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ABSTRACT

This document consists of a series of papers which describe components of a systematic research and development program at the Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH). The presentations focus upon: (1) the development and use of a social interaction recording system supplying the major dependent measures used for screening appropriate socially withdrawn and aggressive children and evaluating treatment variables; (2) comparative data on the efficacy of various treatment components tested in a tightly controlled experimental classroom and the less rigorous regular classroom setting; (3) followup data in the regular classroom for children previously placed in the experimental classroom setting; and (4) problems associated with the early identification of socially withdrawn children in preschool. Studies presented are: The Peer Interaction Recording System; Manipulating Peer Social Interactions Within an Experimental Classroom Setting; Normative Peer Interaction Rate as a Baseline for Followup Evaluation; Increasing Interactive Behavior of Withdrawn Children in the Regular Classroom; and Validating Teacher Selection with Normative Data for Preschool Social Interaction. (Author/MS)

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Symposium

Systematic Analysis of Social Interaction: Assessments and Interventions

Hyman Hops, Chairperson

University of Oregon

Papers

Introduction

Hyman Hops

The Peer Interaction Recording System

Bobbi Garrett, Hyman Hops, Nancy M. Todd and Hill M. Walker

Manipulating Peer Social Interactions Within an Experimental Classroom Setting

Nancy M. Todd, Hill M. Walker, Charles R. Greenwood and Hyman Hops

Normative Peer Interaction Rate as a Baseline for Follow-up Evaluation

Annabelle Street, Hill M. Walker, Charles R. Greenwood, Nancy M. Todd and Hyman Hops

Increasing Interactive Behavior of Withdrawn Children in the Regular Classroom

Diane Hernandez Fleischman, Hyman Hops and Annabelle Street

Validating Teacher Selection with Normative Data for Preschool Social Interaction

Charles R. Greenwood, Hill M. Walker, Nancy M. Todd and Hyman Hops

Presented at the 84th Annual Meeting of the American Psychological Association
Washington, D.C.

PS 009 259

Systematic Analysis of Social Interactions:

Assessment and Intervention

Hyman Hops, Chairperson

Introduction

The ability to initiate and maintain positive social interactions with others is considered by many to be an essential developmental achievement. Social interactions provide opportunities for children to learn and perform social skills that may critically influence their later social, emotional, and academic adjustment. For ecample, cooperative behavior can be positively influenced by social interaction (Cook & Stingle, 1974). Further, popularity with peers has been shown to be related to academic performance, predictive of early school dropout (Hartup, 1970).

Positive social interaction may be adversely affected by (1) deficiencies in a child's behavioral repertoire, e.g. low rates of initiating to peers or (2) excesses of an incompatible behavior, e.g. high rates of aggressive initiations. Both excesses and deficiencies can be considered to be handicapping conditions. This may be especially true for primary grade children when the peer group begins to take on greater influence. Additionally important is the fact that children's interactions with peers are reciprocal in nature. Charlesworth and Hartup (1967) found that the amount of positive reinforcement received from peers was highly correlated with the amount given. Rejection, as determined by sociometric data, was highly correlated with negative reinforcement (Hartup, Glazer, & Charlesworth, 1967). Thus, children who withdraw from social interactions or who display relatively high rates of negative social behaviors are not likely to be responded to positively by their peers. The lack of responsiveness by the peer group may have profound implication for a child's later social and academic achievement.

In the last decade, there has been an increasing concern with the development of remediation techniques for the problem of social withdrawal. The majority of the studies reported in the literature have focused upon a precise demonstration of the impact of one or more independent variables. Early studies in this area investigated the effects of contingent adult attention upon the social behavior of low interacting preschoolers (Allen, Hart, Buell, Harris, & Wolf, 1964; Buell, Stoddard, Harris, & Baer, 1968). Subsequent research has examined more complex procedures including token systems (Clement & Milne, 1967; Walker & Hops, 1973), symbolic modeling (O'Connor, 1969, 1972), the use of peers as therapeutic agents to facilitate social interaction (Kirby & Toler, 1970; Wahler, 1967; Walker & Hops, 1973), coaching (Oden, Asher, & Hymel, Note 1), and the generalization of interaction skills (Cooke & Apolloni, 1976; Strain, Shores, & Kerr, 1976). So far, the impact of this research on total number of children involved in reports of intervention techniques has been exceedingly small with few replications across subjects or experimenters.

The socially aggressive child has also received considerable attention in the educational setting (Patterson, 1974; Patterson, Cobb, & Ray, 1972; Walker, Hops, & Feigenbaum, 1976; Walker, Mattson, & Buckley, 1971). Generally, the nature of the intervention technology has focused on the reduction of disruptive classroom behavior by making reinforcement contingent upon incompatible task-oriented behavior (Hops, Beickel, & Walker, Note 2). The primary social relationship affected by these intervention strategies has been that of the student-teacher with peers playing a supportive but secondary role (O'Leary & O'Leary, 1976). Unfortunately, much less attention has been paid toward directly improving the socially aggressive child's positive interactions with peers (Strain, Shores, & Kerr, 1976). A systematic and sustained programmatic effort has simply not engaged this problem.

Behavioral Management Packages

The development of a behavioral technology has advanced to a point where it is feasible to develop and evaluate "packaged" behavior management programs intended for use by relatively untrained "mediators," e.g. parents, teachers, in the natural setting. These social agents (Patterson, McNeal, Hawkins, & Phelps, 1967) stand in key positions in the social milieu to provide cost effective, direct services to target subjects in need of behavioral change, e.g. students, delinquents, families. Examples of such innovations in behavioral technology are represented by the following recently developed treatment programs: (a) the Achievement Place model -- The Teaching Family Handbook (Phillips, Phillips, Fixsen, & Wolf, 1972), a program for the residential treatment of children with delinquent behaviors; (b) the Oregon Research Institute's social learning model for the treatment of the aggressive child in the home and school -- A Manual for the Professional Who Trains Parents to Manage Aggressive Children (Patterson, Conger, Jones, & Reid, 1975); (c) Exceptional Teaching: A Multi-Media Training Package developed by Owen White and Norris Haring of the Univesrity of Washington for training teachers in the precise measurement and programming of child behavior in the classroom; and (d) two programs developed at the Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH) -- the CLASS Program (Hops, Beickel, & Walker, Note 2), a program for children with acting-out behavior in the school setting, and the PASS Program (Greenwood, Hops, Delquadri, & Walker, Note 3), a group behavior management program for study and work skills during academic instructional periods.

As mentioned, these "packaged" behavioral programs contain not only the basic intervention procedures required to successfully change the target subjects' behavior but also procedures for training the mediator in the correct

implementation of the treatment program (Tyler, 1973). These programs are often the result of several years of research and developmental work which document the effectiveness of the program's use (Cobb & Hops, 1973; Greenwood, Hops, Delquadri, & Guild, 1974; Patterson, 1974; Phillips, Phillips, Fixsen, & Wolf, 1971; Walker & Hops, 1976; Hops & Beickel, Note 4; Hops, Walker, & Fleischman, Note 5).

The Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH)

The Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH) has as its primary goal the development and delivery of standardized treatment and assessment packages for homogeneous subgroupings of behaviorally handicapped children in the regular classroom. Via a three-stage program, significant treatment variables are (a) identified and functionally analyzed in an experimental classroom setting, then (b) packaged and adapted for use in regular classrooms by teachers working with a CORBEH teacher consultant, and finally (c) tested in several school districts to evaluate the package's effectiveness when implemented by local school personnel trained in the role of teacher-consultant.

In Stage I, behavioral assessment instruments, culminating in behavioral observation procedures, are first developed. Initial investigations are next carried out with children identified as being representative of a specific behavioral subgrouping, e.g. acting-out, social withdrawal. Then, intensive studies are conducted in an experimental/demonstration classroom setting to determine the relevant variables involved in remediating the problem behaviors and teaching the children more effective and appropriate ones.

In Stage II, the effective treatment techniques are incorporated into treatment package in the form of procedural manuals and adapted for use within

the regular classroom setting. Studies are carried out on issues related to the delivery and implementation of the specific procedures. At this level, the package is implemented via a teacher-consultant and practical problems associated with the training of teachers, programming maintenance of behavioral changes, and the withdrawal of the consultant are examined.

Stage III research answers fundamental questions related to the adequacy of the final package and its adoption for widespread use. Reliable procedures are developed to train a variety of consulting school personnel to implement the packages effectively.

CORBEH is currently developing two specific intervention packages for children who are socially withdrawn and socially aggressive in relation to their peers. In a third area, a cost effective screening/assessment instrument for social interaction assessment is also being developed. The programs and instruments are being designed for use by consulting school personnel who work with children and teachers to implement the techniques. The interventions take place in the regular primary grades so as to increase the probability of each child's continued success and survival in the educational mainstream.

The series of papers presented in this symposium illustrate a systematic research and development program involved in the first two stages of CORBEH's research. The presentations focus upon:

1) The development and use of a social interaction recording system supplying the major dependent measures used for screening appropriate socially withdrawn and aggressive children and evaluating treatment variables.

2) Comparative data on the efficacy of various treatment components tested in (a) the tightly controlled experimental classroom and (b) the less rigorous regular classroom setting.

3) Followup data in the regular classroom for children previously placed

in the experimental classroom setting.

4) Problems associated with the early identification of socially withdrawn children in the preschool.

The Peer Interaction Recording System

Bobbi Garrett, Hyman Hops, Nancy M. Todd and Hill M. Walker

Paper Presented as part of the Symposium,
Systematic Analysis of Social Interactions:
Assessments and Interventions

Hyman Hops, Chair

At the 84th Annual American Psychological
Association Convention, Washington, D.C.
September 3-7, 1976

The Peer Interaction Recording System

Bobbi Garrett, Hyman Hops, Nancy M. Todd and Hill M. Walker

The purpose of this paper is to describe a two level coding system for recording the social behavior of children in classroom settings. The system was developed as part of CORBEH's ongoing efforts to develop treatment programs for socially withdrawn and socially aggressive children.

The observational assessment of social behavior differs in several important respects from the assessment of academically related behavior (Minkin, Braukmann, Minkin, Timbers, Timbers, Fixsen, Phillips and Wolf, 1976). For example, very precise rules usually govern the appropriateness or inappropriateness of academically related behaviors such as attending to task, listening to instructions and complying with teacher directives and commands. On the other hand, socially interactive behavior occurring among peers is usually characterized by a lack of externally imposed rules designed to regulate or control it. At best such rules are vaguely defined and serve only to control the more obvious forms of socially inappropriate behavior such as physical aggression.

Academically related behavior occurs under highly structured conditions where it is possible to quantify and observe antecedent variables that may control academic responding. Interactive social behavior usually occurs within playground or free play setting where it is extremely difficult to identify antecedents that control subsequent interactive behavior.

A comparison of the respective characteristics of academically related versus social behavior suggests that social behavior is (a) more complex (b) usually occurs at a higher rate (c) is more difficult to relate to controlling antecedent

stimului (d) is more variable overtime and (e) is less subject to control and regulation via externally imposed rules. As a result, efforts to assess social behavior using observational systems often suffer from the absence of a standard of criterion for judging its appropriateness in terms of level or quantity.

The intent of this paper will be not only to describe two observation codes for social interactive behavior, but to demonstrate the use of normative peer observation data (Walker & Hops, 1973) recorded for class peers as a means for establishing criterion for evaluating interactive behavior. This data source can be used as a criterion for making decisions about identification, as a standard for judging the effectiveness of treatment designed to change the level and/or quantity of social behavior, and as a means of evaluating the impact of identifiable stimulus conditions upon social behavior.

The Peer Interaction Recording System (PIRS) (Hops, Todd, Garrett, & Nicholes, Note 6) is an observation procedure for recording social interactive behavior in a classroom setting. The PIRS consists of two separate observation codes: a) the Individual Interaction Code (IIC), and b) the Peer Tally Code (PTC). Both codes are used simultaneously to collect data on the frequency and quality of children's interactions in the same classroom.

The Individual Interaction Code (IIC)

The IIC focuses in detail on the interactive behavior of one target subject with interacting partners. An interaction is defined as a sequence of responding between two individuals without a pause of more than five seconds between responses. A minimum of two responses is necessary to code an interaction: an initiation by one individual followed by a response to that initiation by the other. The following information is recorded on the IIC: (a) the initiator of

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Insert Figure 1 About Here

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each interaction, (b) the topography of each behavior [illegible]

nonverbal, physical), (c) the quality of the behavior (positive or negative), (d) the sequence of responses occurring within an interaction, and (e) the duration of each interaction. A more detailed description of the IIC is found in Appendix A.

Examples of the dependent measures that can be obtained include: (a) frequency and rate of interaction (positive and negative), (b) frequency and rate of response (positive and negative), (c) frequency and rate of initiation (positive and negative), (d) mean duration per interaction, (e) mean percent of time interacting per session.

Training on IIC involves approximately 40 hours. Each observer trainee reads a manual of definitions and procedures, practices recording from videotaped simulations of classroom interactions, and establishes a reliability of 80 percent or better on five consecutive trials with the observer trainer in the natural classroom setting. Throughout the course of every study, agreement checks are made regularly to reduce the probability of drift and maintain high levels of agreement (Taplin & Reid, 1973). Of 345 interobserver agreement checks made during investigations from 1973 to 1975, the mean agreement was 81 percent with a range of 44 percent to 100 percent. Agreement is determined on the sequential order of all responses, by type and by quality.

The Peer Tally Code (PTC)

The PTC is used simultaneously with the IIC to record the total number of positive and negative interactions occurring in the same classroom between all the subject's peers. During continuous five-second scans, the observer tallies each new interaction as positive or negative, using the same criteria as the IIC.

Insert Figure 2 About Here

The PTC and the IIC produce three comparative measures for the peers and the sub-

ject: (a) the frequency and rate of positive interactions, (b) the frequency and rate of negative interactions, and (c) the percent of positive interactions. Training on the PTC requires approximately four hours of practice recording in order to establish a reliability of 90 percent or better on five out of six consecutive trials. In a sample of 57 reliability checks for studies on socially aggressive children, the average percent agreement for positive, negative, and total interactions were 94 percent, 80 percent, and 93 percent, respectively.

As previously mentioned, the PIRS system can be used to make decisions about identification of socially deviant children, and to evaluate the effect of various treatment procedures on social behavior. Since the latter will be discussed in several accompanying papers (Todd, N. et. al; Street, A. et. al; Fleischman, D. et. al.), this paper will describe the screening process and identification measures used in selecting socially withdrawn and socially negative children.

Observation Procedures

Subjects were referred to CORBEH for inclusion in studies for socially withdrawn and socially aggressive children by public school teachers and counselors from school districts in and around Eugene, Oregon. For each referral, two trained observers collected data in the classroom on the interactions of the referred subject and his/her peers. Observations for selection purposes ranged from 5-10 daily observation sessions of 20-30 minutes each. Generally, observations took place during a time when the class was involved in an activity in which social interactions were likely to occur. Examples of typical "interactive" activities were art, free play, group study and projects and game time.

Screening Measures

tion rate, and percent of positive interactions collected during baseline conditions on the IIC and PTC observation codes. The means are given for three groups: (a) withdrawn subjects involved in studies from 1972-75, (b) aggressive subjects in studies from 1974-76, and (c) control subjects selected as average interactors by classroom teachers of aggressive children in studies in 1974-75.

Insert Table 1 About Here

As indicated previously socially withdrawn subjects are identified by a subject/peer discrepancy in positive interaction rates. The referral data collected on 20 withdrawn subjects and their peers from 1972 - 1975 showed an average positive interaction rate of .198 for the target subjects and .58 for their peers. The average positive interaction rates for all other subjects and their classmates ranged from .472 to .682 interactions per minute, rates 2 to 3 times higher than the average for the withdrawn subjects. These normative data appear consistent with estimates of average interaction rates for preschoolers at .627/minute reported by Greenwood, Walker, Todd & Hops, Note 7, for a sample of 457 subjects.

Figure 3 provides two examples of the withdrawn subject/peer discrepancy in screening interaction rates for children referred as socially unresponsive. Both subjects exhibited rates that were consistently lower than their peer group,

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Insert Figure 3 About Here

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with means approximately one-fourth that of the average peer.

Socially aggressive children, on the other hand, are identified by a subject/peer discrepancy in the frequency and rate of their negative interactions with

sive subjects and their peers yielded an average rate of negative interactions per minute of .218 for the subjects, compared to .029 for their peers, and .039 for the peers of the withdrawn and control subjects. Figure 4 provides an example of the screening data collected on two socially aggressive subjects and their peers. The subjects demonstrated negative interaction rates consistently

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Insert Figure 4 About Here

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higher than their peers, with overall averages 9 to 10 times as great.

A second identification measure that may be used for socially aggressive children is the percent of total interactions that are positive. The referral observation data in Table 1 indicates that the average score percent positive for aggressive subjects was 75% compared to 95% for their classroom peers. Further, the mean percent positive of their peers corresponds almost identically with that of the control group and their peers (95% and 96% respectively). The mean of the withdrawn group at 84% however, is 11 percent lower than that of the other normative groups. This lower figure may be simply an artifact of the generally lower frequency of interactions for the withdrawn group. For example, the withdrawn and the control subjects had identical negative interaction rates of .039. However, the withdrawn subjects overall interaction rate was only 1/3 that of the controls and their percent positive was 11 percent lower as well. This suggests that the percent of positive interactions may not be as stable a measure as rate of negative interactions for aggressive children who are also low interactors, or in stimulus conditions where interactions are infrequent, such as academic or work periods.

Discussion

Two observation systems developed at CORBEH to record the interactive behavior of individual subjects and groups of subjects have been described in this report. The two coding systems have the advantage of providing detailed information on the interactive style of a target subject while simultaneously measuring the rate of positive and negative interactions for a relatively large normative group of peers. Other more complex intrasubject measures available on the IIC have also proven to be sensitive indicators of social behavior change such as: (a) percent of time interacted, (b) rate of initiations, (c) percent of verbal behavior, and (d) rate of responses (positive and negative).

In addition the procedures were described by which referred subjects are assessed and selected for inclusion in research studies designed to teach more effective social interaction skills. For both withdrawn and socially aggressive interactors the "normative peer" method was demonstrated. Using this procedure subjects selected for treatment must demonstrate a significant discrepancy between their rates of interactive behavior, i.e., positive or negative, and that of the peer estimates within the same classroom stimulus conditions. In this manner the subject's behavior is evaluated in contrast to the "optimum" peer level on-going with the same conditions. Although not presented here, similar contrasts during intervention assist consultants to evaluate the effectiveness of their interventions in producing the optimum peer level for subjects involved in treatment programs. Furthermore, the normative data for both low and average interactors reported in this work appears consistent with normative estimates provided in the Greenwood, Walker, Todd & Hops report in this symposium. Presently, work is continuing in the development of observation systems and in the utiliza-

Appendix A

Individual Interaction Code

Definitions.

Activity: a description of what the children in the classroom are doing. Examples: show and tell, art, reading, arithmetic, free play.

Structure: the degree of organization with the classroom. The four structures coded with this system are: teacher led (TL), seatwork (SW), transition (TR), and joint activity (JA).

Interactive Behaviors: There are 2 columns of interactive behaviors; The target subject's behaviors are recorded in the left hand column the behaviors of peers and other interactors in the righthand column. The three behaviors coded in an interaction are: verbal (VB), nonverbal (NB), and physical (PH).

Each behavior is recorded as being either positive or negative. Negative behaviors, marked with a horizontal slash (eq: ~~VB~~), are aggressive statements or acts which are directed at another individual in an abusive, angry, deliberately annoying, or uncomplimentary manner.

Positive behaviors, recorded with a vertical line through the behavior (Eq: PH), include all behaviors which are not negative in quality.

Recording Procedures.

Initiator/Initiation: the person making the initial contact in the interaction is marked first in the top line of a given box, reading left to right. In this example, the subject initiated with a positive verbal and the subject's behavior was coded as follows:

SUBJECT	ID	INTERACTORS
VB NB PH		VB NB PH
VB NB PH		VB NB PH

Another example shows the interactor initiating with a negative physical behavior:

SUBJECT	ID	INTERACTORS

Other responses:

1. A response to an initiation is indicated as the behavior which follows an initiation.

SUBJECT	ID	INTERACTORS
VB NB PH		VB NB PH
VB NB PH		VB NB PH

(If the initiation is made by the interactor, the subject's response follows the initiation on the next row.)

SUBJECT	ID	INTERACTORS
VB NB PH		VB NB PH
VB NB PH		VB NB PH

2. Continuing responses are marked in sequential fashion until the interaction is terminated, or, when more than 5 seconds elapses between responses.

SUBJECT	ID	INTERACTORS
VB NB PH		VB NB PH
VB NB PH		VB NB PH
VB NB PH		~~VB~~ NB PH
~~VB~~ NB PH		VB NB ~~PH~~
VB NB PH		VB NB PH
VB NB PH		VB NB PH

Identification: The individual interacting with the subject is identified in the ID column. Peers are coded as:

B_1(2, 3, etc.) - The first (second, third, etc.) boy to interact with the subject

G_1(2, 3, etc.) - The first girl (second, third, etc.) interacting with subject.

Other interactors' identifying initials are:

T - teacher
TA - teacher aide
C - CORBEH consultant
S - students from other classrooms (tutors, messengers, etc.)
A - other adults

An example of a completed peer interaction is as follows:

SUBJECT	ID	INTERACTORS	DURATION
VB NB PH VB NB PH	B_1	VB NB PH VB NB PH	
VB NB PH VB NB PH		VB NB PH VB NB PH	15"
VB NB PH VB NB PH		VB NB PH VB NB PH	

Table 1

Normative Baseline Data on Target Subjects and Their Peers for Socially Withdrawn and Socially Aggressive Children 1972-75[†]

Individual Interaction Code	Mean Rate Positive Interactions	Mean Rate Aggressive Interactions	Mean Percent Positive Interactions
Withdrawn Subjects$_{(N=20)}$	.198	.039	84%
Aggressive Subjects$_{(N=19)}$	.627	.218	75%
Control Subjects$_{(N=12)}$	.682	.039	95%
Peer Tally Code			
Peers/Withdrawn	.518	---	--
Peers/Aggressive	.563	.029	95%
Peers/Control	.472	.022	96%
Mean for all Classroom Peers	.521	.026	95%

[†]Number of observations for each mean ranged from 184-243.

Date ________ Sheet # ____ of ____ Total Time Observed ________________

School ____________ Teacher ________________ Subject ________________

Structure Codes TL Teacher Led TR. Transition

SW Seat Work JA Joint Activity

ACTIVITY	STRUC	TIME	SUBJECT	ID	INTERACTORS	DURATION
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
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			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	
			VB NB PH VB NB PH		VB NB PH VB NB PH	

Date _____ _____

Subject _____ Session #____ Observer #____ School _____
Rel.#____

Structures
TL Teacher-led TR Transition
SW Seat Work JA Joint Activity

\+ / / =
\- / / =
/ = %

Activity	Structure	Grp. Size	Time Start	Duration	+ Interactions	- Interactions	+ Total	- Total

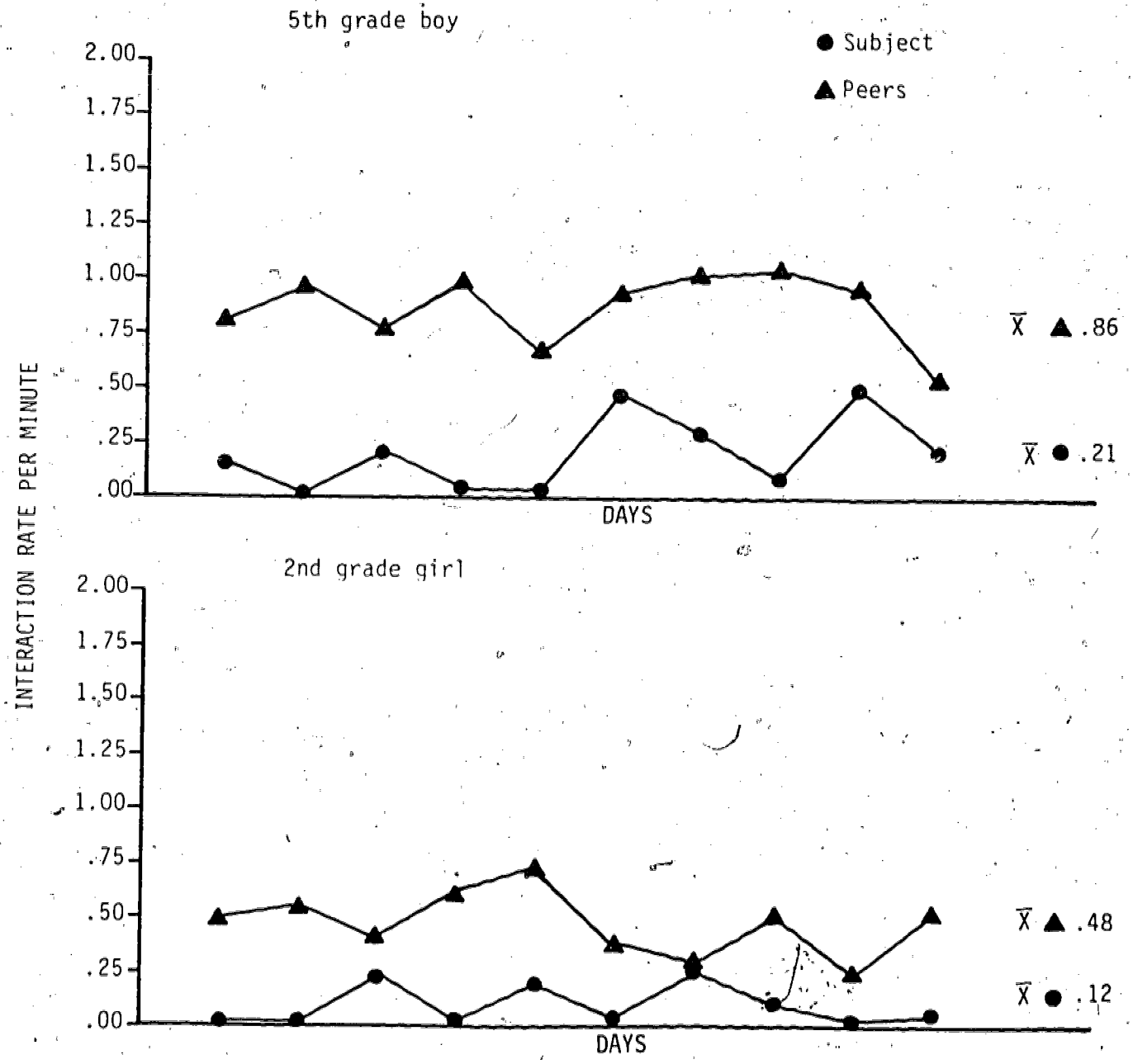

Figure 3. Screening data of two referred children accepted as socially withdrawn.

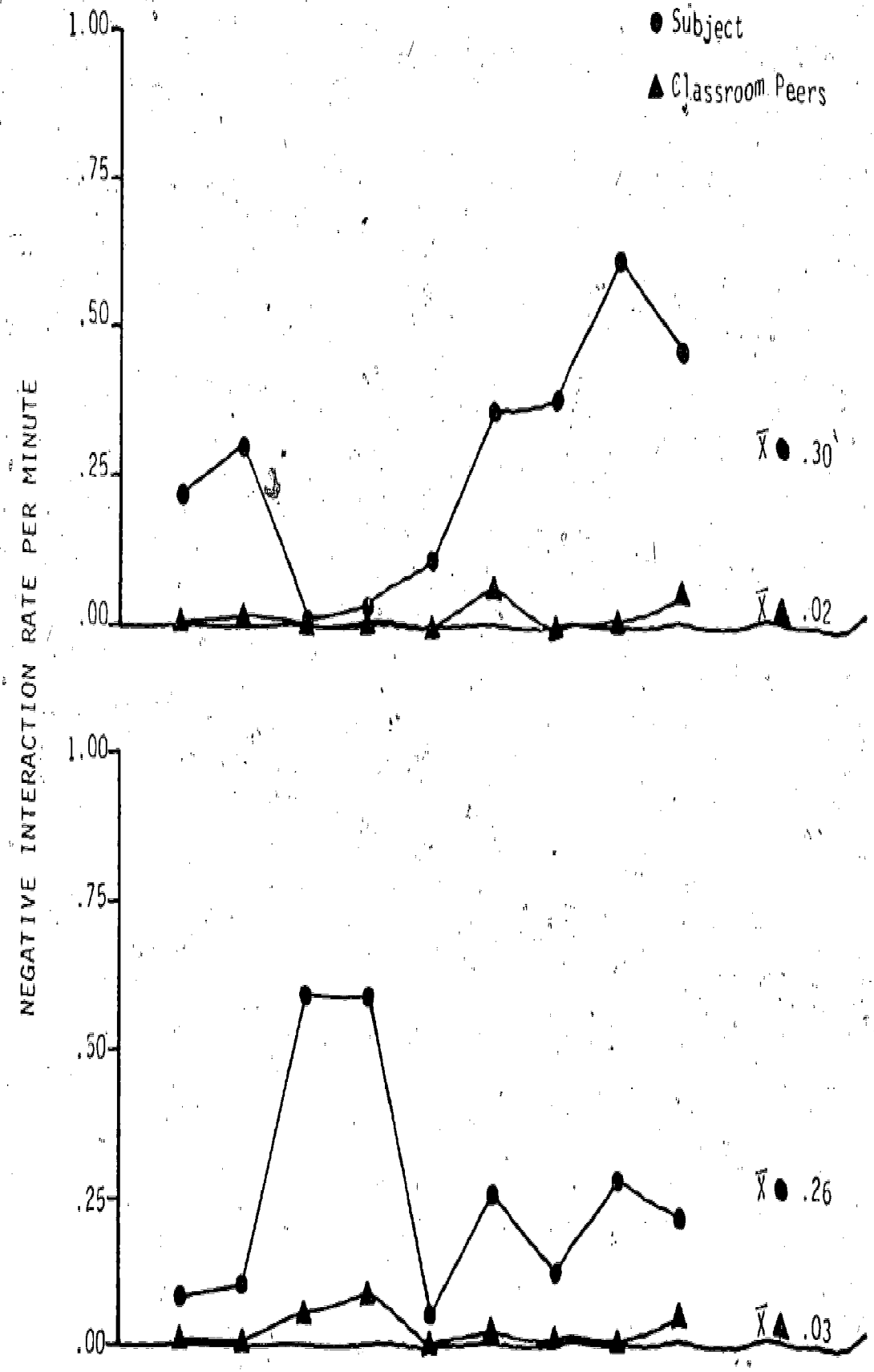

Figure 4. Screening data of two referred children accepted as socially negative-aggressive.

Manipulating Peer Social Interactions Within an Experimental Classroom Setting

Nancy M. Todd, Hill M. Walker, Charles R. Greenwood and Hyman Hops

Paper Presented as part of the Symposium,
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Hyman Hops, Chair

At the 84th Annual American Psychological
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Manipulating Peer Social Interactions Within an Experimental Classroom Setting

Nancy M. Todd, Hill M. Walker, Charles R. Greenwood and Hyman Hops

The effects of a token reinforcement program to increase the positive social interactions of low interacting children and the addition of a cost contingency to decrease the hostile interactions of socially aggressive children were examined in four separate studies within an experimental classroom setting over the period 1972-75.

Subjects and Setting Overview

The subjects in each study consisted of six children drawn from the regular classroom, grades K-6, using multiple selection criteria. These 24 children were selected using criteria which included (a) a counselor's referral indicating the subject's interactive behavior was relatively unresponsive or negative-aggressive when compared to that of peers, (b) behavioral observation scores of the target subject in contrast to peers indicated a significant discrepancy in response rates, and ( ) a comparatively high score on the appropriate subscale, e.g. withdrawal or acting-out, of the Walker Problem Behavior Identification Checklist (WPBIC) (Walker, 1970) completed by the regular classroom teacher.

Each group of six selected children participating in each study attended an experimental classroom. They were involved in a full-day program which consisted of four academic periods and three activity periods. Each child's academic work was individualized by a teacher and aide, with the major emphasis being upon math and reading. The experimental classroom adjoined a public elementary school so the subjects were able to participate in the schools' lunch and recess programs with the public school population.

Data Collection

Observers were trained to use the PIRS (Hops, Todd, Garrett, & Nicholes, Note 6) described in the first paper by Garrett, et al. in the symposium. Observations were made of the three daily activity sessions from behind a one-way mirror. From within this observation gallery it was possible to record subjects' behavior without being directly seen. Regular reliability checks were made (at least one per week) as reported by Garrett, et al.

Procedures Overview

The treatment procedures to be described were introduced during the three daily activity periods for each group of subjects. Two teachers were responsible for implementing the procedures. The activity setting contained a variety of games and toys with which the children were free to play and interact. Prior to the treatment phases in each study involving token reinforcement, backup reinforcers were selected by the children at a local department store. The token points earned during the token phases could be exchanged at a rate of approximately one cent per token/point. The treatment phases in each study were evaluated using basic reversal designs allowing the response measures to return to baseline or to the previous treatment phase in order to ascertain the causal effects of the treatment procedures. The general treatment procedures used in our studies were:

Baseline In all four studies, baseline measures were made to assess the operant level of interactive responses prior to any formal treatment procedures. At several times during each study, baseline procedures were reinstated to allow the measures to return to operant level as part of the experimental design. In Studies 3 and 4, it was possible to obtain baseline data both in the subject's regular class setting and in the experimental class.

Social reinforcement. Teachers were trained to praise various interactive responses immediately following their occurrence using a bug-in-the-ear device.

Token reinforcement. Token reinforcement procedures were used by teachers to consequate specific interactive responses. This was done by dispensing points using a digital display board in full view of the children during activity sessions. Points were redeemable for backup reinforcers following each session.

Social and token reinforcment. During this condition, teachers provided both social praise and dispensed token/points as consequences for subjects' interactive responses.

Differential reinforcement of other behavior (DRO). DRO was used as an additional method for demonstrating a causal relationship between token procedures and interactive behavior. During the DRO condition, the subjects were reinforced for all responses except interactive behavior.

Cost contingency. Cost contingency was used as a means of consequating negative-aggressive interactive responses. The procedure involved a verbal statement initiating disapproval of the response and the deletion of points from the subject's digital display board counter. In Studies 3 and 4, a subject could lose three points for each negative behavior noted by the teacher.

Follow-up. In Studies 3 and 4, follow-up data presented represent the subjects' interactive performance following return to the regular classroom setting. Since normative peer data (Walker & Hops, 1976) were collected for peer rate of interactions, comparisons to peer levels are possible as well as intrasubject comparisons.

Studies I and II

Studies I and II investigated the effects of procedures to increase the time spent interacting of selected socially withdrawn/low interacting children.

Study I

In Study I, a social plus token reinforcement procedure was applied one at a time to three separate component features of social interactions. The three targets selected for reinforcement were (a) initiating an interaction (Start), (b) responding to an initiation by someone else (Answering), and (c) continuing to interact over a period of time beyond the first initiation-response interactive exchange (Continue). In this study, the first activity period scheduled in the day served as a no-treatment control and generalization period. Treatment was never applied to the subject's interactive or noninteractive behavior in this period. Treatment procedures were implemented during the second and third activity periods only. The six subjects in this study were four girls and two boys, ages 7-11.

The experimental phases were programmed as follows: (a) Baseline 1, (b) Continue 1, (c) Baseline 2, (d) DRO_1, (e) Baseline 3, (f) Answer, (g) Baseline 4, (h) DRO_2, (i) Baseline 5, (j) Start, (k) Baseline 6, and (l) Continue 2. The phases ranged in length from 3 to 11 days each. Study I lasted for 74 school days.

Results and discussion. Figure 1 contains the group daily means plotted separately for Activity Period I and in combination for Periods II and III

Insert Figure 1 About Here

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where treatment procedures were applied. In the two continue phases, the subject's level of interactive behavior in combined Periods II and III was clearly higher than in Period I (the no-treatment period).

During the Start and Answer phases, the subject's total time interacting was apparently suppressed below the no-treatment Period I as a result of these conditions. Moreover, a concomitant increase in Period I above previous baseline

levels was noted during the Answer phase, suggesting some behavioral contrast effect. DRO conditions clearly established the power of the social plus token system as interactive responding was virtually eliminated in each phase in which other than interactive behavior was reinforced. Interactions in Period I showed no effects as DRO was applied in Periods II and III. Looking at the subjects' performance over the six baseline phases, a gradually increasing trend is noted in both treatment and no-treatment conditions from Baseline 1 to Baseline 4 with some leveling off during the last two baseline phases.

These data indicate that reinforcement of interaction duration produced the greatest amount of time spent interacting while Start and Answer interventions tended to decrease the amount of interactive time. In addition, both behavioral contrast effects and incremental increases over baseline levels were noted in the untreated Period I and during baseline phases throughout the study. Those data suggest a tendency for social behavior to come under control of interactive variables in addition to the experimental variables programmed. Only during the DRO conditions was interactive behavior substantially reduced below Baseline 1 levels.

Study II

In Study II, an attempt was made to use the knowledge gained in Study I to design an intervention procedure that would maximally facilitate the amount of time spent in social interactive behavior. In this study, subjects were reinforced socially and with token/points for their interactive behavior regardless of its topographic form. Subjects could earn praise and points for Starting, Answering, or Continuing interactions concurrently in this study. The six subjects consisted of four girls and two boys, ages 7-12.

The experimental phases were: (a) Baseline 1, (b) Start + Answer + Continue 1, (c) Baseline 2, (d) Start + Answer + Continue 2, (e) Baseline 3,

(f) DRO, (g) Baseline 4. Study II lasted for 39 school days.

Results and discussion. Figure 2 contains the daily group means for Study II. Again, Period I was used as a control and generalization period. Treatment procedures were implemented during Activity Periods II and III. Figure 2 demonstrates that this intervention produced very powerful treatment effects, dramatically increasing interaction in contrast to baseline and the subject's behavior in the no-treatment period. This effect was replicated a second time following Baseline 2. The DRO condition again replicated its ability to suppress interactions as in Study I. In this study, generalization to the control setting did not replicate as in Study I. These suggest that an intervention package which reinforces starting, answering and continuing components simultaneously is an effective set of procedures for low interactors.

Studies III and IV

Studies III and IV examined the effects of social, social plus token reinforcement, and social plus token plus cost contingency components as techniques for decreasing negative peer interactions. In both studies, the treatment procedures were introduced in all three activity periods. The two groups of six boys, ages 5-8, were selected as a result of their high rates of negative interactions. In addition, baseline and follow-up data is presented for the two groups in contrast to their regular class peers.

Study III

Study III investigated the effects of social, social plus token, and social plus token plus cost procedures on the behavior of six negative-aggressive boys.

Results and discussion. The data plotted in Figure 3 showed that percent of positive interactions for the group was clearly below their peers in the

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Insert Figure 3 About Here

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regular class. In the experimental classroom the target group varied about the 77% positive level until the cost contingency was added to the social plus token consequences for positive interactions. In this condition, praise and tokens were earned for positive interactions (36 points available during each 20-minute period) and lost (3 points each occurrence) for each negative-aggressive behavior exhibited.

The data clearly indicated that the social and social plus token contingencies programmed for positive interactive behavior were clearly insufficient and did not effect the occurrence of negative-aggressive behavior. In fact, the data indicate some suppressive effects under these conditions. The cost contingency was a critical requirement to effect behavior change. Follow-up in the regular classroom showed improved performance in contrast to initial baseline.

Study IV

Study IV was essentially a replication of Study III using the social plus token plus cost package for decreasing negative interactions. In addition to replicating Study III, procedures for fading the program and maintaining near 100% positive interaction were carried out. Beginning with the 8th week, point earning was faded, decreasing by 20% each week, until the subjects could earn only 20% of the number originally available.

Results and discussion. Results of this study are presented in Figure 4.

Insert Figure 4 About Here

As in Study III, original classroom data for subjects and peers indicated clear differences in the percentage of positive interactions. Replicating the effects produced in Study III, the social plus token plus cost package eliminated negative responses. Gradual fading of the token contingencies also maintained a

zero level throughout the fading portion of the study. Follow-up in the regular classroom shows the subjects closely resembling their peer's interactive behavior.

General Discussion

This paper has attempted to demonstrate the first research level in CORBEH's research and development system, the goal being the production of workable intervention packages for use in the regular classroom setting. The four studies in this report demonstrated the use of single subject designs in an experimental classroom with subjects selected as having problems being socially responsive or socially aggressive in their peer interactions. By carefully manipulating reinforcement contingencies in these studies, the following conclusions emerged. First, for socially unresponsive children, a reinforcement system providing consequences concurrently for starting, answering, and continuing interactions with peers was most effective in increasing the total amount of time these subjects spent interacting. Secondly, for socially aggressive children, the inclusion of a response cost contingency as a consequence for negative behaviors was the sufficient procedure effecting a 100% positive interactive pattern for these subjects.

These findings are presently in different stages of refinement as the two programs continue to be developed for field usage and additional testing under actual field service conditions.

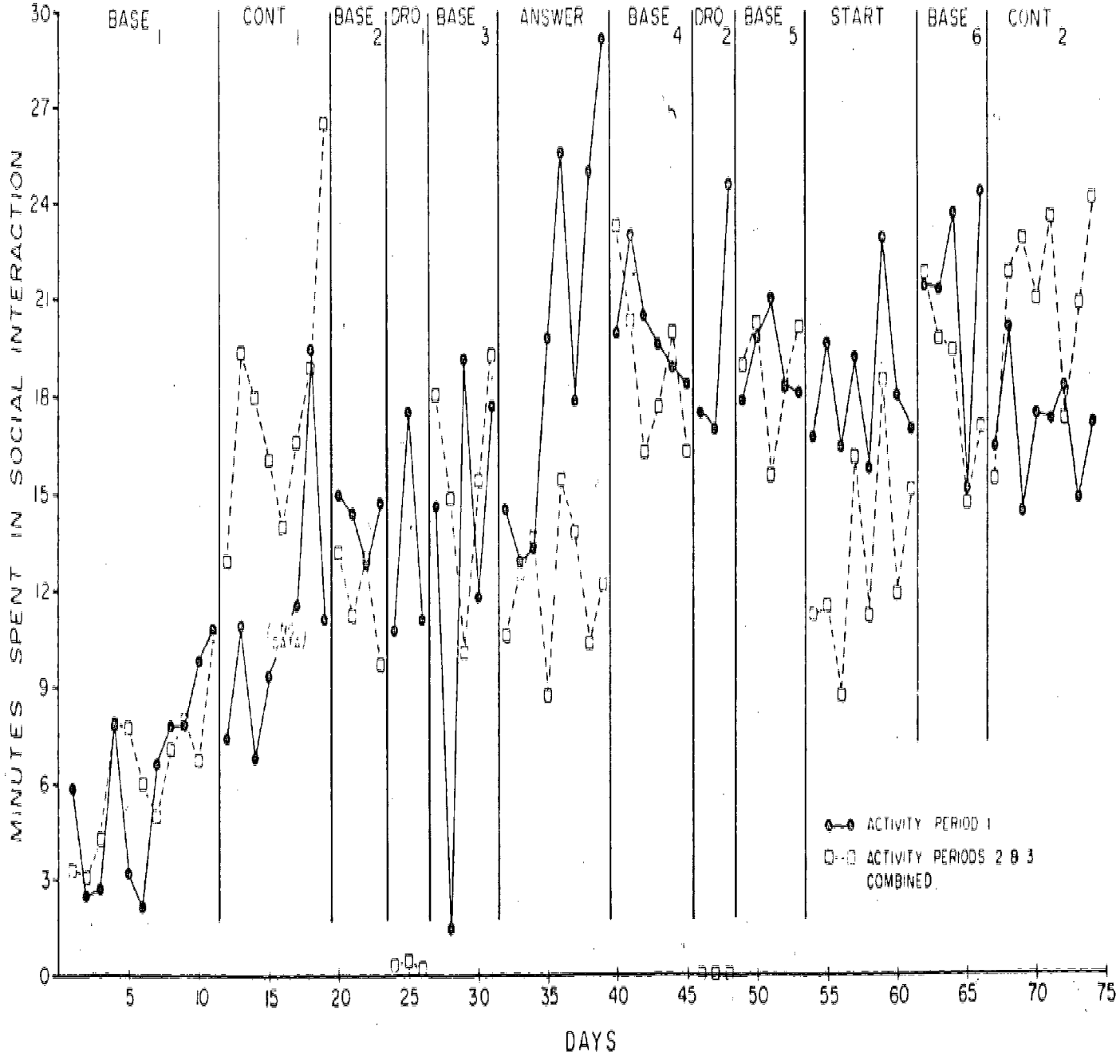

Fig. 1 Daily group means of minutes spent in social interaction across phases

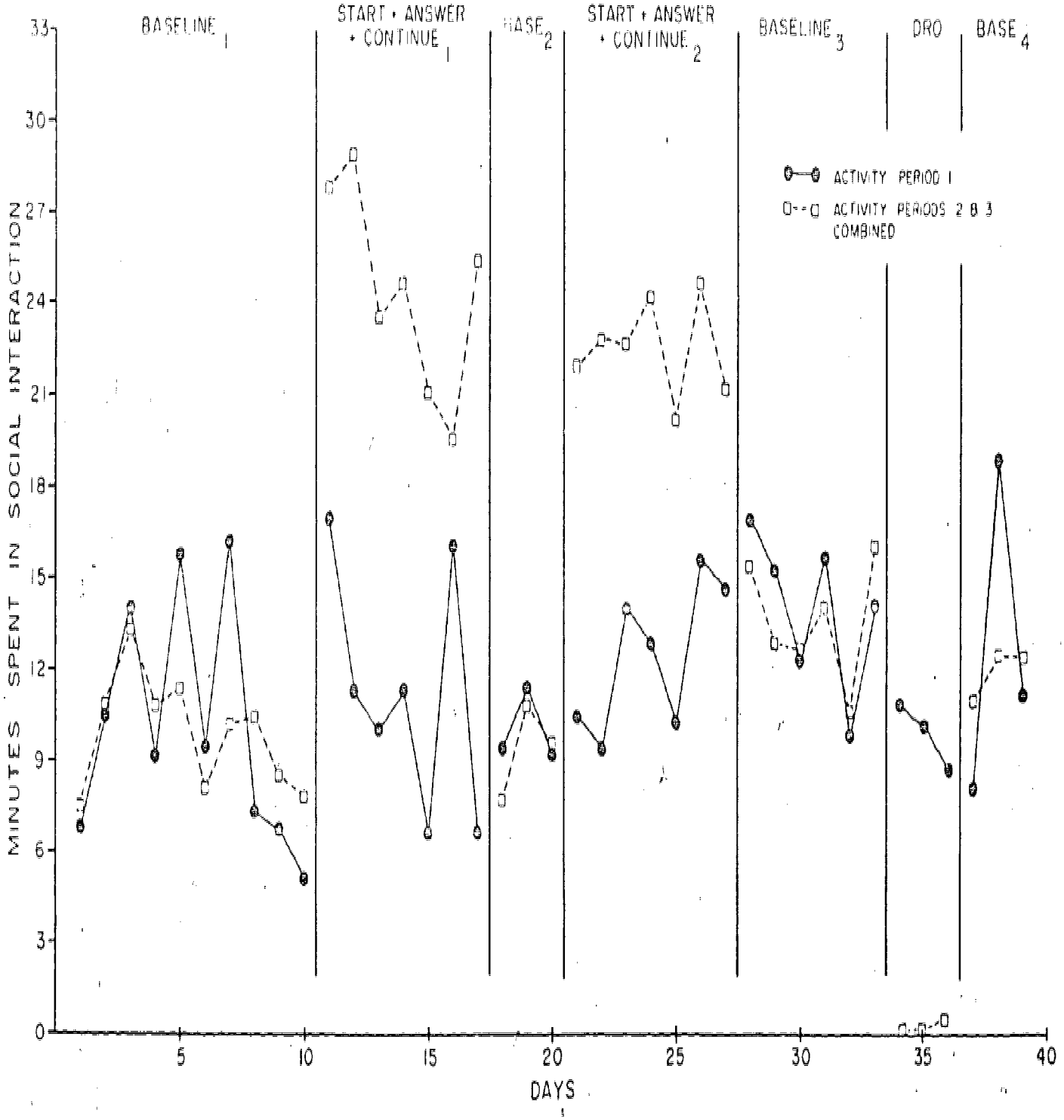

Fig. 2 Daily group means of minutes spent in social interaction across phases

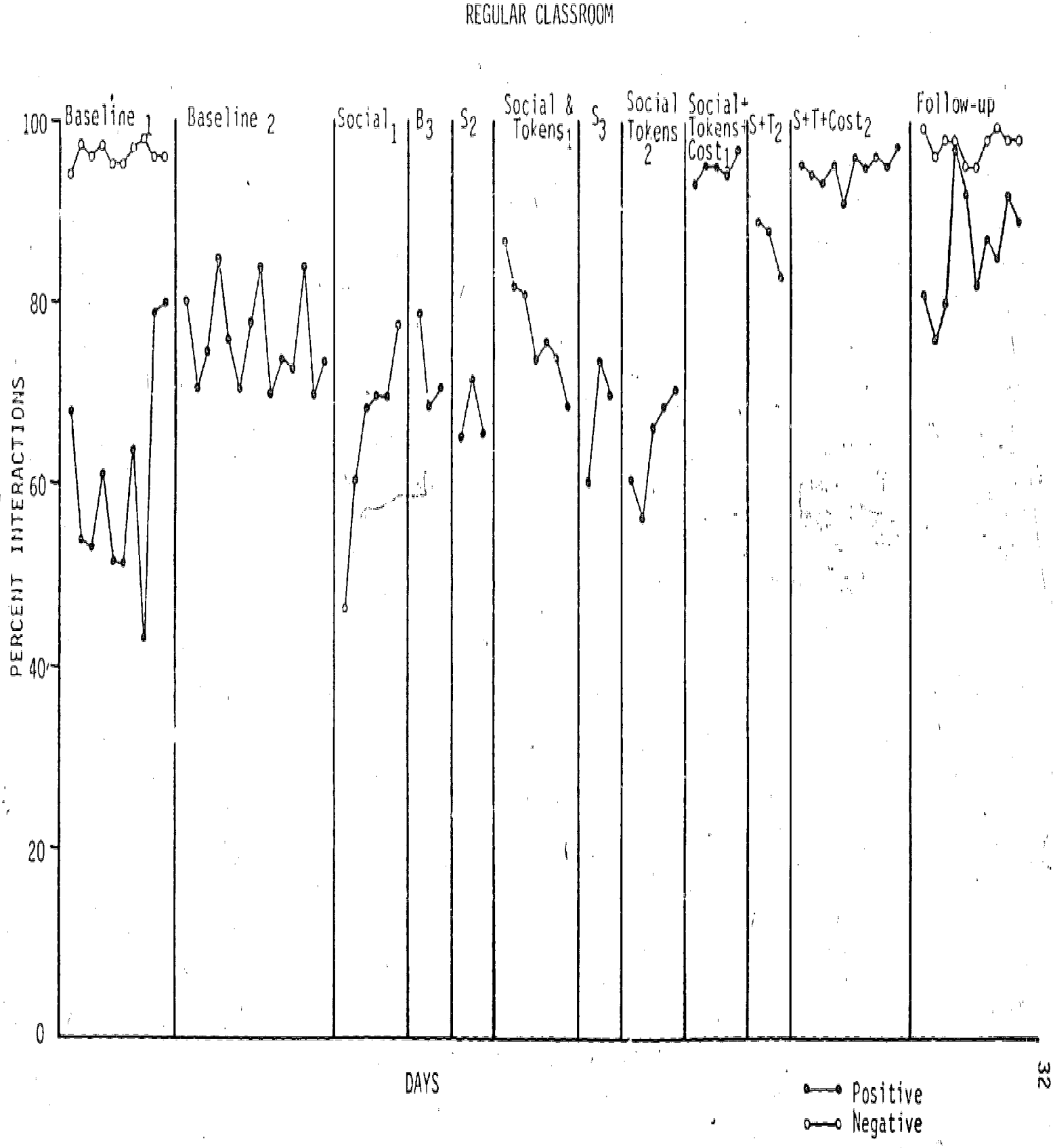

Fig. 3 - Daily group means of percent of positive interactions across phases

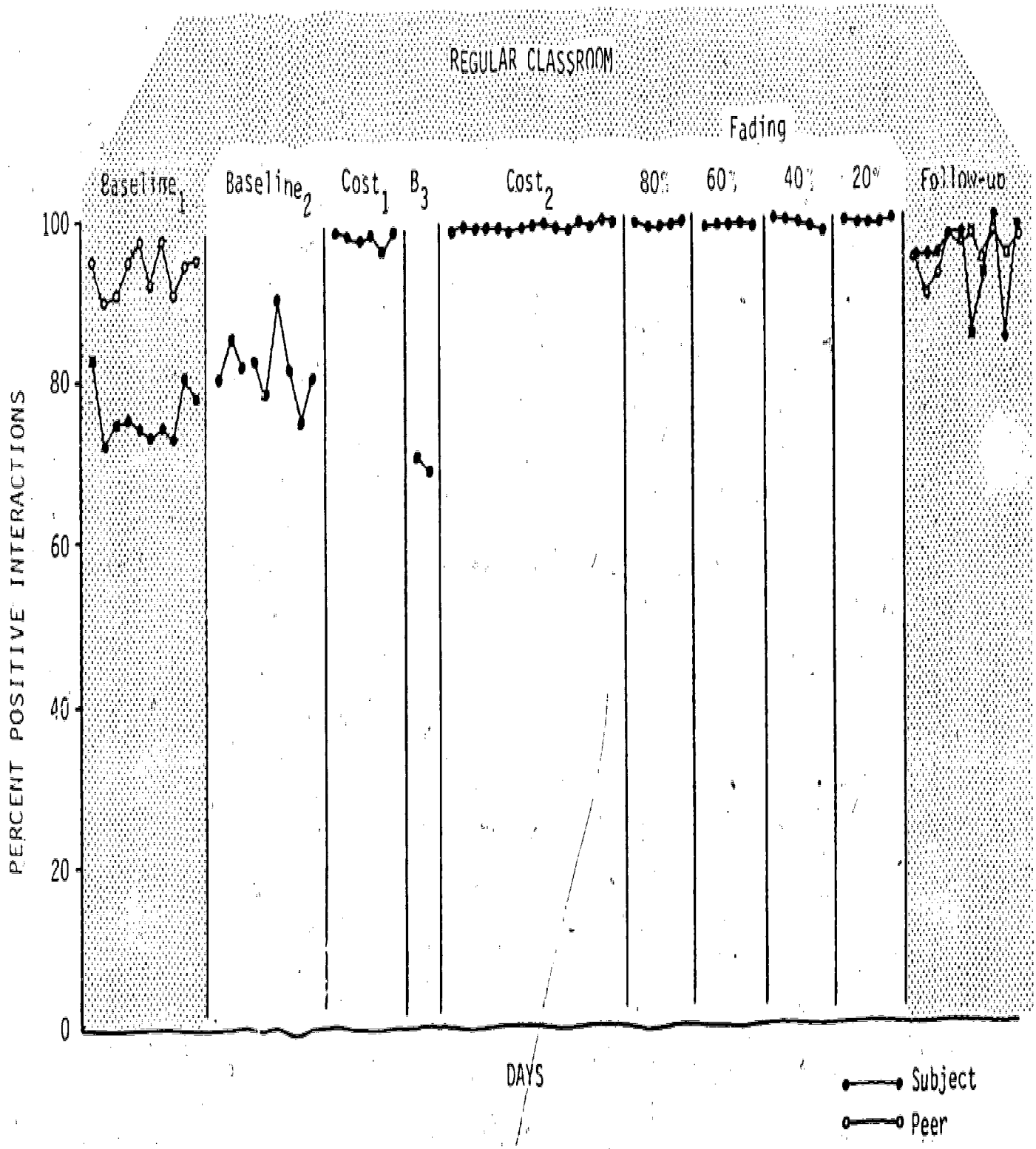

Fig. 4 Daily group means of percent of positive interactions across phases

Normative Peer Interaction Rate as a Baseline for Follow-up Evaluation

Annabelle Street, Hill M. Walker, Charles R. Greenwood,
Nancy M. Todd and Hyman Hops

Paper Presented as part of the Symposium,
Systematic Analysis of Social Interactions:
Assessments and Interventions

Hyman Hops, Chair

At the 84th Annual American Psychological
Association Convention, Washington, D.C.
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Normative Peer Interaction Rate as a Baseline for Follow-up Evaluation

Annabelle Street, Hill M. Walker, Charles R. Greenwood,
Nancy M. Todd and Hyman Hops

As part of the screening procedure for selecting withdrawn children for treatment within the experimental classroom (as described by Todd in attached paper), baseline data on social interaction were recorded for target subjects and their respective peers in the regular classroom. The discrepancy between the subject and peer rates of social interaction determined the child's appropriateness as a subject. Following the return of the children to their homerooms, observation data were again collected for subjects and peers. This additional comparison provided a means for evaluating the long term effects of experimenatl class treatment (Walker & Hops, 1976). The primary purpose of this paper is to present the two years of follow-up data (social interaction rate) collected on the first group of children (N=6) to attend the 3-month treatment classroom for socially withdrawn younsters. A system for comparing subject data to normative peer data (same classroom) will be detailed. A description of a recess treatment program for a child whose follow-up data did not compare well to that of his peers at follow-up will be presented.

Method

Subjects

The subjects were referred to the experimental classroom from regular public school first, second, and third grade classrooms. Five of the six subjects were female.

Observations

The referral and follow-up observations were made in the regular classroom setting. The Peer Interaction Recording System (PIRS) was used (as described by Garrett, et.al). One of the major dependent variables yielded by PIRS is social interaction rate for (a) the subject and (b) his/her peers. It is rate data that will be presented herein.

Five days of data were collected during the referral phase. Whenever possible, at least 10 days of data were collected during each follow-up phase. The daily observations consisted of 30-minute samples collected in the regular classroom during times when at least some social interaction was appropriate (ranging from reading to free play). Two follow-up phases were completed before the end of the first school year. Two more follow-up phases were conducted during the following school year.

Follow-up Treatment

No follow-up treatment was given until after the third follow-up phase was completed. At this time, some treatment procedures were carried out by the regular classroom teachers for three of the remaining five original sample children (one of these treatment programs will be described later).

Results

Figure 1 shows the mean rate of interaction for each of the six subjects and his/her peers for each of the referral and four follow-up phases (by the fourth follow-up, three of the children were no longer available for observation). Inspection of Figure 1 reveals a complete separation between the individual subject means and the peer means during the initial referral phase; this separation is not repeated during any of the follow-up phases as changes occurred over time.

Insert Figure 1 About Here

Figure 2, a condensation of data in Figure 1, graphically presents the group means for the subjects and their respective peer groups for each of the

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Insert Figure 2 About Here

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five phases. It is readily seen that a substantial increase in interaction rate occurs following treatment with continued increases for the next two follow-up assessments. However, a concomitant increase in interaction rate occurred for the peer group as well.

Insert Figure 3 About Here

To test whether the increase in subject's rate was greater than the peer increase, a ratio of each subject's interaction rate divided by his/her respective peer group rate was computed for the five subjects who were available for the first three follow-up phases. These data are presented in Figure 3. Next, a randomized block design ANOVA (Kirk, 1968) was carried out. The results show a significant difference in mean ratio between phases $F(3, 12) = 4.17$, $p < .05$. While no significant difference using a post-hoc analysis was obtained between referral (.20) and the first follow-up phase (.43) significant differences were found between referral and the next two follow-up assessments, .53, $p < .05$ and .65 ($p < .01$) respectively. Thus, it appears that the target group continued to gain on their respective peer groups into the following academic year.

Discussion

Though no follow-up treatment was given until after the third follow-up, the six children continued to improve with each phase. One explanation for

this effect might be that once a child gets some practice at interacting with others (which occurred in the treatment classroom) interacting becomes reinforcing in itself. A second possible explanation has to do with the quality of behavior. The children who showed the least gains were children whose social behavior from the start was "unusual" in quality as well as quantity. If the quality of a child's social behavior is typical for that aged child, then the child's peers may be made responsive to the child and spontaneously participate in reinforcing the child's interactions. If a withdrawn child's social behavior is "strange" in some way, increasing its frequency may not be adequate treatment.

It appears that further research must consider the use of a control group or normative peer group data based on the experimental subjects' own peers (Walker & Hops, 1976) for evaluating the effects of an intervention outside the experimental setting. The peer group data can control for changes in conditions across settings and over time. In the present studies increases in subjects' interaction rates were noted in each of the follow-up phases. However, the same phenomenon was noted for the peer group as well. While it would be interesting to attempt to explain the general increases over time for both subjects and peers, the evaluation of the subjects' increases can still be evaluated relative to their respective peers.

Insert Figure 4 About Here

After the third follow-up, CORBEH offered the various teachers consultation concerning in-class treatment (if needed) for the remaining five children. Figure 4 shows how the five individual children compared to their peers during the third follow-up. The children ranged from Child B, interacting at a rate above her peer mean, to Child E, interacting at only .17 of her peer mean. The purpose

of the last portion of this paper is to describe the follow-up treatment program for Child A, who during Follow-up 3 was found to be interacting at .42 of his mean peer rate.

Method

Subject

The subject was a third grade boy enrolled in a regular public school classroom. His teacher was found to be primarily concerned about his social behavior during recess. Observation revealed that he was inclined to spend the bulk of his recess time running about the perimeter of the playground pretending to be driving a sports car of one sort or another.

Observations

Observations were made by the CORBEH consultant, the teacher, and a sixth grade student. A stopwatch was used to record the time spent in activity with other children. Observations were made during the morning recess by the teacher and/or consultant and in the lunch recess by the student and/or consultant. Consultant-teacher agreement averaged 99.16% across six agreement checks over the course of the study. Consultant-student agreement was similarly high averaging 98.66% for three agreement checks.

Procedures

Intervention occurred in the morning recess period after a prolonged baseline interrupted by the Spring vacation. Intervention was administered by the teacher while being monitored by the CORBEH consultant. In the $Treatment_1$ condition the subject earned two points for every minute he spent in some form of activity with his peers, a maximum of 20 points for the 10-minute recess period. The teacher used a cumulative stopwatch to record the time the subject spent in activity. At the end of each period the teacher praised the subject, told

him how many points he earned and recorded the points on a classroom poster. Periodically the points were redeemed for prizes of the subject's own choosing. On the third day, the intervention was modified slightly. In Intervention$_2$ the boy earned an extra point for every minute he was involved in a ball-handling activity. This additional contingency was added in an attempt to improve his poor ball-handling skills.

Children who inquired were told that the program was a continuation of a project the subject had been involved in the previous year. Most were spontaneously supportive of the subject's efforts to do well. No group contingency was involved.

After 16 days of Treatment$_2$, a second baseline condition was instituted to demonstrate experimental control. Eight days later, the treatment was reinstated. A fading procedure was attempted next, but because of frequent absences, the condition lasted only two days. During fading, accumulating time on the stopwatch was discontinued. Instead, the subject was informed that the teacher would check twice from her window during the treatment period. If the child was playing with others, he earned 10 points, and additional 5 bonus points for ball play.

Results

Figure 5 shows the number of minutes the subject spent in play with others during the two 10-minute observation periods. During the morning recess period,

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Insert Figure 5 About Here

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the time the subject spent in play with others increased from a mean of 24% to a mean of almost 100% during each of the three treatment phases. A spontaneous increase was noted during the non-treatment noon recess as soon as the treatment

program was introduced in the morning recess period. After twelve days of treatment, the points were withdrawn and the percent time decreased in both the treatment and nontreatment recesses. The treatment contingency was reinstated in the morning recess with a concomitant increase in the data. However, a similar increase during the noon recess did not occur. The subject's behavior maintained well during the treatment recess under the fading condition.

Discussion

The results of the follow-up intervention indicate that the minimal intervention procedures were indeed successful. Follow-up data collected in the classroom (see Figure 1) show the subject's mean rate of interaction higher than during any previous phase. Furthermore, the ratio of the subject's rate to his peers increased from .42 to .54.

No doubt better service could have been given if a multiple baseline design had been employed rather than a reversal. By eventually extending the treatment to the noon recess (rather than by temporarily dropping out the points), disruption of the treatment effect (morning and noon) would have been avoided and the discrimination between treatment and non-treatment settings not established.

Allowing the subject to earn points for simply being in a activity with other children (rather than by actually talking with other children) seemed appropriate for this child. Once in activities with others, talking occurred spontaneously and was very natural in content. The observation system (accumulating the time spent in activity with other children) proved to be very easy to manage -- even for the sixth grade student observer.

The fading procedures also seemed promising in that (a) little teacher time was required and (b) the intermittent scheduling of the teacher checks would produce better maintenance.

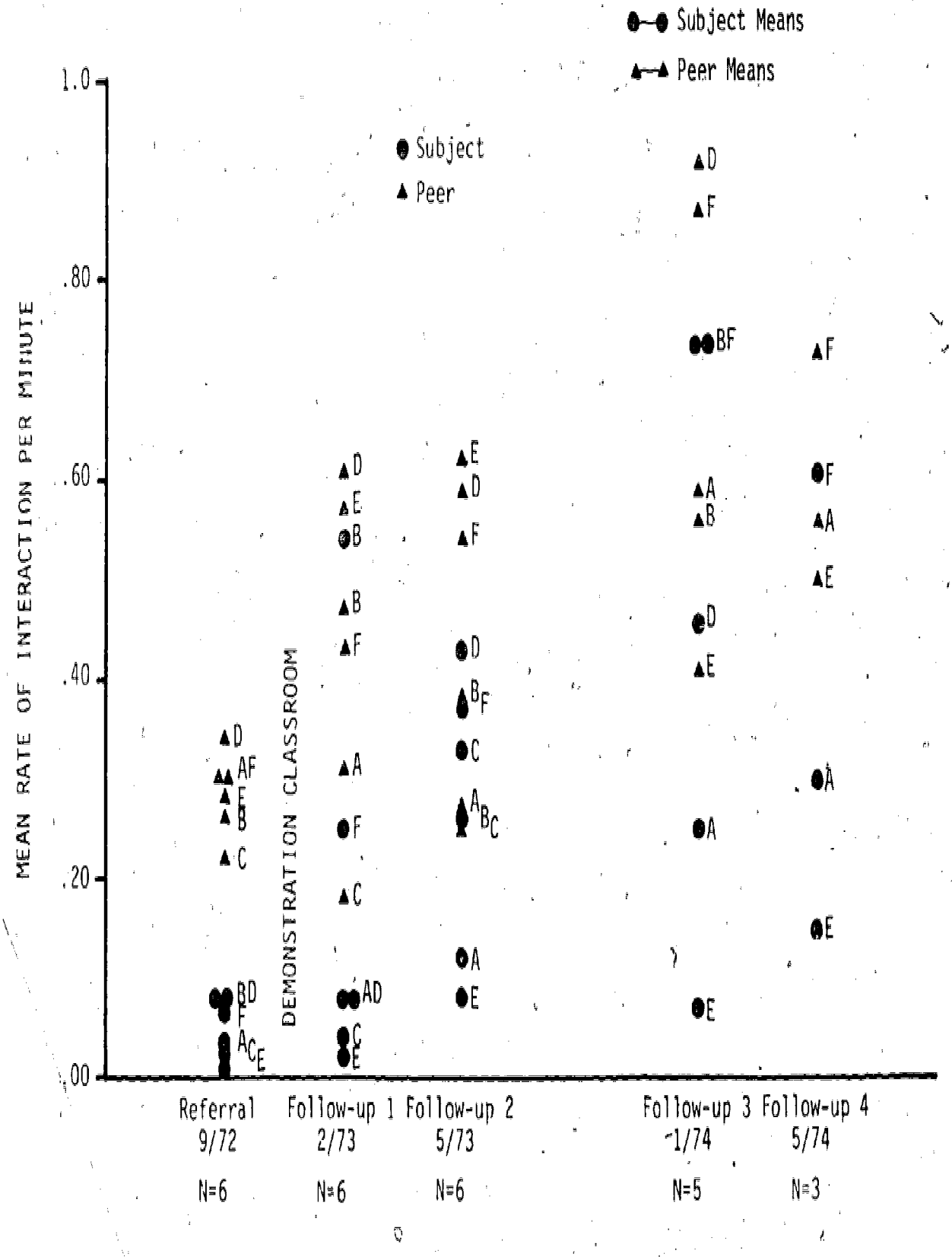


Figure 1. Means phase interaction rates for individual subjects and their respective peer groups.

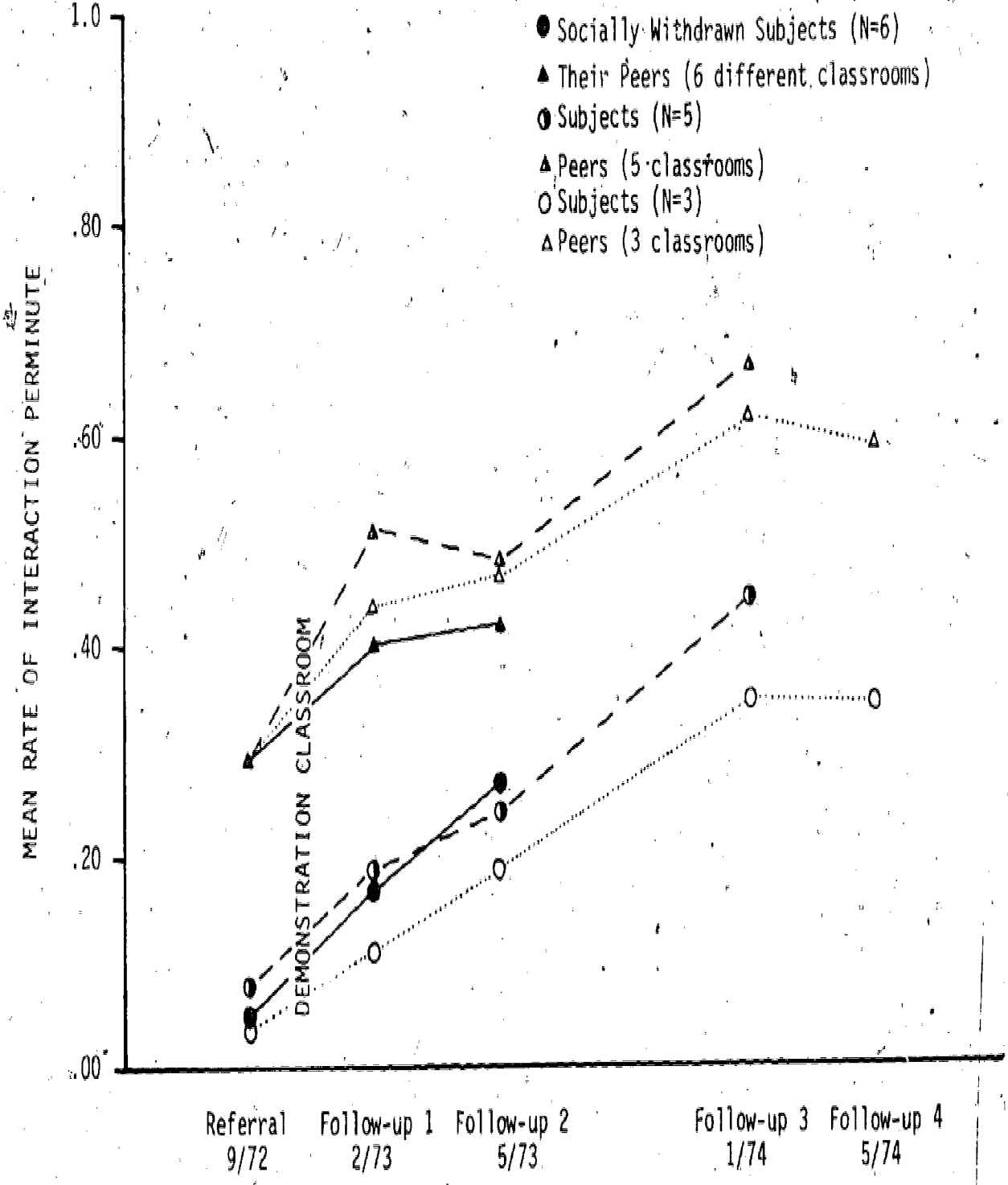


Figure 2. Phase means for subjects and peer groups.

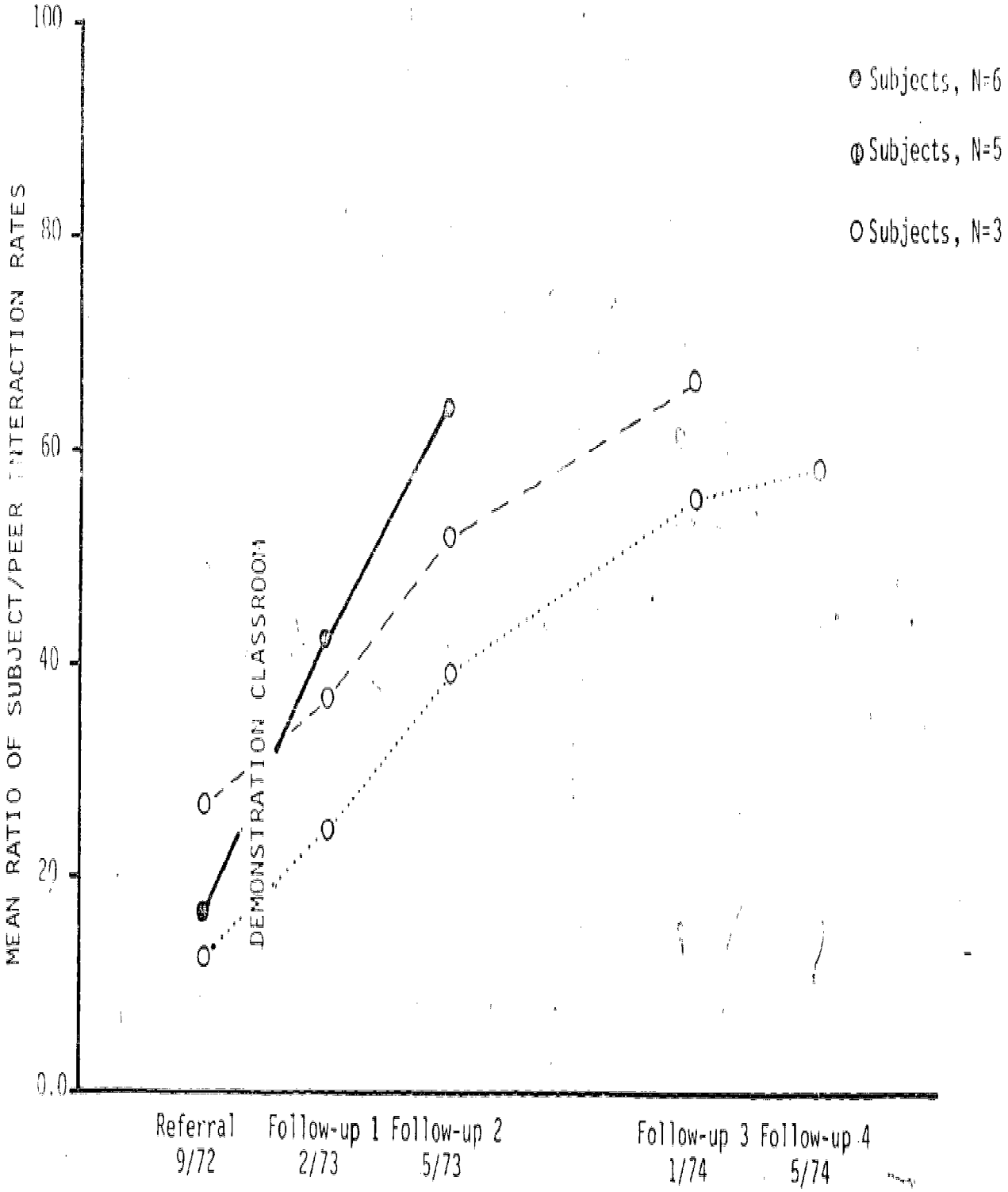


Figure 3. Mean ratios of mean subject interaction rate to respective peer ratios across phases.

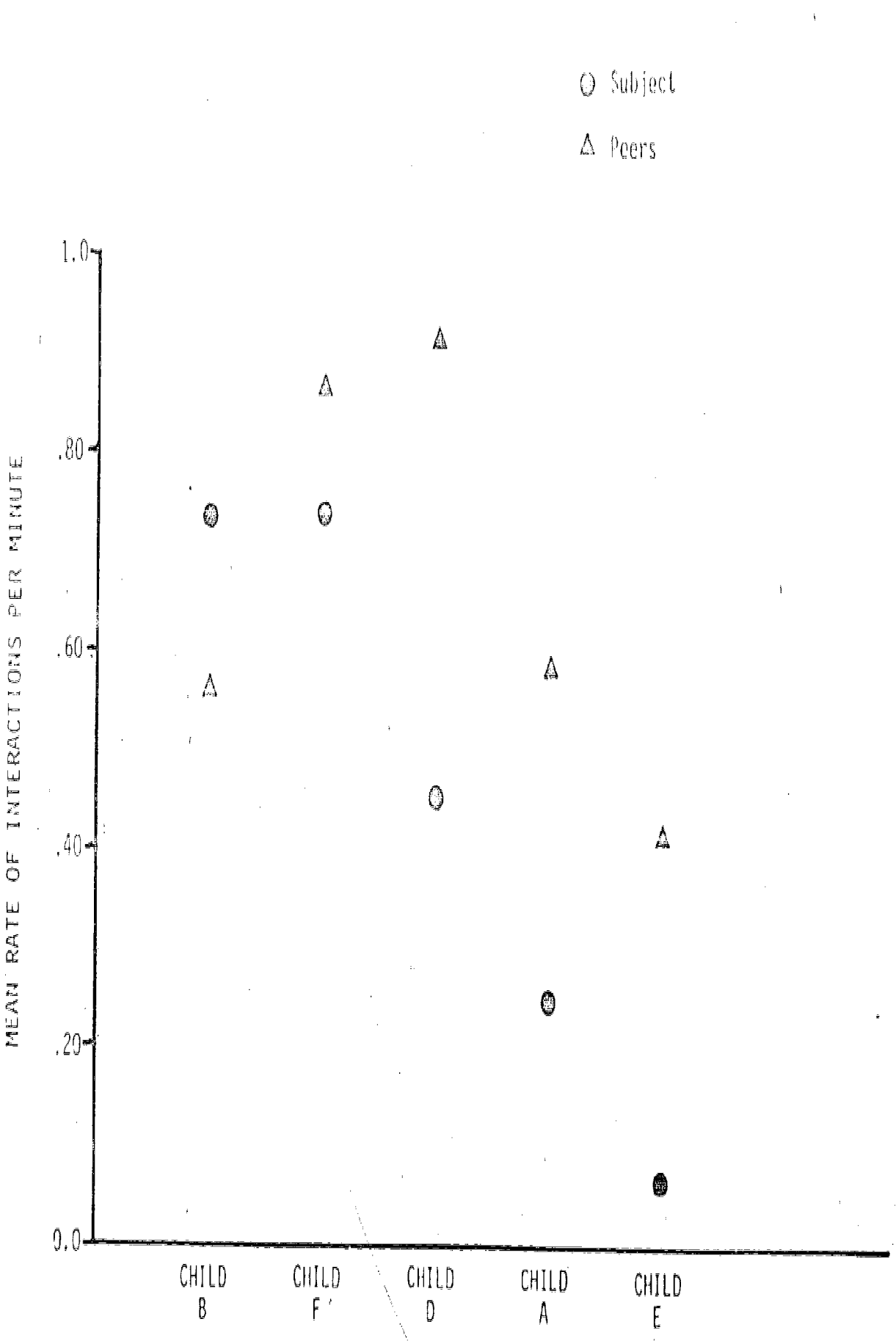
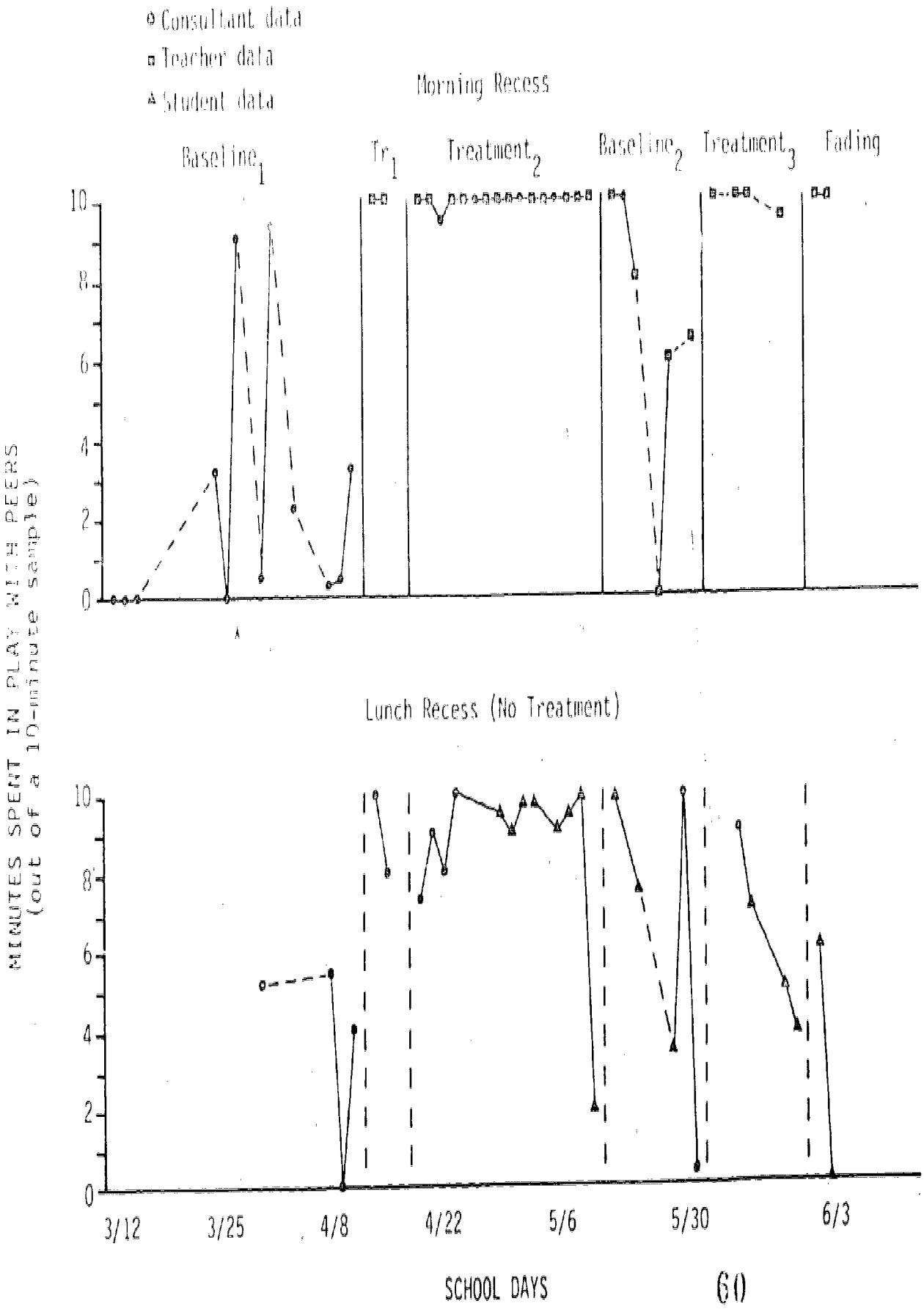


Figure 4. Mean individual subject and peer interaction rates for follow-up 3.



*Time sample less than 10 minutes.

Figure 5. Daily percent time spent in play with peers during treatment and non-treatment settings.

Increasing Interactive Behavior of Withdrawn Children in the Regular Classroom

Diane Hernandez Fleischman, Hyman Hops and Annabelle Street

Paper Presented as part of the Symposium,
Systematic Analysis of Social Interactions:
Assessments and Interventions

Hyman Hops, Chair

At the 84th Annual American Psychological
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Increasing Interactive Behavior of Withdrawn Children in the Regular Classroom

Diane Hernandez Fleischman, Hyman Hops and Annabelle Street

A series of four studies examined the effects of both antecedent and consequent events on the social interactions of four primary grade withdrawn children using combinations of multiple baseline and reversal designs. These four experiments were conducted during the first year of pilot testing a program to increase the social interaction skills of withdrawn children in the regular primary grades. The experiments were all short term interventions designed to evaluate the application of different treatment procedures.

The specific procedures tested were: (a) Joint Task (JT) -- assignment of the subject and a peer to work at a specific task requiring alternating verbal interaction; (b) Individually Contingent Teacher Praise (IP); (c) three forms of contingent token reinforcement, (a) individually contingent praise plus points with individual backups (IPPB), (b) individually contingent praise plus points with a backup shared by the entire group (IPPGB), and (c) a cross-over contingency (Walker & Hops, 1973) in which the subject earned points for group initiations, the group earned points for subject initiations, and the backups were delivered only after both the subject and the group met a specific criterion (CROSS).

The four studies, in various combinations, compared (a) an individual praise contingency to Joint Task, (b) the three forms of contingent token reinforcement, and (c) the effects of the individual reinforcement group backup procedure in an academic setting to one implemented in recess.

Method

Subjects and Setting

Three girls and one boy were selected as subjects for the experiments.

All were enrolled in regular classrooms in the Eugene (Oregon) public school district 4-J and were referred by their teachers as having low rates of social interaction with classmates and/or being deficient in the social skills necessary to initiate and maintain social interaction with their peers. Criteria for accepting these children were: (a) five days of observational data during which the subjects were consistently lower than their peers in rates of social interacting or total duration of time interacted; (b) agreement to participate by the classroom teacher(s); and (c) written parental permission for the child to participate in the treatment program.

The experiments were conducted in the classroom setting in three of the studies and in both the classroom and recess in the fourth. In each study, data was also collected in a third no-treatment control period. In-class periods were either the more structured academic variety or less structured activity sessions. Generally, the subjects worked in small groups or at independent seat work during which time they were also free to interact.

Observations

In three of the four studies, observations were performed using the PIRS coding system described in Garrett, Hops, and Todd in the present symposium. Data was collected in the classroom on each of the target subjects using the IIC and on their respective peers using the PTC. No recess data was collected on the peer group using the PTC because peer responding was too high rate and and the physical area to be covered too large for accurate reliable observations.

In Experiment IV, interaction rate was found not to discriminate between referred child and her respective peers. Informal observations indicated that she had frequent but brief interactions that were not maintained. Since the PTC did not record duration of peer interactions, a second peer group contrast procedure was developed which provided an estimate of the percent of time peers spent interacting. Using this estimate of peer social behavior, a subject/

peer discrepancy was confirmed.

The procedure to provide an estimate of the percent of time peers spent interacting used an interval coding procedure as follows: in each 8-second interval the peer group observer scanned the room, counted and recorded the number of students, other than the target, engaged in interactions. At the end of the period, each recorded peer was given credit for 8 seconds of interaction, and an estimate of the entire groups' percent of time interacting was computed. The total number of tallies multiplied by 8 seconds divided by the size of the peer group divided by the length of time of the observation session (in seconds) was computed.

Agreement checks using this code were found to range from .90 to 1.00 with a mean agreement of .95 over 14 checks. The correlation compiled between the 14 pairs of scores was .97 ($p < .01$).

Experiment I

The first study examined the effects of teacher praise and teacher praise plus points and individual backups on the interactive behavior of a 5-year old kindergarten girl. The treatment was introduced in multiple baseline fashion in two classroom activity periods for 15 minutes daily. A recess period served as a no-treatment control period.

Procedures

After 7 days of baseline in Activity Period 1, teacher praise (IP) was introduced contingent upon subject verbal behavior directed at any peer. A verbal response included single words, phrases, or conversation. Careful attention was directed at not interrupting the natural flow of social interaction. The teacher was instructed to wait until each interaction had ended before delivering the praise. Four days later praise was introduced in the same fashion in Activity Period II. The IP condition lasted 5 days in each

period.

Individual points for an individual backup reinforcement was added to teacher praise in Activity Period I and three days later in Activity Period II. The subject earned on point for each verbal response made to peers up to a maximum of three points per minute. If the subject was engaged in verbal interaction for a complete minute, the three points and praise were delivered at the end of the interaction, thus reinforcing continuous verbal responding. The IPPB was maintained for 10 days in each activity period. Only 2 days of posttreatment data were collected before Christmas holidays began.

Results and Discussion

The results, graphically presented in Figure 1, indicated that IP was not effective in increasing the subject's interaction rate. While the mean rate increased from .08/min at baseline to .25/min under the praise condition in Activity Period I, the reverse was true for Activity Period II where the mean rate was decreased by half from .31/min to .15/min. The differential effect during the two settings precludes definite conclusions about the effectiveness of IP on subject interaction rate. A concomitant increase in the rate of peer interactions was noted in both periods.

Insert Figure 1 About Here

IPPB was slow to take effect during Activity Period I, but from the 5th day on a considerable increase in the subject's interaction rate was noted. The mean rate of interaction over the entire condition was .65/min. Gains were also noted in Activity Period II, the subject's mean rate changing to .70/min under token reinforcement. However, the increase was more variable than in Activity Period I. The two days of posttreatment data indicated that the gains in subject interaction rate did not persist with return to baseline conditions.

Observations during recess indicated that behavior change did not generalize to that setting. Peer interaction rate which showed an increase during the teacher praise condition returned to baseline levels after praise alone was discontinued and remained there for the duration of the experiment.

Experiment II

The next study first examined the effect of a programming component, Joint Task (JT), and secondly, the effect of IPPB as in Experiment I. The subject was a third grade girl and the interventions were carried out in both an academic and less structured activity period. Recess data were also collected but no treatment introduced in that setting. A combination multiple baseline and reversal design was used.

Procedures

The JT procedure was introduced in the Academic Period after a 5-day baseline and 3 days later in the Activity Period. The teacher was instructed to prepare materials for the JT condition. The tasks involved two-child activities that required alternating verbal interaction. Examples of such tasks are presented in Table 1. The tasks used were appropriate for the specific activity.

Insert Table 1 About Here

At the beginning of each period the teacher paired up all of her students and assigned each pair a specific task. At the end of the 15-minute period, the subject and peers were permitted to continue the joint task or change activities as they desired.

The JT condition was maintained for 5 days in each period, followed by a 3-day return to baseline. Next, IPPB was instituted as in Experiment 1 in both periods. A 5-day return to baseline was introduced in Period I only. The

The beginning of the Christmas holiday precluded the collection of more data in Period II.

Results and Discussion

The rates of social interaction for each of the three periods are presented in Figure 2. They show that interaction rates increased for both subjects and

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Insert Figure 2 About Here

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peers in the Academic Session under JT. The mean baseline rates for the subject and peers were .16/min and .54/min, respectively, compared to JT rates of .82/min and 1.80/min, respectively. The effect in the Activity Session was not as marked. The subject's mean rate increased from the baseline rate of .66/min to .86/min in JT; the corresponding mean rates for peers were .70 and .87, respectively. No decrease in interaction rates was noted under Baseline 2 conditions for the subject and for the peers in the Activity Period. The subject had been provided a structure which she continued to use, asking her peers to cooperate on one of the JT activities.

An increase in rate during the IPPB condition occurred only in the Activity Session. The lack of a systematic effect across both conditions replicated the findings of Experiment I, indicating that this procedure was not very powerful nor predictable. The recess data indicated no generalization across settings.

Experiment III

The third study examined the effects of three reinforcement procedures using a multiple baseline design. The subject was a third grade boy. The settings consisted of one morning academic period of language arts and one afternoon activity period. Recess data provided a no-treatment control baseline.

Procedures

Each of the treatment conditions lasted 5 days and were introduced in the Academic Period first with a 3-day delay before their introduction in the Activity Period. The order of introduction was (a) IPPB as used in Experiment I and II, (b) individually contingent teacher praise paired with points plus a group backup (IPPGB), and (c) a combined individual group crossover contingency (CROSS).

The first condition was identical to that used in Experiment I and II. The second treatment condition substituted a group backup for the individual reinforcement which consisted of group games, free time, etc. The crossover contingency involved a major shift in the procedures. The reinforced behavior in this condition was not general verbal interaction but initiations (a) by the subject to peers and (b) by the peers to the subject. The subject earned points each time a peer initiated to him; conversely, the peers earned points each time the subject initiated to one of them. The points could be exchanged for an individual reward for the subject and a group reward for the entire class including the subject. No reinforcement was delivered unless the subject and peers had met a pre-established criterion based on the mean of the previous 3 days.

Results and Discussion

The results presented in Figure 3 indicate that the IPPB produced increases

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Insert Figure 3 About Here

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in the subject's interaction rate but were slow to take effect and highly variable, replicating the effects produced in Experiment I and II. However, the IPPGB and the crossover contingency produced dramatic increases in the subject's interaction rate in both the academic and activity periods.

The mean rates for the subject in the academic period were .13/min, .49/min, 1.65, and 1.40 across the baseline, individual backup, group backup and crossover, respectively. The corresponding subject interaction rates for the activity period were .50/min, 1.18/min, 2.38/min and 2.48/min, respectively. A return to baseline condition in both periods indicated that the gains produced by the different treatments were not maintained. Recess data showed no generalization to that setting. No significant trends were noted in peer data.

Experiment IV

The last study in this series implemented the procedure found to be most cost effective in the previous studies, i.e., the IPPGB in a recess setting as well as in the classroom. The objective was to compare the effectiveness of the procedure in two different settings, one in which social interaction was the primary socially sanctioned behavior. The subject was a kindergarten girl; the classroom period in which the treatment was implemented was of the activity type. A second activity period served as a no-treatment control session. The major dependent variable used in Experiment IV was the percent of time interacting as opposed to rate of interaction used in the other studies (see Observation section).

Procedures

After 8 days of baseline, the IPPGB procedure was implemented in the recess period first with a 4-day lag before its introduction in the classroom. The reinforcement procedure was changed somewhat in order to correspond with the dependent variable percent of time interacting as recorded on a stopwatch which recorded time cumulatively. The watch was activated when the subject was engaged in interaction and deactivated when interaction ceased. Daily treatments lasted 10 minutes in class and 15 minutes in recess for 10 days in

each setting. Following the treatment condition, a second baseline phase was introduced for 5 days in the class and 8 days in recess.

Results and Discussion

The percent of time interacting for all three periods is shown in Figure 4.

Insert Figure 4 About Here

The percent of time interacting more than doubled in each period after the procedure was implemented. The subject interactions increased from a mean of 21% to 49% in recess and from 9% to 19% in the classroom. A return to baseline had a more immediate effect in the classroom decreasing on the first day to an overall mean of 9%, identical to the first baseline period. In contrast, the daily percent of time spent interacting during recess remained as high in the second baseline period as it did during the treatment condition. Only the last 2 days showed a marked decline. The overall percent time interacting was 52%. No appreciable trends in any direction were noted during the second activity session for the subject or peers.

General Discussion

These four experiments were conducted to apply and to evaluate a number of procedures for increasing the interactive behavior of socially withdrawn children in the primary grades. The results of these experiments will be further researched during a second year of pilot testing in the regular classrooms. Some of the indications for our future research programs may be summarized in the following points.

The Joint Task procedure is highly effective in increasing social behavior in the classroom. Its use in a variety of classroom periods with academically related and nonacademic activities gives it a wide range of application. In

view of the apparent nonreversible effects after a short period of JT, its use in a longer time intervention is highly promising. Further research is required in this area.

The two procedures, ITP or IPPB did not produce consistently significant increases in interactive behaviors for these withdrawn children. Perhaps a longer period under the same conditions would be more effective. However, since more powerful procedures are available in the form of JT and IPPGB the continued use of these techniques is not warranted.

In contrast, the use of group backup rewards with individually contingent praise and points and the crossover contingency were both equally effective. The latter, however, is much more complex and hence difficult to administer procedurally. Thus, it appears that IPPGB was the best overall token reinforcement procedure for the withdrawn subjects in these studies.

The final study strongly suggests that the recess setting best lends itself to a token reinforcement program to increase social interaction. There are no competing responses as occur in the classroom where regular academically related behaviors are at high rate, interfering with social skill practice. In recess, the target child is encouraged to display those skills which are regularly and naturally reinforced by the peer group.

In summary, the four studies suggest that a package for remediating socially withdrawn behavior should include a Joint Task procedure for use in the classroom and an individual reinforcement contingency with a group backup for social interaction during the recess period. Next year's activities will evaluate this package.

Table 1

Joint Task Description

Our Definition: A two-child task that requires taking turns in order to proceed successfully (tasks requiring alternating verbal behavior are emphasized).

Joint Tasks Would Include:

1. Taking turns reading word cards with a classmate.
2. Taking turns spelling words with a classmate.
3. Playing "20 Questions" with a classmate.
4. Playing a "Describe and Guess" game with a classmate.
5. Playing "Chutes and Ladders" with a classmate.
6. Playing "Candy Land" with a classmate.

Joint Tasks Would Not Include:

1. Drawing a picture with a classmate.
2. Looking at a book with a classmate.
3. Writing a story with a classmate.
4. Decorating the bulletin board with a classmate.

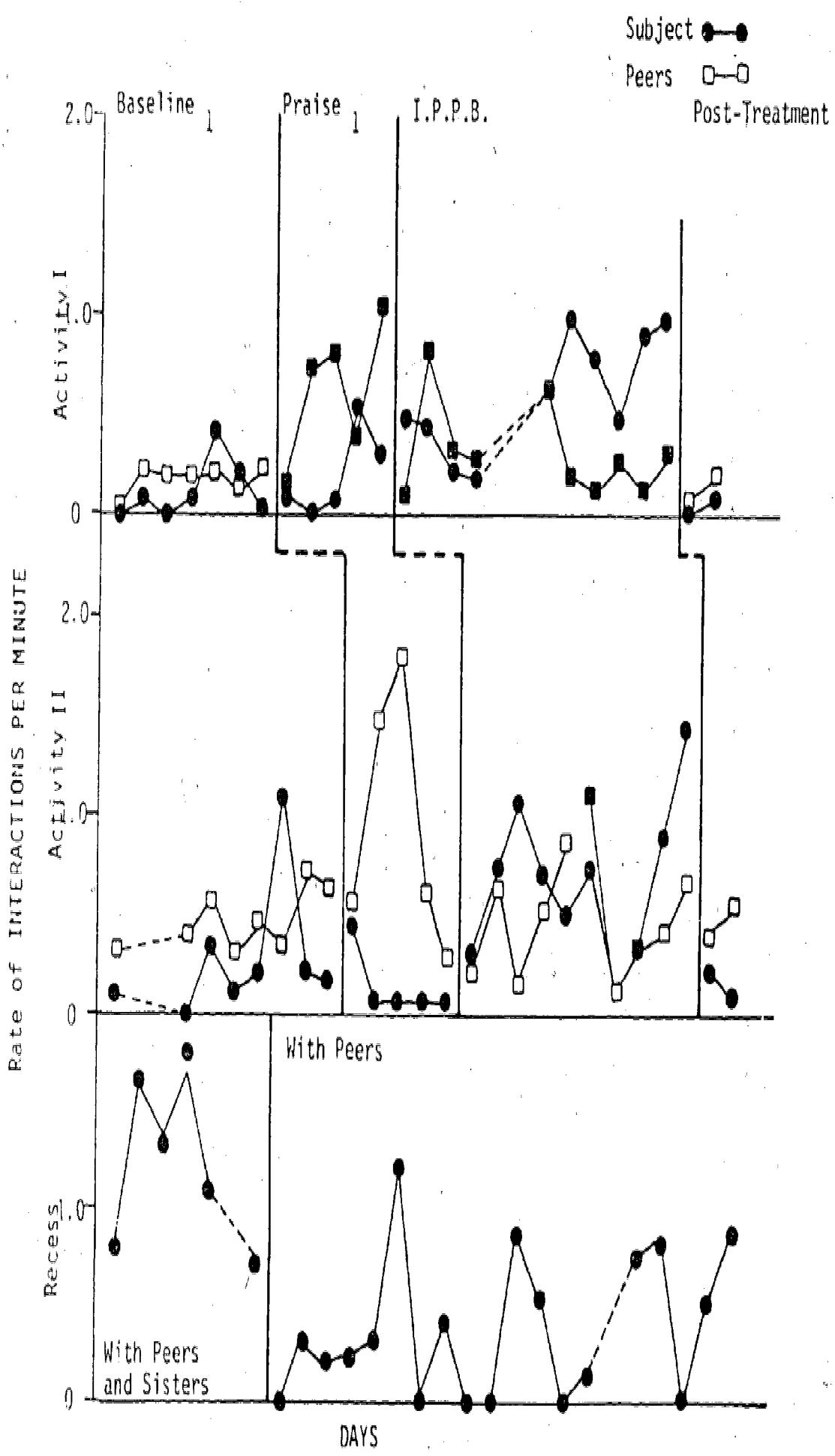

Figure 1. Mean daily interaction rates for subject and peers across settings and phases.

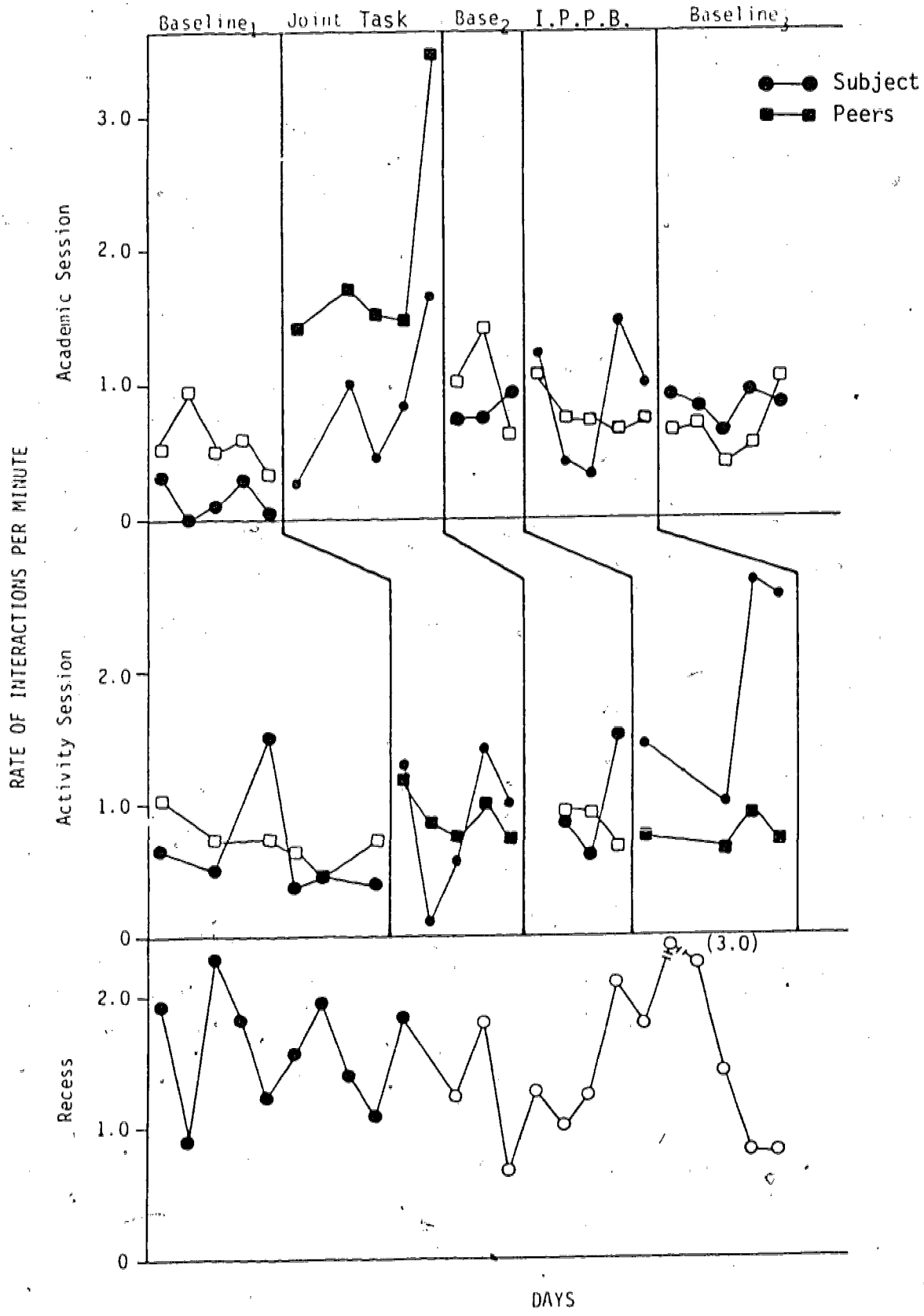

Figure 2. Mean daily interaction rates for subject and peers across settings and phases.

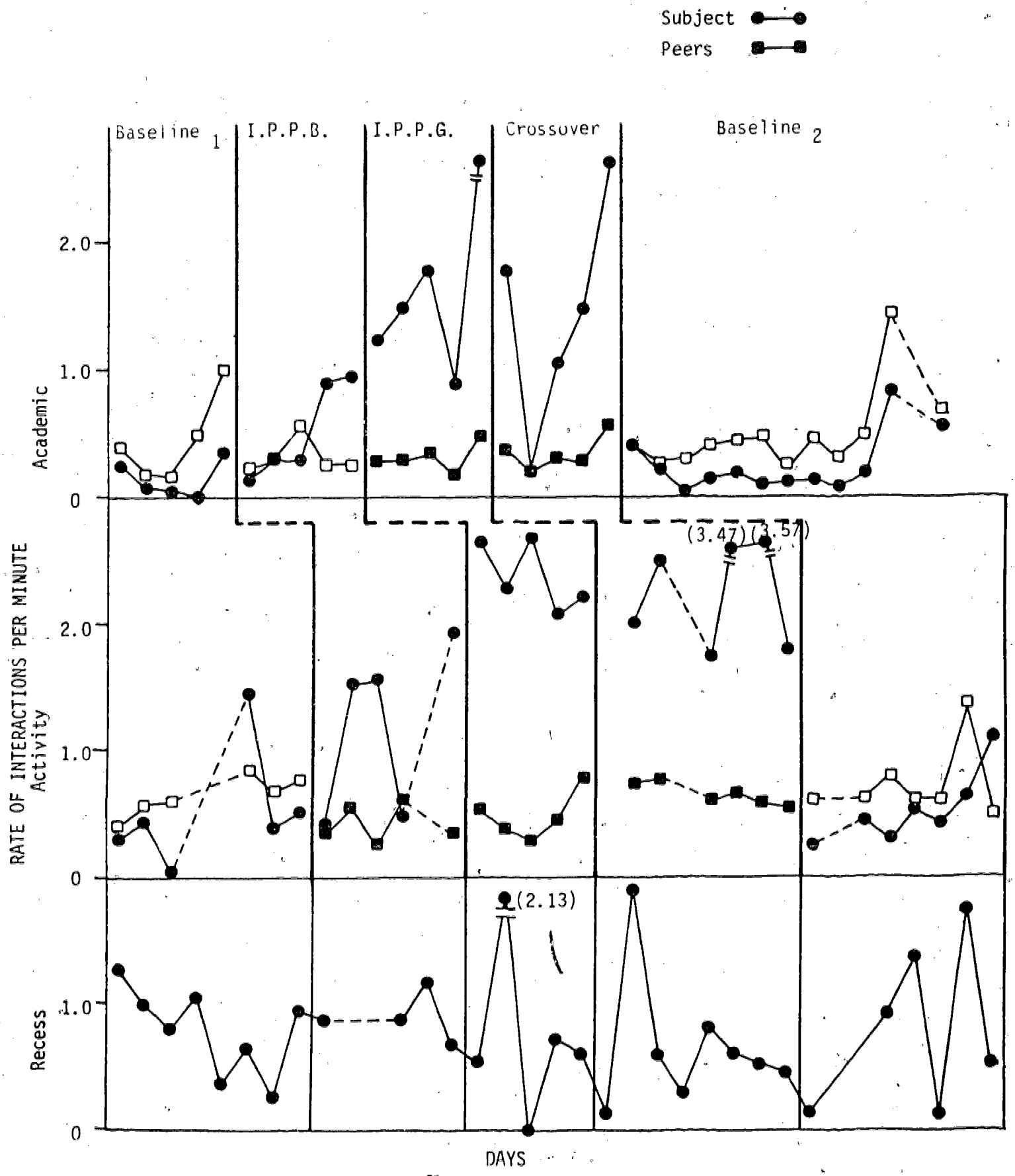

Figure 3. Mean daily interaction rates for subject and peers across settings and phases.

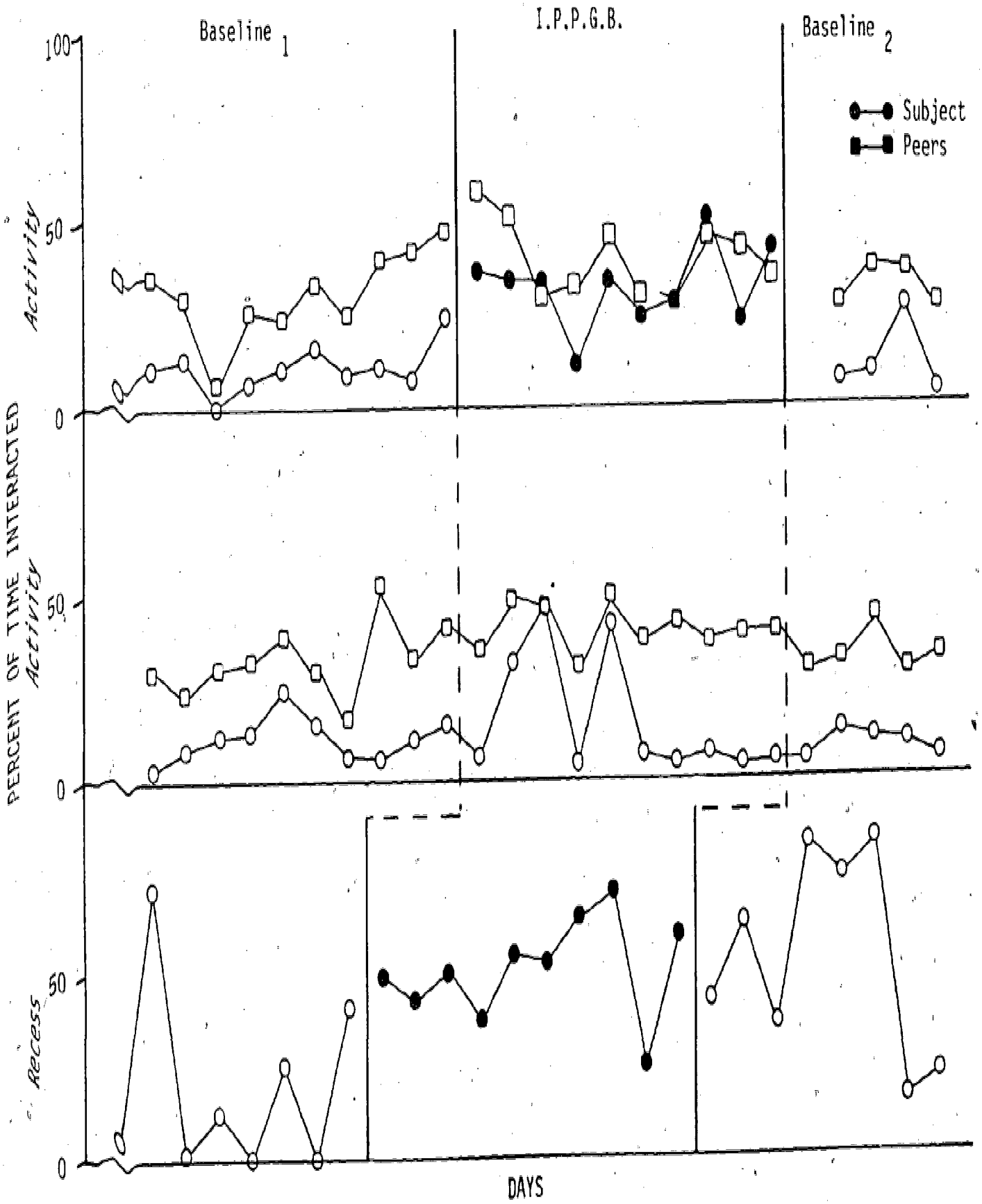

Figure 9. Mean percent of time interacted for subject and peer group across settings and phases.

Validating Teacher Selection with Normative Data for Preschool Social Interaction

Charles R. Greenwood, Hill M. Walker, Nancy M. Todd and Hyman Hops

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Assessments and Interventions

Hyman Hops, Chair

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Validating Teacher Selection with Normative Data for Preschool Social Interaction

Charles R. Greenwood, Hill M. Walker, Nancy M. Todd and Hyman Hops

Numerous studies of young children's social behavior have been carried out in the preschool setting. Few, however, have been conducted with the expressed purpose of generating normative data on social interactive processes for decison making purposes in early identification of social withdrawal and/or evaluation of behavioral treatments aimed at teaching social interaction skills (Greenwood, Walker, Todd, & Hops, Note 7). Even fewer studies have been completed investigating the validation of cost effective screening procedures, e.g. teacher nominations, which might assist in the identification of socially withdrawn large preschool classroom populations.

The purpose of this report was to present the first year findings of a three-year project designed to investigate the validity of teacher paper and pencil instruments for identification of socially unresponsive students. Behavioral observations served as the validation criterion for teacher identification measures. As a result of the behavioral observation data collected, normative findings for preschool for social interactions are also presented.

Subjects and Setting

The subjects for this investigation were approximately 490 preschool students, ages 3-7, drawn from 17 preschools in the local Eugene-Springfield, Oregon, area (pop. 130,000).

Twenty-nine preschool teachers were contacted using a local child care directory (Balk & Yech, Note 8) listing preschool, kindergarten and day care services. The students in this investigation ranged in age from 36 months to 95 months. Forty-nine percent were male, fifty-one percent, female.

The preschool classrooms consisted of three basic types: (a) the private preschool (N=18); (b) the cooperative daycare - neighborhood preschool (N=5); and (c) the parochial, church sponsored preschool (N=6). None of the preschools in this sample were associated with the local school districts nor were university related daycare programs included. Classrooms ranged in size from 11 to 30 students per class. Most teachers attempted some type of academic program in addition to general daycare service. As would be expected in such a large sample, the developmental, religious, and educational philisophies directing the programs were diverse and wide ranging. Classes were usually held on alternating half days per week, e.g. Monday, Wednesday, Friday or Tuesday, Thursday. However, eight of the classes (principally daycare) retained children for the entire day. Each class was generally taught by one teacher; however, the number of teachers ranged from one to five within classrooms and in at least five cases teaching responsibilities were shared by several teachers. Ten of the classes had teacher aides, usually volunteer parents, assisting during different times of the day.

Behavioral Observations of Social Interaction

A behavioral observation system (Interaction Recording System - IRS) (Todd, Note 9) for recording the dyadic verbal, nonverbal, and physical interactive behaviors of preschool students was developed based upon a prior system (Hops, Todd, Garrett, & Nicholes, Note 6). Verbal responses were those comprised of real words, sentences, etc., e.g. "Hello, Susan, what are you doing?" Nonverbal responses were defined as interactive signals such as smiling at, nodding, pointing, handing to, or taking from, etc. Physical responses were defined as behaviors requiring touching, hugging, wrestling, or nudging of the body. The observation system enabled one observer to record the interactions of up to 10 students in a class in sequential and free operant fashion. All subjects wore an identification number on their chest and back during observation sessions.

When an interactive response occurred, e.g. a social initiation to a peer, the observer would code the subject's identification number followed by a dash in an interaction coding box on the record sheet. When a peer responded to the initiation, that subject's number was coded in the same box separated from the first by the dash. The first number recorded always indicated the child who initiated the interaction. Examination of each coding box yielded information concerning the following interactive dependent behaviors: (a) student interactions, i.e. initiations responded to by peers, (b) initiations to peers, (c) responses to initiations, and (d) initiations ignored.

Observer training. During the course of the project, a total of 26 observers were trained to use the coding system and collect data. Three training waves of approximately nine observers each were completed during the project. Observer trainees read the manual and took the unit mastery tests corresponding to the chapters in the manual. Discussion of procedures, terminology and expectations followed. Videotape simulations of interactions were next used to practice recognizing interactions and coding them. Roleplaying was also interspersed with videotape practice; several observer trainees roleplayed preschoolers while others coded their interactions.

During field training trainees entered preschool classrooms and simultaneously coded children's behavior with the observer trainer. A criterion of 85% for sequential agreement and 90% for interaction agreement had to be achieved in the field on three consecutive 15-minute trials for an observer to be considered reliable and ready for actual data collection.

Interobserver agreement. Interobserver agreement on the code definitions and recording processes were checked using several methods. On a daily basis, simultaneous observations between observers were scheduled between two, and sometimes three, observers. All checks lasted for 10 minutes, representing

one-third of the usual 30 minute observation session. Checks were scheduled between observers quasi-randomly to prevent idiosyncratic differences arising between observer pairs from systematically influencing measurement (Johnson & Bolstad, 1973).

Within check agreement was computed both for the number of interactions recorded by observer pairs and for the correct sequence of the interactive responses, e.g. who initiated and who responded. These checks were conducted by counting the number of agreements within each interaction box on the coding sheet. These agreements were then divided by the maximum number of interactions coded by either observer and then multiplied by 100. The average coefficient of agreement for number of interactions was 9[illegible]%, ranging from 92.6%-100% over observers. Equivalent values for the correct interactive sequence was 93.8% with a range of 86.0-100%.

Agreement was also inspected over checks or agreement sessions by using the Pearson "r" with rate of interaction as the unit of analysis. The average correlation over 21 observers with checks greater than 5 was .99 while individual observers ranged from .95 to 1.00 when their scores were correlated to all other observers.

Internal consistency. Split half procedures were used to assess the internal consistency of the observation measures. The split half procedures used an odd-even session division of the total 20 observation sessions. The means across all sessions for the odd numbered days were correlated to the means of the even numbered days. This correlation between halves was estimated at .75 ($df = 426$, $p < .01$). A t test indicated that no differences occurred between halves computed in this manner ($t = .493$, $df = 426$, n.s.); the odd-even means were .666 and .661, respectively.

Procedures

Teachers were asked to select a 30-minute span of time in which the social interaction of the students in the class could be observed. A free play period was requested where the students were free to interact with any of the children in the class. Direct teacher instruction was kept to a minimum. Teachers agreeing to participate signed a contract and received $30 at the completion of observations for their participation.

Teachers were asked to complete an information sheet for each student in the class including information on age, sex and whether or not, to the teacher's knowledge, the child had previously attended preschool. Teachers also completed two paper and pencil assessments of each child's social interactive behavior. The first required the teacher to simply rank order the class from low to high on the number of daily interactions. The second measure consisted of the Walker Problem Behavior Identification Checklist (WPBIC) (Walker, 1970; Greenwood, Walker, Todd, & Hops, Note 7).

Repeated observations of social interaction next were planned to be representative of a 2-month period. Twenty 30-minute observations were scheduled in an alternating fashion for each class. These generally occurred during every other session in which the class met. Six hundred minutes (20 sessions x 30 minutes) was the maximum amount of observed time possible for each student.

Results

Analysis of the data began with stepwise multiple regression investigating the ability of the following variables to predict observed interaction rates. They were (a) teacher ranking, (b) WPBIC, (c) age, (d) sex, (e) previous preschool experience, and (f) class size. Results of the analysis indicated two variables that accounted for the largest proportions of variance, teacher

ranking (17%) and sex (5%), producing a multiple correlation of .47. The four remaining variables entered the equation last and accounted for the remaining 4%.

Teachers' Accuracy in Predicting Low Interactors

The ability of teacher rankings and checklist measures to predict low interactors was investigated. Extreme high/low groups were formed on the social interaction measure using teacher rankings, the variable correlating highest with interaction. The three high and three low subjects in each class were combined to form the two groups (N=75/group). An ANOVA indicated a significant difference between the high and low groups with respective means of .489 and .813 interactions per minute ($p < .001$).

Next, an empirical test of the additional contribution of the WPBIC was made. Initially, low groups were formed based upon ranks, then within this sample extreme groups were created using checklist scores. As illustrated in Table 1, three tests were carried out. First, a sample was formed using all subjects ranked 1-5 in each classroom (N=130). The mean interaction rate was

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Insert Table 1 About Here

.547 for this group. Splitting this low sample into three groups of approximately equal size using checklist scores resulted in means of .600, .550, and .481 ($p < .05$). These data indicated that the checklist helped select lower interactors when used in combination with the first five teacher ranks. Other analyses using groups initially formed on the basis of ranks 1-4 and 1-3, however, were not significantly improved with consideration of the checklist information. In fact, the 1-3 ranked group means of .483 was nearly equivalent to the rank-checklist combination group at .454 (see Table 1).

The final test of the teachers' accuracy looked at the ability of each teacher to identify the lowest interacting subject in their classrooms. Table 2 presents a summary of these results. The data indicated that 8 of the 26

Insert Table 2 About Here

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teachers with complete data (31%) identified the lowest interacting student on the first rank. Nineteen (73%) identified the lowest interactor within the first four ranks, while 22 (88%) had identified the lowest interactor within eight ranks.

Normative and Descriptive Findings

Normative findings. The mean interaction rates and standard deviations for each classroom are presented in Table 3. The overall mean (N=457) was .627.

Insert Table 3 About Here

Individual classroom means ranged from .476 to .962. A one-way ANOVA testing for differences in class means was significant ($F(28,428) = 5.274$, $p < .001$). Table 4 further describes the normative sample by percentile ranks. For example, at the 50th percentile and interaction rate of .642, rank of 8, and checklist score of 0 were noted. At the 10th percentile, an interaction score of .368, rank of 2, and checklist score of 6.00 were observed.

Insert Table 4 About Here

Descriptive findings. To investigate the trends in social interaction development, a three-way analysis of covariance for unequal N was computed using the classroom mean interaction rate level as a covariate to control for differences in mean interaction rates among classes. The levels of the 5x2x2 analysis were ages: 3, 4, 5, 6, 7, sex: Male, Female, and Previous Preschool

Experience: yes, no.

Results of the analysis indicated significant main effects for the factors age ($F(4,343) = 2.61$, $p < .036$) and sex ($F(1,343) = 15.69$, $p < .001$). All other main effects and interaction effects were nonsignificant. The adjusted and unadjusted cell means are presented in Table 5. The adjusted means are also plotted in Figure 1. Inspection of the trends over ages suggests (a) consistently higher levels of interaction for males as opposed to females, (b) generally

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Insert Table 5 and Figure 1 About Here

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increasing trends in interaction rates with increased age and some leveling off following age 5, e.g. experience-females, experience-males groups, (c) a trend, particularly at ages 3 and 4, indicating that no experience-females appeared consistently lower, surpassing experience-females only at age 7.

Discussion

The results of this investigation suggested that teacher rankings of preschoolers' interaction during free play actually only accounted for 17% of the total variance over the total sample of approximately 457 students in 26 classrooms. Other factors combined, including scores on the social withdrawal subscale of the Walker Checklist, accounted for the remaining 9% of the total 26% predicted in the full regression equation. Further analyses including formation of extreme groups using the ranking measure, and most importantly, looking at teacher ability to identify the lowest interactor in their class, suggested that the ranking procedure could be an effective screening procedure when selecting among children in the lower extreme of the interaction rate distribution.

Given that 73% of teachers can identify the lowest child within 4 ranks, sufficient strategies to insure identification of the missing 26%, e.g. repeated screening, could be devised to reduce this error. Within the 73%, the use of

additional assessment, for example, an observation system in conjunction with a body of normative observation data, could produce an effective screening/identification system for use in the preschool.

In the construction of normative data for social interaction, it appeared that factors such as age, sex, and classroom interaction level must be considered.

Further research is presently continuing to replicate the present findings, expand the capability of the present behavioral observation system, and develop a complete screening-assessment package for social interaction.

Table 1

Effect of Combining the WPBIC and

Ranks When Selecting Low Interactors

Inclusive Rank Samples	Interaction Mean	SD	WPBIC Score Breakdown on Rate 00	1-4	5-14	One-Way ANOVA
1-5	.547	.236	.6002	.5501	.4813	
N=130			SD=.266	SD=.219	SD=.197	F=3.00 p<.05
			N=50	N=38	N=42	
1-4	.510	.214	.5597	.5036	.4668	
N=104			SD=.231	SD=.205	SD=.200	F=1.76 p>.05
			N=36	N=31	N=37	
1-3	.483	.191	.5230	.4836	.4543	
N=78			SD=.186	SD=.173	SD=.206	F= .87 p>.05
			N=23	N=23	N=32	

Table 2

Teachers' Accuracy in Identifying the Lowest Interacting Pupils in Their Classes (N = 26 Teachers)

No Ranks Required	Cumulative Frequency Identified	Cumulative Percentage
1	8	31%
2	13	50%
3	16	62%
4	19	73%
5	20	77%
6	20	77%
7	21	81%
8	22	88%
9-N	26	100%

Table 3

Normative Data on Social Interaction

Rates for Classes

Class ID#	N	$\bar{X}$	SD	Class ID#	N	$\bar{X}$	SD	Class ID#	N	$\bar{X}$	SD
10	30	.488	.124	32	16	.692	.222	42	19	.476	.197
11	12	.588	.097	33	17	.860	.309	43	14	.652	.150
22	19	.499	.197	34	16	.756	.230	44	10	.843	.400
23	22	.531	.145	35	19	.637	.186	45	19	.535	.223
24	20	.741	.254	36	11	.868	.129	50	10	.708	.203
25	19	.604	.168	37	12	.592	.158	51	13	.542	.250
26	16	.685	.275	38	15	.540	.226	52	16	.532	.235
29	12	.685	.325	39	13	.496	.206	53	13	.615	.232
30	14	.962	.421	40	12	.620	.139	54	13	.733	.163
31	19	.586	.147	41	16	.477	.143	Overall	457	.627	

Table 4

Percentile Ranks for the Total Sample

(N = 423) and Corresponding Social Interaction Levels

Percentile	Social Interaction Rates	Ranks	WPBIC
99	1.5440	25.270	0
90	.9481	17.000	0
89	.9316	16.000	0
80	.8298	13.900	0
79	.8198	13.000	0
70	.7660	11.600	0
69	.7615	11.000	0
60	.6961	10.000	0
59	.6890	10.000	0
50	.6418	8.000	0
49	.6322	8.000	0
40	.5759	6.000	0
39	.5718	6.000	1.000
30	.5129	5.000	1.000
29	.5070	5.000	3.670
20	.4501	4.000	4.000
19	.4442	3.000	6.000
10	.3680	2.000	6.000
9	.3547	2.000	11.000
0			

Table 5

Means for Social Adjusted and Unadjusted

Interaction Rates by Age, Sex and Preschool Experience

		Social Interaction				Social Interaction (Adjusted)			
		MALE		FEMALE		MALE		FEMALE	
Age		Exp	No Exp	Exp	No Exp	Exp	No Exp	Exp	No Exp
	$\bar{X}$ =	0.55267	0.49796	0.55161	0.42373	0.57635	0.57947	0.55026	0.47878
3	SD =	0.13149	0.22260	0.17888	0.18949				
	N =	7	8	7	10				
	$\bar{X}$ =	0.67873	0.61042	0.61819	0.44810	0.66988	0.62699	0.59445	0.43961
4	SD =	0.27386	0.18865	0.22830	0.13373				
	N =	17	16	15	8				
	$\bar{X}$ =	0.69308	0.62310	0.59635	0.57220	0.71326	0.61525	0.61488	0.56397
5	SD =	0.19110	0.19835	0.17766	0.28080				
	N =	38	24	34	34				
	$\bar{X}$ =	0.66913	0.67220	0.61113	0.55000	0.64768	0.67481	0.60767	0.53580
6	SD =	0.25276	0.18380	0.21981	0.19722				
	N =	23	22	30	23				
	$\bar{X}$ =	0.76073	0.74816	0.63910	0.64888	0.71596	0.75487	0.61336	0.63834
7	SD =	0.17727	0.30969	0.23124	0.18045				
	N =	19	5	13	11				

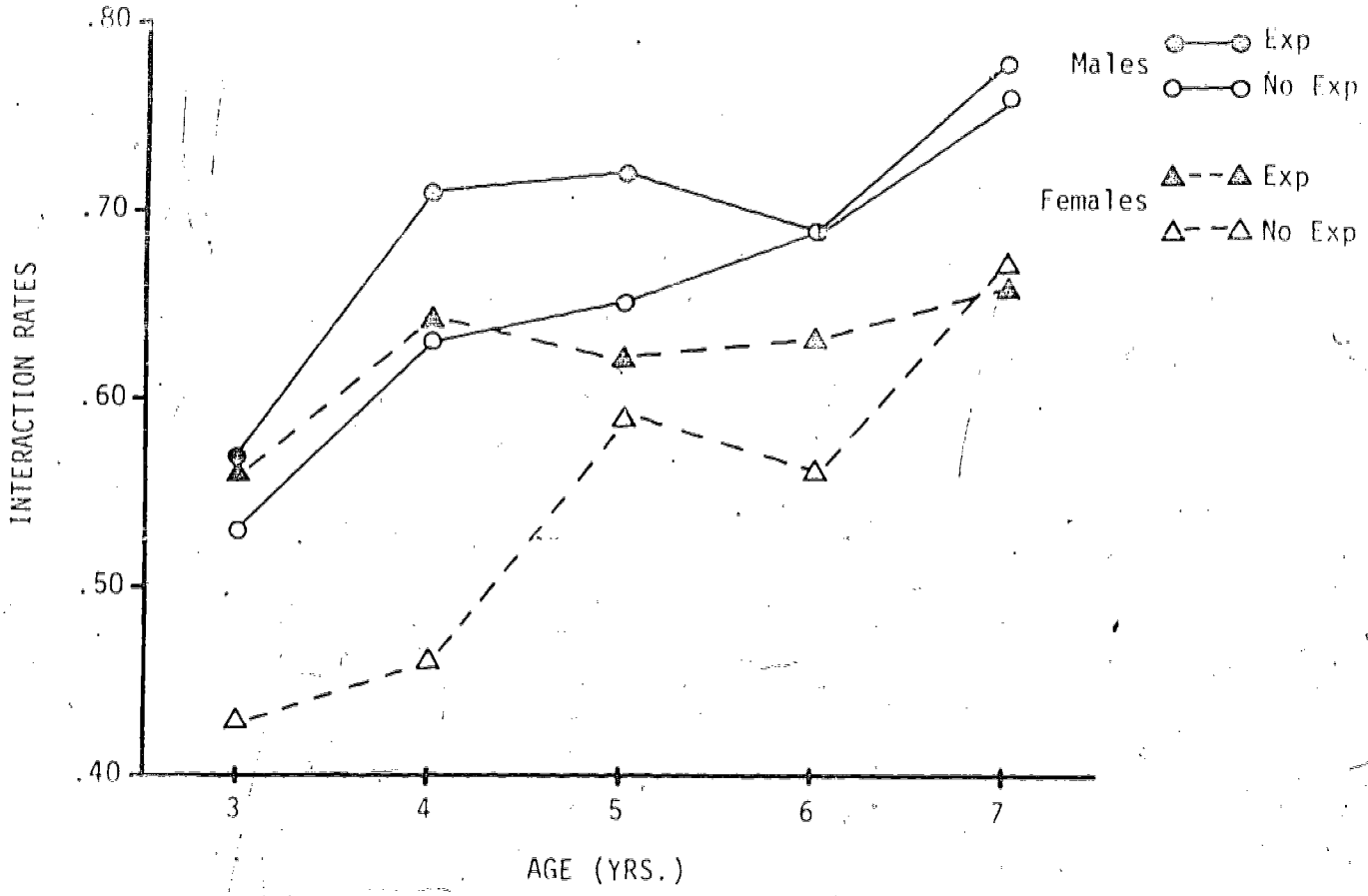

Fig. 1 Social interaction rates by sex, age and previous school experience

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