point comparison statements which decreased from baseline to the change condition. The remaining categories of requests for point information and directions about response choices comprised proportions of 11% or less, with changes from baseline of 3% or less. The role of verbal interaction in the influence process has yet to be clearly defined. These data do little more than suggest that verbal responses fluctuate less systematically than feedback or task responses during influence effects.

In conclusion, the findings of this study specified conditions under which one subject's reinforcement contingencies affected another's response choices. The influence process was not measured directly, but rather inferred from the effects anticipated if influence occurred. The conditions that promoted influence were reductions in subject's reinforcement outcomes on one mode, which, in comparison, made alternative modes more reinforcing. The influence effects observed were: 1) task response variations for both members in accordance with subject's reinforcement contingencies; 2) feedback response variations for both members which co-

rresponded to task response changes; and 3) task response switches from a social mode to another social mode for both members of dyad 7, from a social mode to a nonsocial mode for the members of dyad 1, and from the nonsocial to a social mode for all members of the remaining six dyads. The FR schedules employed ranged from FR2 to FR16 for the self mode, FR2 to FR16 for the group mode, and FR1 to FR16 for the exchange mode.

Interpeer influence is one of several classes of interpersonal relations in which the behavior of one person affects the behavior of another. The conditions producing this pattern require that one person's reinforcement be increased or maintained through the actions of another. Typically in exchange studies, one person's responses reinforce another, whose responses in turn reinforce the first. Here, both members are interested in the exchange. In cooperation studies, both persons respond to obtain reinforcers for both, and, in some instances, mutual interests are served by working cooperatively rather than alone. In this study, the interests of one dyad member were restored by working alone, by exchanging with partner, or by working jointly with partner. In the first situation when subject earned less working socially than alone, he could restore his earning power simply by discontinuing work with partner (in either the exchange or cooperative mode). In the second and third situations when subject earned less working alone than working with partner, he could restore his earning power by getting partner to exchange or cooperate. Self's persuasiveness in this regard could be increased through use of the stop partner switch, which prevented partner from earning points on the self mode and made his social modes more attractive.

Under these conditions all dyads demonstrated an influence effect in which partner's response choices become a function of subject's reinforcement contingencies. However, the variables effective in the influence process were less evident. Some subjects, for example, may have employed the punish button, or threatened its use if partner did not comply with subject's requests for help. There were some data to suggest that use of the punish button increased during the beginning FR manipulations or when schedules were applied to the self mode (dyads 1, 3, 6 and 7a). This was not a universal pattern, however, as some dyads declined use of the punish option entirely and the influence effect still obtained (dyads 2, 4 and 7). Clearly, there were alternatives for obtaining partner's compliance. Subject may have promised a favor or threatened with a punisher following the session. Or, he may have simply described his problem (that he was earning less than before) and partner volunteered to help, i.e., to change to another mode. Further reaserch is necessary to acount for the types of methods subjects employ to obtain another's compliance. Both verbal and nonverbal responses may be important. In the absence of associated verbalizations, use of the punish option constituted a nonverbal method. Pouting, sulking, and refusing to work could be other ways of communicating one s plight.

Possible investigations stemming from these considerations include manipulations of the availability of the punish option as the focal subject's need for assistance increases. When subject's independent reinforcement outcomes are reduced and his outcomes mediated by partner thereby increased, availability of the punish option may affect partner's compliance. This option may be more effective in some dyads than others. For some dyads subject may obtain partner's compliance in the absence of a stop partner option.

A second variable possibly affecting influence outcomes is the availability of information on counter scores. Limiting access to self or partner's scores for the self mode, for example, migth impede the influence process .As FR schedules increase for the self mode, self may respond to the increasing decrements more slowly and less effectively than when partner's score is available for continuous comparisons. Similarly for increased FR schedules on a social mode, self may continue exchanging or joint responding if counter scores are not accesible. In future research, the effects of feedback availability might be evaluated for different FR treatments when access to counter scores is manipulated experimentally. Given that access to information affects influence outcomes, how much information is sufficient for influence effects to obtain? In a study on the development of competition in dyads (Mithaug, 1973), the mere presence or absence of feedback affected both task and feedback responses during a competitive contingency. In another study the presence of partner's score during parallel work increased self's feedback on his counter scores (self audits), (Hake, Vukelich, & Kaplan, 1973).

Finally, the merits of manipulating contingencies for a single dyad member should be considered in future investigations. When one member's reinforcement outcomes change relative to previous levels while partner's outcomes remain constant, a condition of inequality emerges with one member earning more than the other. This situation is different from conditions in which members experience similar decrements and, overtime, can work with or for each other to restore earning levels.

The theoretical significance of investigating social relations through single subject manipulations is that the resulting relation may be inequitable and imbalanced. Burgess and Nielsen (1974) conducted a series of experiments to investigate conditions under which actors engaged in equitable or inequitable exchanges. By reducing self's exchange or individual outcomes relative to his partner and by providing partner with reinforcing alternatives, the experimenters produced conditions of inequity and imbalance. A relation was inequitable when self's input-outcome ratio did not match his partner's, and relations were imbalanced when the magnitudes, rate, or alternative sources of reinforcement were unequal. The results indicated that exchange probalities were a function of the relative value of the resources being exchanged and the value of the al-

ternatives to the exchange relation. These data assisted in the authors' assessments of equity and power theories, suggesting that actors will continue exchanging during inequitable relations when the alternatives to the exchange are less reinforcing.

In the present study, actors participated in both inequitable and imbalanced relations to the extent that: 1) self's input-outcome ratio was less than partner's, and 2) partner had greater reinforcement alternatives than self. For all groups, equity eventually was restored when partner's response patterns became a function of self's reinforcement contingencies. The degree to which balance in the relation was altered depended upon self's use of punish button. By preventing partner from earning reinforcers independently, self limited partner's alternatives to those available to himself, the social modes. This, in effect, balanced the relationship during the FR-self conditions. Use of the punish button could alter a condition from imbalance to balance and, as a consequence, return the relation to equity.

While one focus of equity and power theories has been to explain why actors continue in a relation or disrupt the pattern in favor of a more attractive one, these findings underscore an equally viable alternative, restoring a relation to equity and balance. Data from this study suggest that although subjects endured inequitable and imbalanced relations for extended periods, e.g., during session sequences of FR2, 4, 8 or 16, eventually their response patterns changed and equity was restored. Burgess and Nielsen similary found that when given the option, actors worked to restore equity and balance in their exchanges.

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