To the Graduate Council:

I am submitting herewith a dissertation written by Thomas David Coe entitled "Independent Schoolwork: A 'Keystone' Behavior for Classroom Intervention Strategies." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Robert G. Wahler

Robert G. Wahler, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

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INDEPENDENT SCHOOLWORK: A "KEYSTONE" BEHAVIOR FOR CLASSROOM INTERVENTION STRATEGIES

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Thomas David Coe

August 1976

1288305

This is for Leslie, in gratitude for her encouragement and support.

ACKNOWLEDGEMENTS

I wish to acknowledge the following people without whom this dissertation could have never been completed: John Weeks, Beth Kell, Carole Wahler, Sandra Gillis, Glen Wilson, Bill Verplanck, Jo Lynne Cunningham, Rod Hammond, Al Wiberly, John Drake, Damien Coe, Ed Rogers, Ann Lacava, Bob Berland, George Leske, Bruce Fender, Serge Martin, Lenneke Favier, Susie Assid, Holly Moore, Paula Stangline, Ruth McArthur, Mary Lou Preston, Mark Friedrich, Julie Schuffman, Tom Metzguer, Scott Anderson, Stan Hurt, Joel Spencer, Bob Bogen, Laura Wilhite, Elaine Arms, Ernestine Moore, Mary Alice Wishart, and the children. A special thanks to Bob Wahler and Pat Mussey. And for mother and dad, who stuck with my decisions and supported me through it all.

ABSTRACT

The intention of this study was to test the effect, in three public school classrooms of the third and fourth grades, of a short, 15-minute period devoted to quiet, independent schoolwork. Based on earlier work the study attempts to find changes in the rates of other behaviors not manipulated directly by the experiment. Furthermore, the study investigates the possibility that behaviors may also be effected at later times in the day by the experimental condition. In an ANOVA reversal design, the study experimented with the 15-minute "Quiet Time" as an addition to a standard contingency management program.

The data for the study was gathered by the teachers who counted the students' work units as they were completed, and the students' rule violations. Also trained observers entered the classroom and observed randomly selected children. The data was analyzed statistically and graphed, and generally showed the significant, immediate changes in behavior could be manipulated by the teacher when they used a quiet period every morning. Any later effects in the day were limited to a short term effect in a single classroom. The results merely show that the children could remain quiet and work independently.

The study concludes with a discussion of the ethical questions raised by behavior change strategies which ask children to remain quiet. In this study the results are equivocal and somewhat inconclusive. The expected overall effect of Quiet Time was not achieved,

however, the population in this study was normalized and heterogeneous. It is perhaps true that the response set stability described in the literature of deviant behavior is limited to deviant populations; the findings of this study do not challenge those notions. Quiet Time, or independent behavior, may have much greater effects on the behaviors of troublesome children rather than the behaviors of normal populations.

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CHAPTER I

INTRODUCTION

Response classes have been cited by applied behavior analysts as a structure of a within-child behavioral system. Wahler (1975) noted that these structures, or behavior clusters, were stable across an A-B-A-B design; that is, the clustered behaviors covaried consistently throughout experimental manipulations. Wahler and Moore (1975) extended the analysis by using larger samples and found strong correlations between sustained isolated activity and low rate problem behaviors. Specifically, in the home settings they found that sustained isolated toy play covaried negatively with low-rate problem behaviors, such as fighting, and that in the school settings appropriate social behavior with peers and adults covaried positively with low rate problem behaviors. From these findings they argued that the usual behavior modification tactic of increasing appropriate social interactions might be misguided, and that therapies aimed at increasing these children's periods of independent activity might provide many long range beneficial other effects.

This "indirect" behavior modification leads behavior analysis to several interesting points. First, it takes up the banner of Willems (1974) who contends that behaviors are inter-related as systems, and second, it follows that accurate behavior analysis could lead behavior modifiers to the position of making interventions in an environment that lead to greater and more long-lasting change. Such "intervention

economy" would be based on discovering what Wahler and Moore (1975) refer to as "keystone" behaviors and manipulating these behaviors through operant behavior modification techniques. Through the use of multiple measures (e.g., Wahler, House, and Stambaugh, 1976), the within-child system of behaviors can be measured, and behavior clusters (or "side effects", as they are called by: Risley, 1968; Sajwaj, Twardosz, and Burke, 1972) can be identified. The next step is to test these clusters by directly manipulating the rates of keystone behaviors and observing concurrent changes in other behaviors. Wahler (1975) demonstrated this phenomena clearly.

The child's behavior can be viewed as a system of covarying responses, which in turn is a subsystem component of other systems such as a school classroom or family. Changes in the responses of one system component should have an impact on the larger systems. Studies by Drabman, Spitalnik, and Spitalnik (1974) and Sundstrom and Altman (1974) show a strong relationship between group structure and behavior. Furthermore, Drabman and Lahey (1974) and Kazdin (1973) showed that the behavior of "untreated controls" in a school classroom was changed when contingency management procedures were applied to target children. Conversely it might be noted that only one of Drabman, Spitalnik, and Spitalnik's (1974) four token reinforcement schemes produced change in group structure, although measured change in behavior occurred in all procedures. This raises another important issue for psychologists interested in long term therapeutic change. Wahler and Leske (1973) have shown dramatically that significant and desirable changes in children's behavior can go unnoticed by their

caretakers; that is to say, the change makes no observable difference in the social system. In social learning theory language, the response is extinguished because it is not observed by the reinforcement dispensers in the environment (e.g., Patterson and Reid, 1970; Patterson, 1975). It is imperative, then, that for long term behavior change to take place, the changes must be supported by the environment.

It is a dilemma of sorts which presents itself to the behavior change therapist. If the therapist, for example, sets up a contingency management program for a disruptive child in his school setting, it could lead to undesirable effects not only in other behaviors of that child but also the behavior of other children. On the other hand, it may be stated that if there is no change in the behavior of other children (i.e., other components of the system) in the classroom, then the modification has not penetrated the social system and therefore will not be maintained. Hoffman (1971), in addressing this same question as it relates to family therapy, asserted that the homeostasis of the family system must be upset, in order for change to come about.

This study was aimed at two system levels of child behavior. The first and most important was based on the keystone behavior concept of Wahler and Moore (1975). The study tested the notion that manipulated changes in the amounts of time spent by the child in independent schoolwork will covary with other behaviors of the child. The second level system measured concurrently was the social interactions in the classroom. These measures were taken during the first and last phases of the study in order to determine whether there were any variations in the social interactions which might be results of the classromm intervention program.

CHAPTER II

METHODS

I. SUBJECTS

The subjects were public elementary school pupils in three classrooms at a Knoxville elementary school serving an upper middle class neighborhood. These classes comprised the third and fourth grades of this school (one class of each grade and one split group). There were 85 students, in all. The third grade class had 26 students; the fourth grade class had 30 students; and the split group had 29 pupils.

II. APPARATUS

Three measurement procedures were employed in this study. One was direct observation by a trained observer, another involved the daily data keeping of the teachers and the last was a paper and pencil test administered by the teacher.

Standardized Observational Coding System (SOCS)

This is a pre-packaged behavioral coding system developed by Wahler, House and Stambaugh (1976). The observer trained in this system can directly code 20 ostensively defined behaviors of the observed child and 6 ostensively defined social stimuli that may come from peers and adults in the classroom (see Appendix A). The SOCS records behaviors that are appraised by caregivers as positive, negative neutral. Data gathered by SOCS observers provide a time sample

(one-half hour long, with alternating 10 second observation and 5 second recording intervals), which is converted to percentage rates of occurrence for the behaviors, some of which are defined as discrete operations, others having a durational quality. That is, behaviors are scored as occurrence/non-occurrence according to the ostensive definition, which may include a stipulation that the behavior was sustained for the full 10 second "observational" interval.

Teacher Classroom Assessment (TCA)

In each classroom two categories of data are kept by the teacher. They are work units (assigned vs completed) and rule violations. These are explained at length in Coe and Wahler (1975), but briefly they involve the teacher keeping records of the work units (such as math,spelling, etc.) that each child is told to do, and the actual number of units satisfactorily completed. From this a "percentage completed" figure can be obtained. In addition, the teacher counts the number of times each child is observed violating the classroom rules, as defined and posted by the teacher.

Sociometric Data

In line with the studies of Drabman and Lahey (1974) and Drabman, Spitalnik and Spitalnik (1974), sociometric (e.g., Gronlund, 1959) data was recorded. The criterion question, "Who are the five people you would most like to sit beside?" produced a rating which translates into a sociometric status scale. Changes in that scale will be seen as demonstrating a change in the social system (a la

Drabman and his colleagues). The criterion question was asked of the children in the initial and final phases of the study.

III. OBSERVERS

The observers for this study were trained in the standardized observational coding system (SOCS) of Wahler, House and Stambaugh (1976). The observers were recruited from the student population of the University of Tennessee and included 13 undergraduates and 1 graduate student, all of whom received course credit from the Psychology Department for their work. Their reliability in the field (school) setting was checked by a supervisory observer.

IV. EXPERIMENTAL CONDITIONS

This study was designed primarily to test the notion suggested by Wahler and Moore's (1975) correlational data that periods of independent behavior that is purposive will lead to a reduction in troublesome behavior. This independent behavior, which Wahler and Moore (1975) have referred to as productive solitude, is characterized by solitary toy play (see ST, Appendix A) in home settings and solitary sustained schoolwork (see SS, Appendix A) in the school setting. Periods of quiet independent work ("Quiet Time") were instructed by the classroom teacher and were manipulated in a reversal design. Following four weeks of pre-baseline measurement, a contingency management program was instituted in each classroom.

The contingency management program consisted of the teacher making work unit assignments to each child at the beginning of the

school day. The child recorded the work units assigned them on a personal work ticket and then checked off the units when they were completed. At the close of the day, the teacher recorded, on a weekly summary sheet, the work units assigned and completed by each child. Also as part of the contingency management program, the teacher counted the rule violations of the children. The teacher posted a list of classroom rules and explained them to the students, and thereafter used the procedure loosely referred to as "time out" as a consequence to each observed rule violation. The time out used here consisted of a period of 5 minutes in which the child was separated from the rest of the class by being placed, sitting on a chair, in a corner of the room. The reward system of the contingency management program was based on the student's earning trips to the "Achievement Store," which gave the child a choice of paperback books and some toys. The Achievement Store was available on an unpredictable basis approximately every two weeks, and a trip to "the store" was earned by the student when they completed all work units except one and had no more than one time-out in the period since the previous "store day." Also the teachers set daily contingencies, which varied from day to day, and from teacher to teacher. (For a complete detailed description of the program, see Coe and Wahler, 1975). This program of contingency management continued throughout all phases of the study (see Wahler and Moore, 1975, for data on the demonstrable effect of the program).

The design of this experiment was to test the effect of the Quiet Time (QT) experimental condition (an imposed 15 minute period

of quiet independent schoolwork) which was in addition to the contingency management program. Therefore, in this study, the baseline phases consisted of contingency management alone (which lasts throughout the day) and the treatment phases consisted of a 15 minute period of Quiet Time, plus the continuous program of contingency management management. Following a week of baseline (contingency management alone), a Quiet Time was initiated every morning in all three classes. The students were told to be totally quiet during the entire interval, which should be taken up with schoolwork activities performed independently by each child. Beginning with 5 minutes the first week, an incremental phase increased the Quiet Time to 15 continuous minutes by the fourth week. After two-and-a-half weeks of 15 minute periods of Quiet Time imposed on the contingency management program (Treatment I), the condition was dropped in all classes for two weeks (Baseline II--contingency management alone). Lastly, all three classrooms returned to the condition of 15 minutes of Quiet Time in addition to contingency management (Treatment II). A further condition of the Quiet Time condition was that the contingency management system continued during the Quiet Time; that is, work units could be completed during that time of day, that disturbances during Quiet Time were punished by a time-out-by-separation and that the successful completion of Quiet Time without a rule violation was rewarded as another completed work unit.

SOCS data were collected during these phases and observations[1] were scheduled for set times during the day. Through Baseline I, observations were made at exactly 9:30 a.m. (by observers trained in the SOCS). These observations lasted 30 minutes and were taken on a selected child. In the Treatment phases, the Quiet Time began at exactly 9:30 a.m. in each classroom, simultaneously with the SOCS observation. The SOCS observer recorded data on a selected child during the 15 minutes of Quiet Time and for the 15 minutes immediately following. At a later time in the school day, following each classroom's lunch period, the SOCS observer made another observation in each classroom. These observations covered only the final three phases of the study (Treatment I, Baseline II, and Treatment II).

The sociometric data were gathered by the teachers in the three classes during the end of the Baseline I period and the end of the Treatment II phase. This is considered to measure a change in a classroom's social interactions and was used to assess the effects of the social system by the presence of the total experimental program. Drabman, Spitalnik and Spitalnik (1975) found that the repeated use of the technique led to boredom on the part of the children, resulting in stereotypic and invalid data, therefore this experimenter relied on only two measures. The sociometric data were recorded as a matrix and the number of times chosen for each child was calculated.

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[1]The child to be observed was chosen by the observer from a class roster which had arranged the children in each class by the use of a random number table. However, the observations were not truly random since each child was observed once before any child was observed a second time.

The teacher classroom assessment (TCA) data were used primarily in the contingency management program which was going on in these classrooms. Percentage of work units completed and data on time-outs are included in the analysis of the experiment.

V. DATA ANALYSIS

The statistical procedures employed in this study are an analysis of variance (ANOVA) computed on the percentages of occurrence of selected behaviors outlined in Appendix A, and t-test analyses on the sociometric data. The most important data gathered for this study were the SOCS data as they relate to the treatment variable. Not all SOCS categories were considered germane to this study; however, categories reflecting sustained activities, compliance/opposition and social behaviors were indicated to be potentially significant by Wahler and Moore (1975). Some behaviors were summed (such as Σ O, "the sum of oppositional behavior," which is the sum of the categories O, O-, CP and RV) prior to analysis. The analysis of variance (ANOVA) was first done in a "two-way" format (classrooms x experimental conditions). Then the data of each classroom were analyzed separately in "one-way" ANOVA designs.

Data gathered during the Quiet Time period of 9:30-9:45 a.m. were compared to data from comparable times of the baseline periods in order to assess the actual implementation of the treatment. In Wahler, House, and Stambaugh's (1976) coding system (SOCS), no behavior category (see Appendix A) directly reflects independent activity; however, the behavior could be easily measured by simply

summing all instances of Sustained Schoolwork (SS), Sustained Toy Play (ST), and Sustained Work (SW) that did not occur simultaneously with instances of social categories (Ac, Aa, SIa, SIc, SA+, SA-, SC+, SC-, MA, MC, IA+, IA-: See Appendix A for further explanation). This critical measure of independent behavior (IB) demonstrates the implementation of the treatment phase.

The second half of the observation period (from 9:45-10:00 a.m.) was analyzed as to the immediate consequence of the immediately preceding period of Quiet Time. ANOVAs were performed on all relevant behaviors during these two time periods. Thus the data from the 9:30 to 10:00 a.m. observations was split, in order to answer two separate questions: (1) What happened during Quiet Time? and (2) Was there any immediate effect of the QT treatment?

Furthermore, during the final three phases of the design (Treatment I, Baseline II, and Treatment II), observations were taken at other times of the day (shortly before lunch) in order to assess any later consequences of the QT manipulation. ANOVAs were executed on all relevant behaviors. The observation schedule for each classroom is shown in Table 1.

TCA Data

Measures of work production and rule violations, recorded by the teachers, were analyzed in the same fashion as the SOCS data, both graphically and statistically, in order to provide a different measure of any effect of the QT treatment phase.

TABLE 1. SOCS Data Analysis

Analysis	Time of Day	Baseline I	Treatment I	Baseline II	Treatment II
Quiet Time	9:30-9:45 a.m.	cm	QT	cm	QT
Immediate Effects	9:45-10:00 a.m.	cm	cm	cm	cm
Later Effects	afternoon	no data available	cm	cm	cm

Note: The analyses were made horizontally (across treatment levels). cm means the normal program of contingency management is in effect. Quiet Time means the cm program is augmented by the period of "Quiet Time" during the observation.

Sociometric Data

The pre-post test data obtained by the sociometric measures were statistically analyzed by the correlated t-test method (McNemar, 1969, p. 114). The scores tested were the actual number of choices received by each child on the criteria measure. The data of the three classrooms were analyzed separately.

The results of this statistical analysis reveal the effect of the overall program in the classrooms, since the pre-test scores were taken in the pre-baseline (pre-contingency management) phase, and do not reflect directly any effect of the variable, Quiet Time. The equivocal nature of such results is also due to the measurement device itself. That is to say that despite the above cited work of Drabman and his colleagues, sociometric data are a somewhat crude gauge of the hypothetical construct, "social system."

Reliability Analysis. Wahler (1975) discusses the pros and cons of "conservative vs liberal" tests of the reliability of observations, which he refers to as Type I and Type II reliabilities. In the conservative Type I calculation only scored intervals enter the computation, while in the liberal Type II test observer agreement on the non-occurrence of a behavior weighs as heavily as observer agreement of occurrence. For this study, a compromise quotient, which ranged between Type I and Type II figures, was used (see Appendix B for an explanation of the computational procedure). Reliability coefficients for this data ranged from 74% to 92% with a mean agreement of 81.1%.

CHAPTER III

RESULTS

I. SOCS DATA

The results of the two-way and one-way ANOVAS are presented in summarized form in Table 2. The figures are for the treatment variables only.

TABLE 2. Significance Levels for Two-Way and One-Way ANOVAs

	Two-Way ANOVAs			One-Way ANOVAs		
			Time of Day			
Category	9:30-9:45	9:45-10:00	p.m.	9:30-9:45	9:45-10:00	p.m.
SS	p<.10	n.s.	n.s.	p<.001	n.s.	n.s.
SA	p<.01	n.s.	n.s.	p<.001	n.s.	n.s.
IB	p<.01	n.s.	n.s.	p<.001	n.s.	n.s.
Σ O	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Σ soc	p<.001	n.s.	n.s.	p<.001	p .01	n.s.
C	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
NI	n.s.	n.s.	n.s.	n.s.	p<.10	n.s.

Note: See Appendix A for definitions of the behavior codes. IB = SS + ST + SW - any interval where SIa, SIc, AA, AC, IA+, IA-, SA+, SA-, SC+, or SC- occurs. Σ O = the sum of O, O-, CP and RV. Σ soc = the sum of SIa, SIc, AA, and AC. n.s. = non-significant.

The two-way ANOVAs represent the results for all three classrooms, while the one-way ANOVAs represent the findings of a single selected classroom.[2] The two-way ANOVAs demonstrate simply that

[2]All three classrooms' data were analyzed and all three showed significant effects in the 9:30-9:45 time period for the same behaviors (SS, SA, IB and Σ soc). However, only the third grade class showed effects at any later times of the day and therefore, since it is the only class which is different, it is the only class whose data are presented individually.

the experimental manipulation had consequences. In the 9:30-9:45 time period, independent behavior (IB) was significantly different across treatment conditions which says that the teacher was able to increase the amount of independent behavior (mostly schoolwork) with the institution of Quiet Time. Likewise, the behavior Sustained Schoolwork (SS) showed a similar pattern, while the summation of social categories (Σ soc) predictable varied inversely across phases.

SS and Σ soc reaching significance levels is a predictable consequence of IB reaching significance as they are forced almost by definition to covary with IB. This is especially true of Σ soc, although it is not necessarily true of SS (since IB includes the sum of SS, ST and SW). However, it is to be expected in school settings that most of the instances which make up the IB category will be SS. The behavior Sustained Attending (SA) on the other hand is not, by definition, linked to IB and for the two-way ANOVA of all three classes it reached a significance level of $p<.01$, dropping in rate during treatment phases. Figure 1 graphically displays the overall means (across three classes) of the behaviors IB, SS, Σ soc and SA for the 9:30-9:45 time block. Table 3 displays the two-way ANOVA summary tables for the behaviors IB, SS, Σ soc and SA for the 9:30-9:45 a.m. period.

For the 15 minutes following the Quiet Time, there were no across the board significant differences; the same was true for the behavior in the afternoons. It may be said then that for the three classes combined, the teachers were able to demonstrably raise the

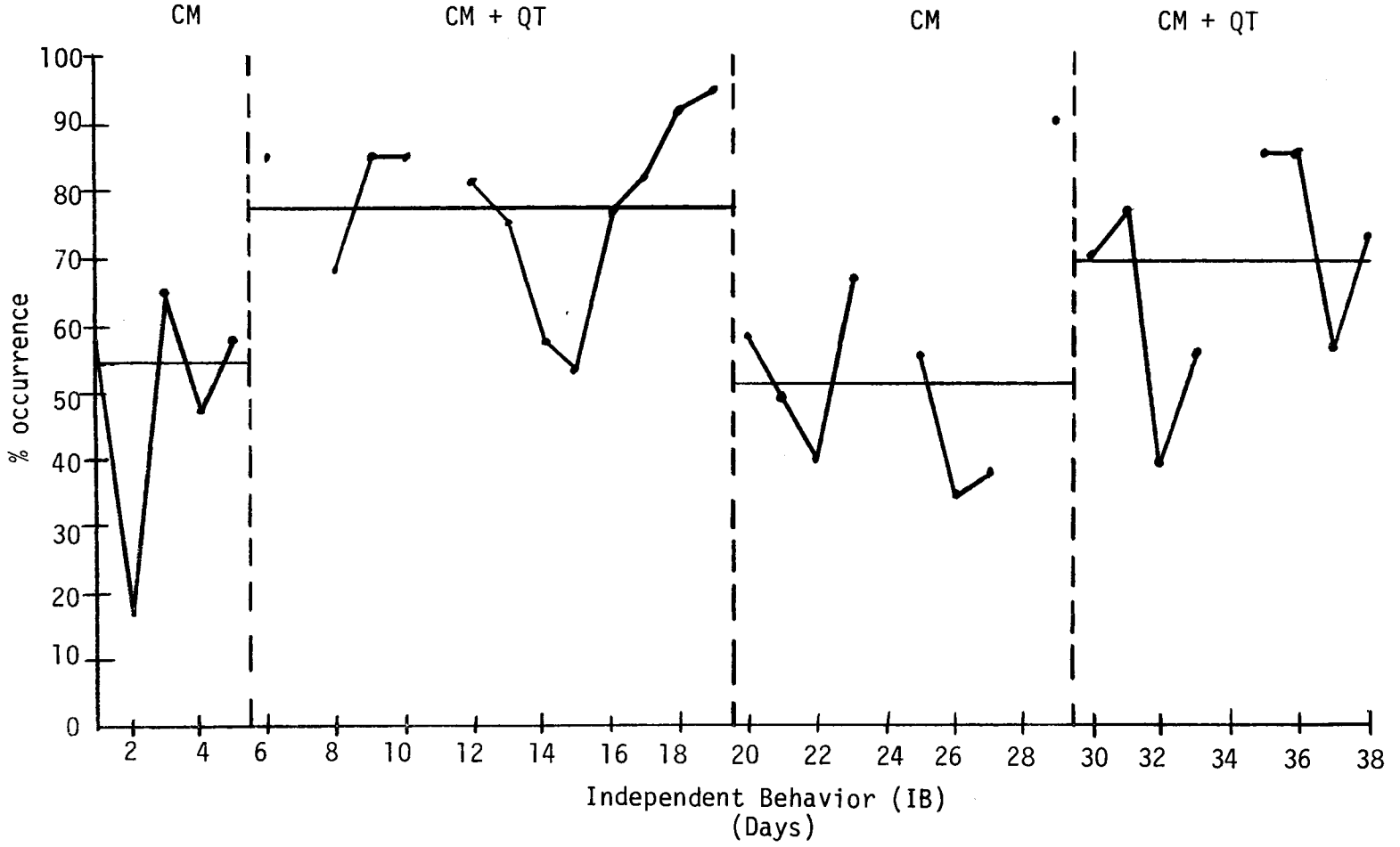


Figure 1. Daily Means of Three Classes, 9:30-9:45 A.M.--Independent Behavior (IB); Sustained Schoolwork (SS); Σ of Social Behavior (Σ soc); and Sustained Attending (SA).

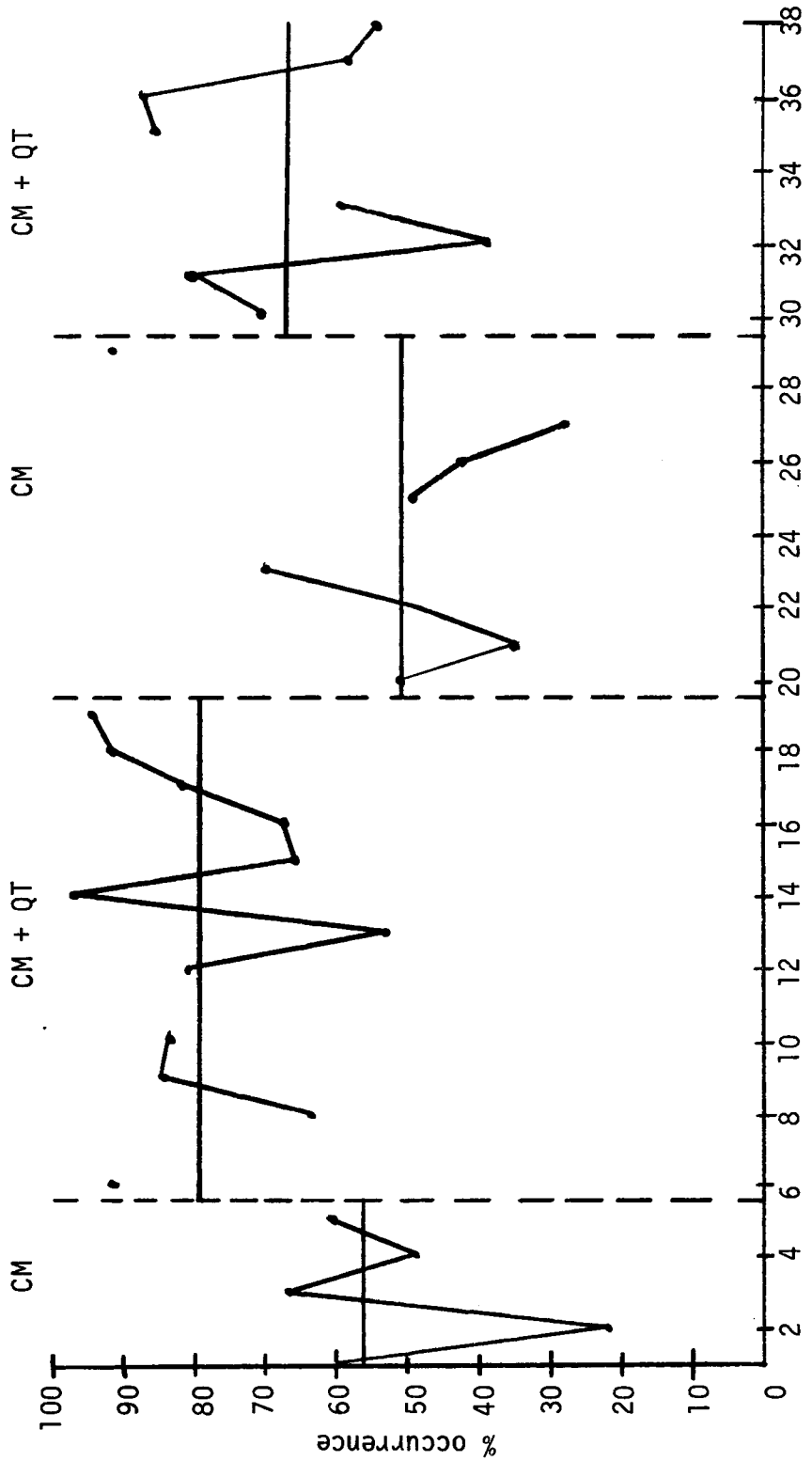


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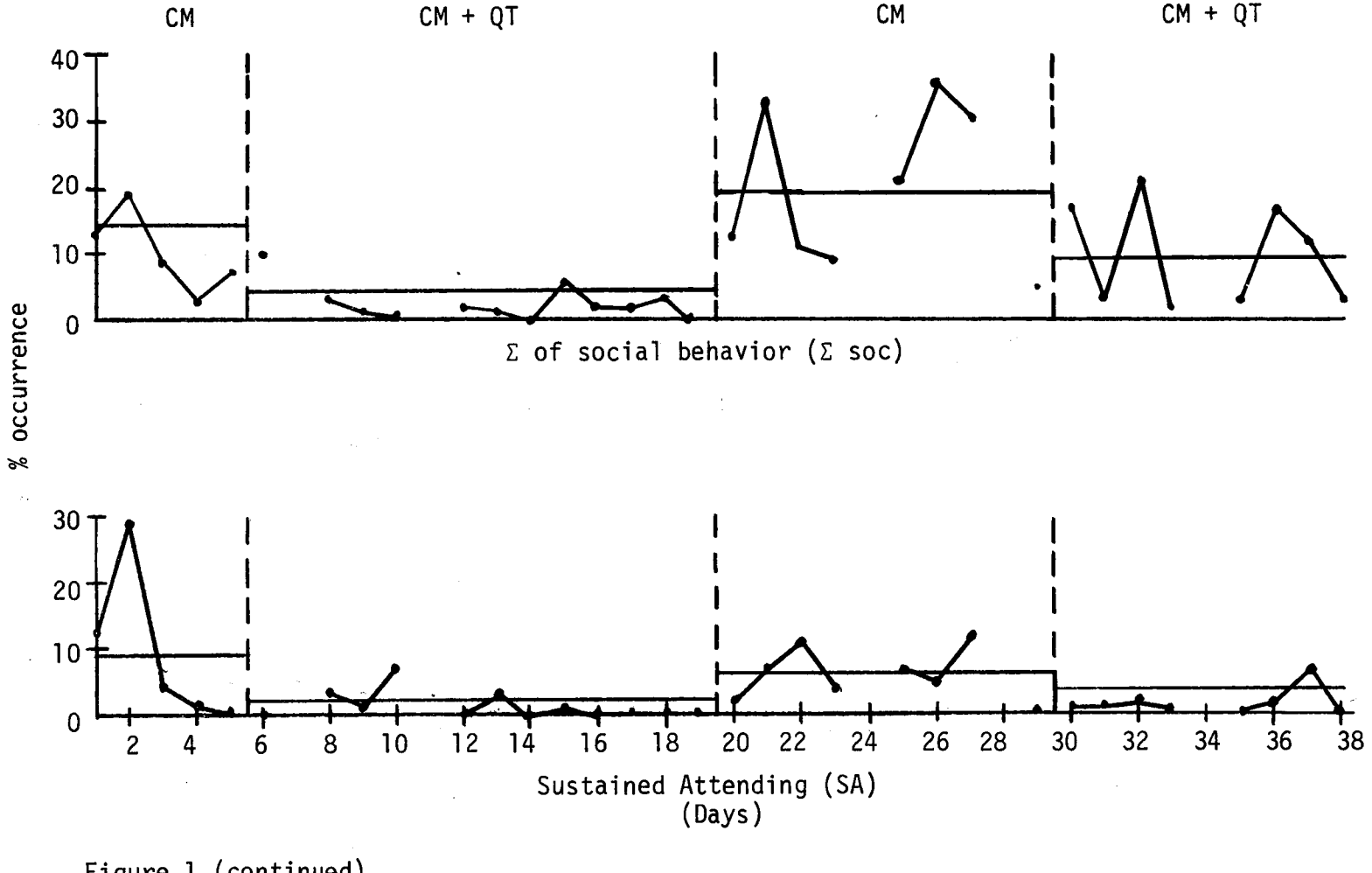


Figure 1 (continued)

Note: The horizontal bars indicate means for phases.

CM = Contingency Management; QT = Quiet Time.

TABLE 3. Analysis of Variance Summaries for Selected Behaviors During the 9:30-9:45 a.m. Time Period (All Classes)

Source	DF	SS	MS	F
Independent Behavior (IB)				
Between Rows (classes)	2	.4602	.2301	7.1017[d]
Between Columns (treatments)	3	.4673	.1558	4.8073[c]
Interaction	6	129.8896	21.6499	668.1647[e]
Within Groups	47	1.5229	.0324	
Total	58	(1)		
Sustained Schoolwork (SS)				
Between Rows (classes)	2	.4055	.2027	2.9100[a]
Between Columns (treatments)	3	.5012	.1671	2.3980[a]
Interaction	6	103.1269	17.1878	246.7023[e]
Within Groups	47	3.2745	.0697	
Total	58	(1)		
Sum of Social Behavior (Σ soc)				
Between Rows (classes)	2	1.0920	.5460	52.1572[e]
Between Columns (treatments)	3	.1191	.0397	3.7924[b]
Interaction	6	3.7842	.6307	60.2468[e]
Within Groups	47	.4920	.0105	
Total	58	(1)		
Sustained Attending (SA)				
Between Rows (classes)	2	.0453	.0227	11.6328[e]
Between Columns (treatments)	3	.0278	.0093	4.7491[c]
Interaction	6	1.4113	.2352	120.6776[e]
Within Groups	47	.0916	.0019	
Total	58	(1)		

[1] In this analysis, no total SS is computed because it does not equal the other SS added together.

Note: Superscripts with the following designations indicate the following significant differences: a = $p < .10$; b = $p < .025$; c = $p < .01$; d = $p < .005$; e = $p < .001$.

level of independent schoolwork and lower the level of social behavior through their instructions (i.e., Quiet Time). At the same time the behavior of Sustained Attention (SA) was lowered systematically by the treatment condition.

Turning to the one-way ANOVA of a single classroom's data we see that the same behaviors (IB, SS, SA, Σ soc) were significantly different across experimental conditions during the 9:30-9:45 time period. Figure 2 graphs the occurrences of these behaviors and shows that the changes in these behaviors were parallel to those for the overall means. Table 4 presents the ANOVA summaries. Again the conclusion to be drawn from these data is that the teacher in fact was able to increase the amount of independent schoolwork and decrease the amount of social behavior upon her instructions. Also the behavior SA appears to be linked to these other behaviors in that it covaries systematically across phases.

The analysis of the data from this particular classroom also produced some short-term effects (see Table 1, p. 12) that were statistically significant. As the data show for the combination of all three classes, the data from this classroom produce no significant treatment effects from the afternoon observations; nevertheless there are some more immediate effects of the treatment variable. In the 9:45-10:00 a.m. time period, two behaviors showed statistically significant treatment effects. These behaviors are the Sum of Social Behavior (Σ soc) and Non-Interaction (NI) (which curiously was not significant in the 9:30-9:45 time frame). Figure 3 graphically displays the changes in the rates of these

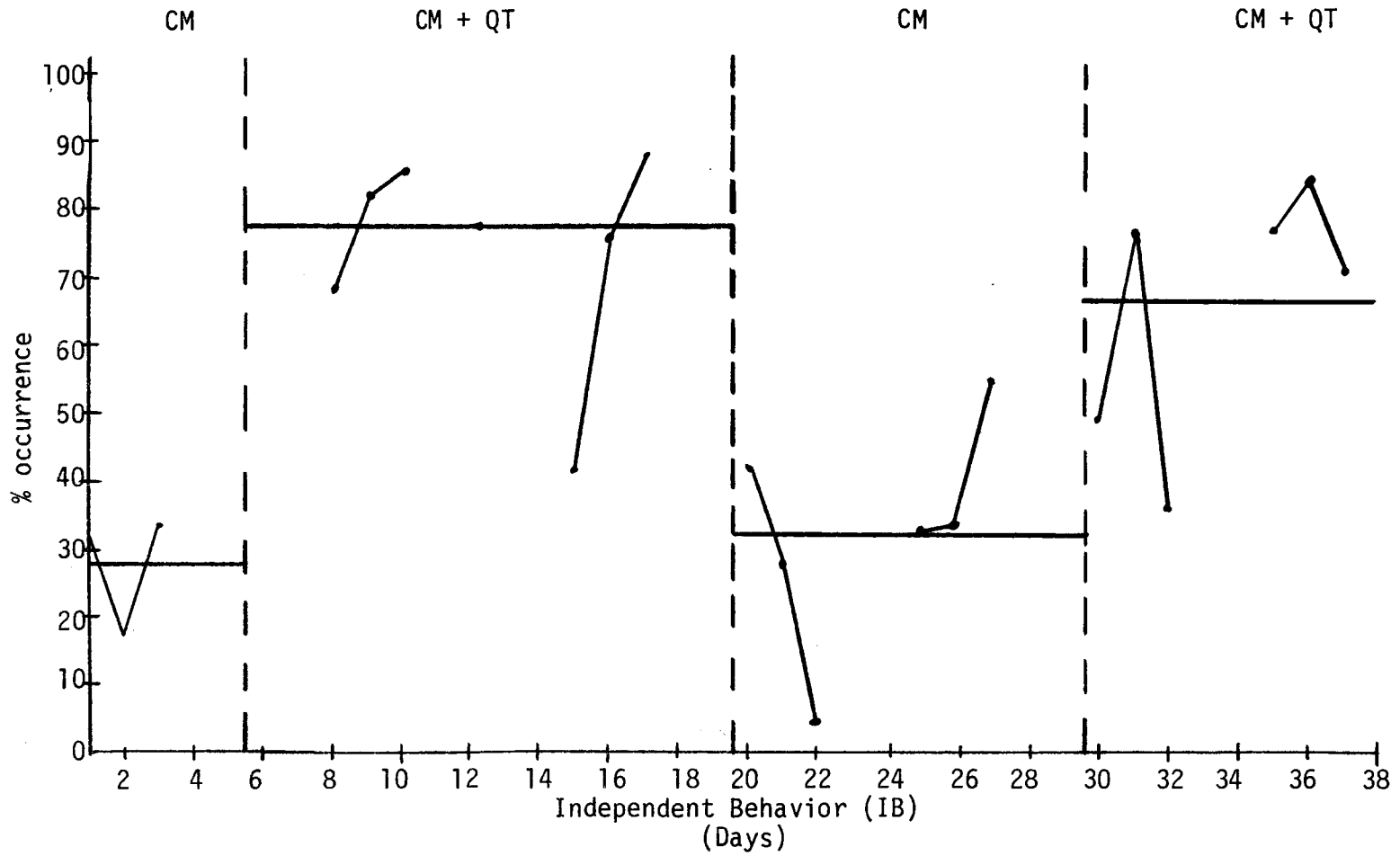


Figure 2. Daily Percentage of Occurrence for a Selected Classroom, 9:30-9:45 A.M.--Independent Behavior (IB); Sustained Schoolwork (SS); Σ of Social Behavior (Σ soc); and Sustained Attending (SA).

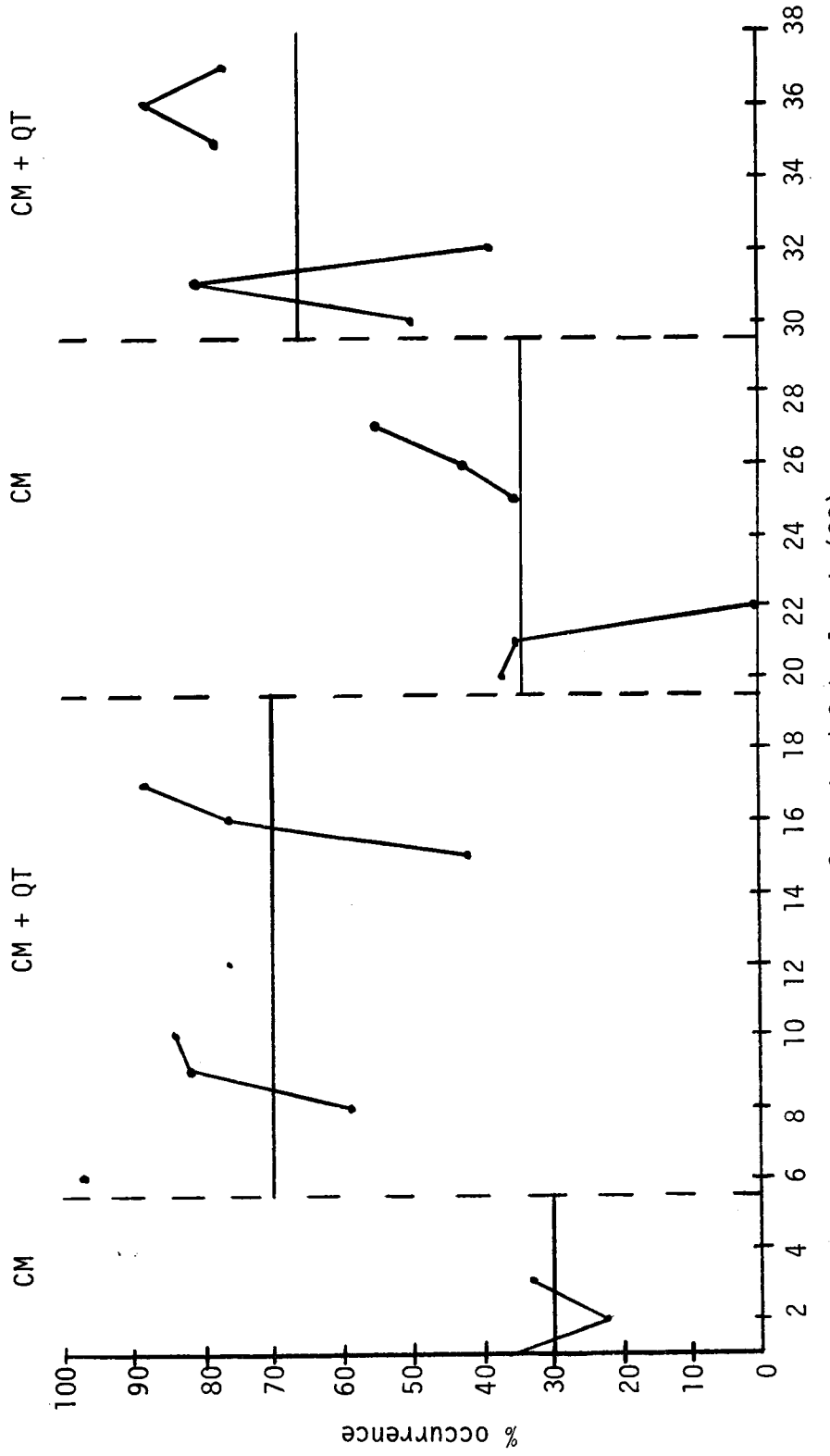


Figure 2 (continued)

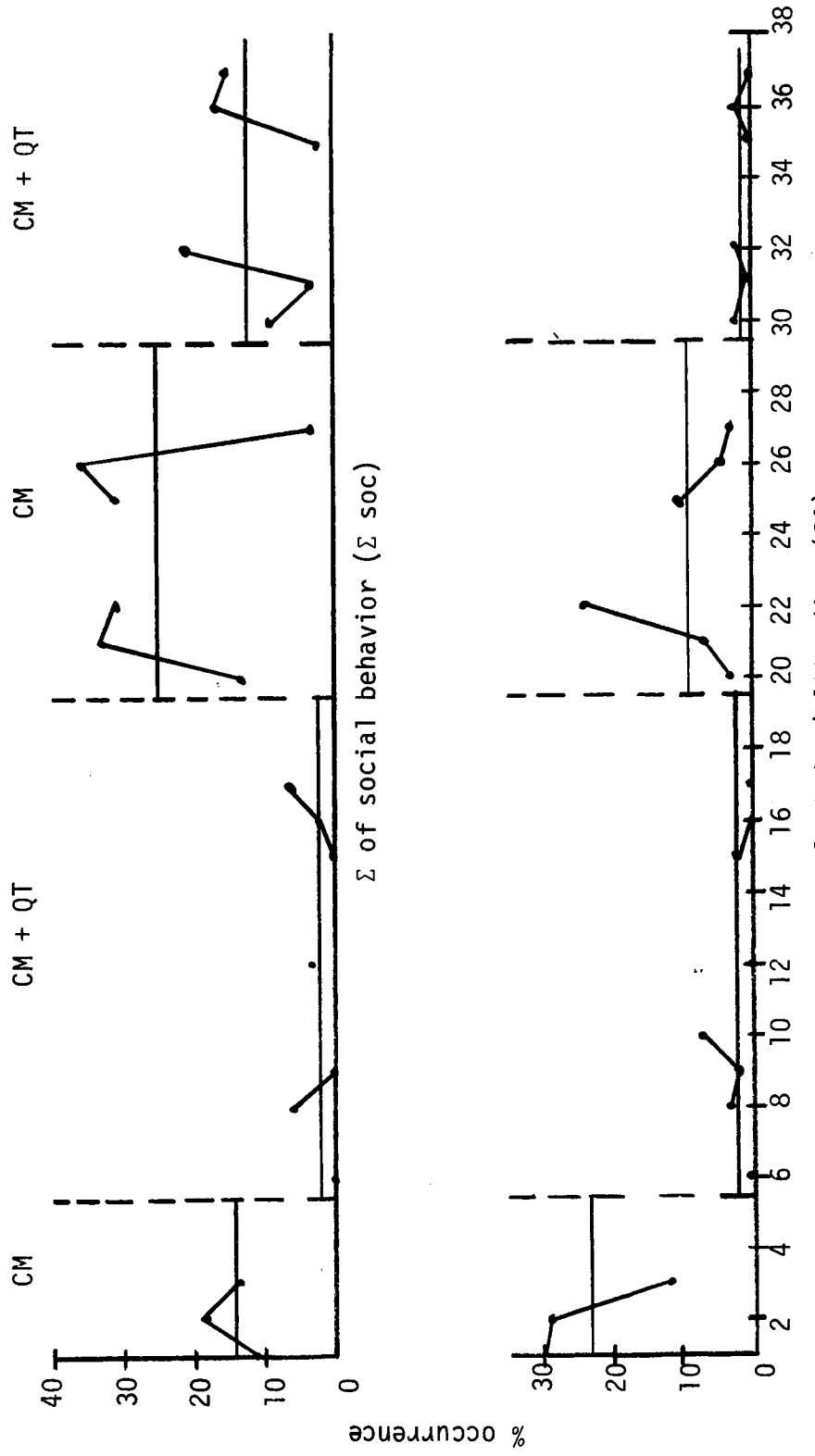


Figure 2 (continued)

Note: The horizontal bars indicate means for phases.

CM = Contingency Management; QT = Quiet Time.

TABLE 4. Analysis of Variance Summaries for Selected Behaviors During the 9:30-9:45 a.m. Time Period in a Selected Classroom

Source	DF	SS	MS	F
Productive Solitude (PS)				
Between Groups	3	1.0206	.3402	12.4289[a]
Within Groups	20	.5475	.0274	
Total	23	1.5681		
Sustained Schoolwork (SS)				
Between Groups	3	.8926	.2975	9.7264[a]
Within Groups	20	.6118	.0306	
Total	23	1.504		
Sum of Social Behavior (Σ soc)				
Between Groups	3	.1838	.0613	9.9311[a]
Within Groups	20	.1234	.0062	
Total	23	.3072		
Sustained Attending (SA)				
Between Groups	3	.1297	.0432	15.1413[a]
Within Groups	20	.0571	.0029	
Total	23	.1868		

[a] $p < .001$.

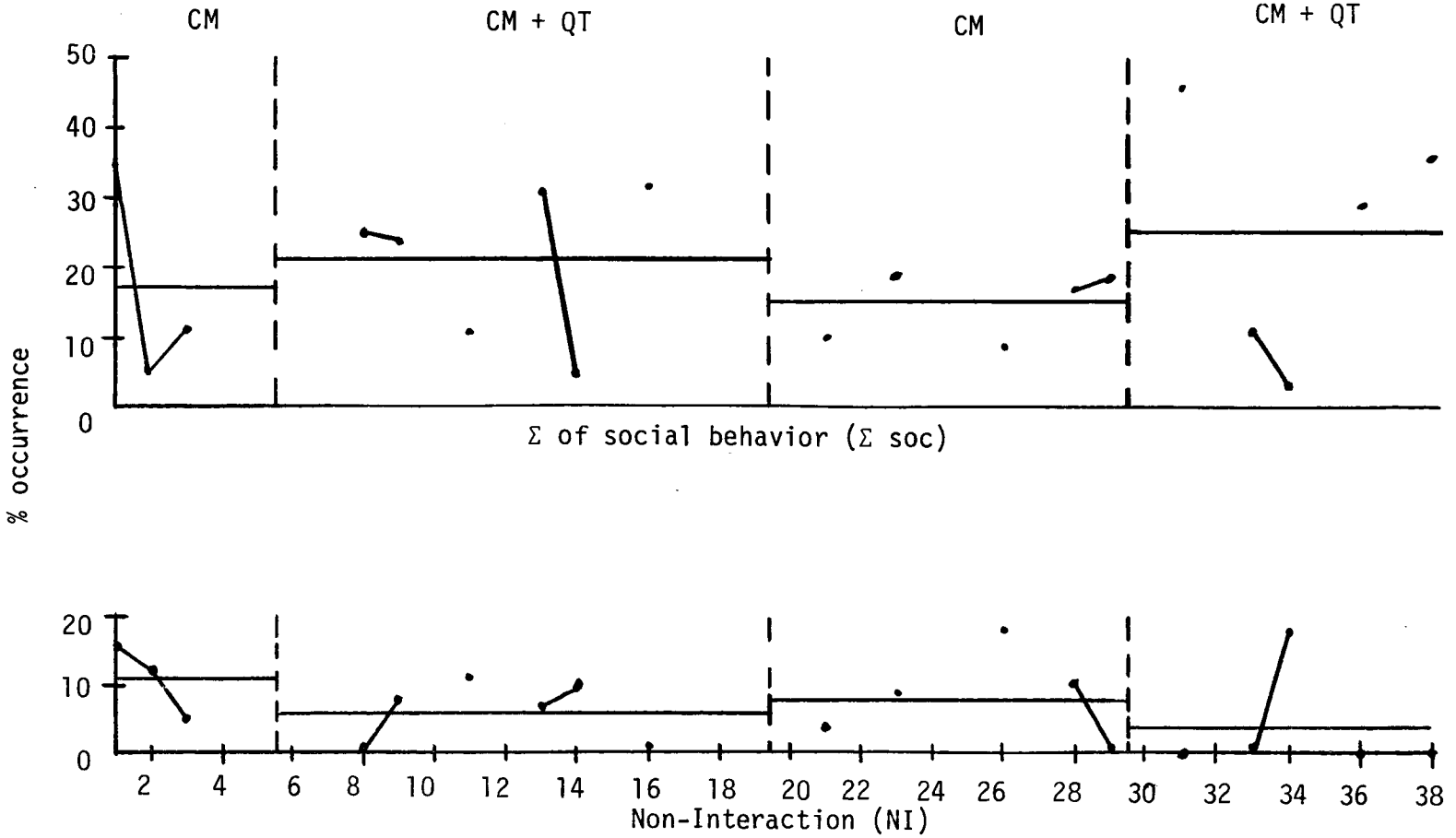


Figure 3. Daily Percentage of Occurrence for a Selected Classroom, 9:45-10:00 A.M.-- Σ of Social Behavior (Σ soc) and Non-Interaction (NI).

Note: The horizontal bars indicate means for phases.

CM = Contingency Management; QT = Quiet Time.

behaviors across the experimental conditions and Table 5 reports the ANOVA summaries for the three behaviors.

TABLE 5. Analysis of Variance Summaries for Selected Behaviors During the 9:45-10:00 a.m. Time Period for a Selected Classroom

Source	DF	SS	MS	F
Sum of Social Behavior (Σ soc)				
Between Groups	3	.2090	.0697	5.1494[b]
Within Groups	20	.2706	.0135	
Total	23	.4796		
Non-Interaction (NI)				
Between Groups	3	.0142	.0047	2.3952[a]
Within Groups	20	.0396	.0020	
Total	23	.5385		

Note: Superscripts with the following designations indicate the following significant differences: a = $p<.10$; b = $p<.01$.

In this classroom, then, the immediate effect of the treatment variable, Quiet Time, was systematic reduction of the rates of social behavior in general (Σ soc), and Non-Interaction (NI). The children of this class, following Quiet Time, were predictably less prone to be idly sitting (NI), or socially interacting (Σ soc).

II. TEACHER CLASSROOM ASSESSMENT (TCA) DATA

In every classroom there was no predictable difference between treatment and baseline phases that was reflected in the teachers' records of work units and rule violations. Table 6 presents these data.

TABLE 6. Teacher Classroom Assessment Data

Teacher	Baseline I			Treatment I			Baseline II			Treatment II		
	WU Completed		RV	WU Completed		RV	WU Completed		RV	WU Completed		RV
	%	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.
A	97.3	5.8	.19	96.0	6.7	.4	96.5	5.76	.21	96.0	6.5	.47
B	86.0	4.13	1.63	73.5	4.7	1.4	72.3	3.20	1.58	79.3	3.6	1.60
C	99.4	6.77	.28	98.9	5.95	.18	95.3	5.82	.12	96.8	4.39	.25
Total	95.6	5.66	.55	91.4	5.91	.59	89.3	5.01	.60	90.8	4.57	.79

Note: WU = work units; RV = rule violations.

In each experimental condition, the percentage of assigned work units that were completed is displayed. Also the mean number of work units completed and rule violations per day per child is presented.

Clearly it does not appear that the treatment variable affected these measures in any systematic fashion and the data are statistically non-significant. It is interesting to note however, that classroom B, which has the highest number of rule violations in all phases, was the only classroom to show even immediate consequences of the Quiet Time variable, as measured by the SOCS.

III. SOCIOMETRIC DATA

Correlated (dependent) t-test measures of pre- and post-test sociometric data showed non-significant results in all classes:

Classroom	DF	t-test Value
A	30	.3667
B	26	.0706
C	29	.5351

One is led to conclude that the overall effect of the classroom intervention program was not reflected by this measure. However, if this sociometric technique is a reliable measure of the social structure of the group, then logically one can say that the social system was left intact by the contingency management program, or that such a system never existed in the first place.

CHAPTER IV

DISCUSSION

The present experiment tested the impact, in three public school classrooms, of a short, 15-minute period devoted to quiet, independent schoolwork. The data derived from the study fail to support the correlational data of Wahler and Moore (1975), which found an inverse correlation between independent child behavior and that child's troublesome behavior. Furthermore, this study fails to find the sociometric changes reported by Drabman et al. (1974a, 1974b) as a result of a token reinforcement intervention. At the same time, this paper does not directly contradict these studies. Unlike Wahler and Moore (1975) or Wahler (1975), this study reports observational data taken on a heterogeneous population of children. Their work concentrated on children identified as deviant. Drabman's work produced sociometric changes only under certain conditions, not met completely by this study, and again the focus was on deviance.

It may be, however, that highly stable response sets are only the property of children whose behavior is deviant and that such "indirect" intervention techniques as the one tested here might still prove successful in changing such behavior. In this study the classroom which produced the most rule violations was analyzed separately and indeed, it documented the greatest change. It was the only class of three which showed any significant changes in behavior outside of the treatment period (i.e., Quiet Time). The failure to find

within-child structure as noted by Wahler (1975) may be a function of the group design. The structural aspects of the two subjects' behavior in that study differed considerably, and there is no reason to believe that such behavior covariations will be the same across individuals; perhaps structural systems of covarying behavior will always be undetected in group designs such as this study employs.

On the positive side, the experiment did demonstrate the utility of a simple, easy to implement, technique by which public school teachers might be able to at least momentarily increase the amount of schoolwork produced and reduce the rate of social behavior emitted by their students. The verbal reports of all three teachers involved in the study were unanimous in their praise of the technique, which they felt had a settling effect on their classes. Also, the pupils commented that they liked being able to work in an undisturbed climate. It is obvious that use of a Quiet Time in the public schools warrants further experimentation. The technique could be tried on populations of deviant children or for longer periods of time.

It must be clearly stated here that the Quiet Time treatment variable was imposed upon the subjects. The independent behavior cited by Wahler and Moore (1975) appeared as an operant behavior, which covaried with other operant behaviors, while the independent behavior in this study was under the partially aversive and threatening instructions which characterized Quiet Time. Although the children could receive positive reinforcement for the successful completion of Quiet Time, the threat of time-out-by-separation was the other part of the teacher's instructions to the students. Furthermore, the

ethical considerations raised by Winett and Winkler (1972) must be addressed. They argue that behavior modification is pre-occupied with quiet and discipline in the classroom. They assert, ". . . the children are being forced to spend almost their whoe day not being children, but being quiet, docile, and obedient 'young adults'" (p. 500). In this study the independent behavior appeared as a naturally occurring operant behavior. The children were doing this naturally and the teachers simply asked them to do it again at a certain time and reinforced them for it. Independent behavior was treated as a pleasant activity that the child should find rewarding. The parents of these children were pleased with the focus of the study. Also the short, 15-minute period of Quiet Time was the only time during the day that silence was asked for. Surprisingly the pupils liked the Quiet Time and requested that it be lengthened. The author sternly cautions readers from thinking this study promotes a return to the traditional classroom of the past where the children were expected to be "young adults." The optimal amount of Quiet Time has yet to be determined, but let no reader be mistaken in thinking that teachers should keep their students quiet for hours on end. Quietness is not the critical variable here anyway; it is the independence of the behavior that seems crucial. In classroom, however, quiet must be asked for if the children are to be able to work by themselves.

In this study, the effects of the keystone behavior, independent schoolwork, seem to be specific to a particular classroom. The argument is put forth that the keystone effect may be more pronounced in deviant samples, as deviant behavior may have a more stable response

in deviant samples, as deviant behavior may have a more stable response set nature. Indeed, Moore (1975) found greater covariations between behaviors (i.e., greater stereotypy) in deviant children as opposed to normal children. In a group decision such as this, the behavior covariations which form clusters (a la Wahler, 1975) may "wash out" across a varied, heterogeneous group.

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APPENDICES

APPENDIX A

BRIEF DESCRIPTIONS OF CATEGORY CODES USED TO RECORD DIRECT OBSERVATIONS OF CHILDREN

Adult Instruction (Non-Aversive)(IA+). This category is scored for direct commands from an adult.

Adult Instruction (Aversive)(IA-). This category is scored for those direct commands from an adult that are judged to be aversive by an observer.

Adult Social Attention (Aversive)(Sa-). This category is scored for adult non-instructive contacts with the target child. The observer must also consider the contact to be aversive.

Adult Social Attention (Non-Aversive)(Sa+). This category is scored for adult non-instructional contacts with the target child.

Child Social Attention (Aversive)(Sc-). This category is scored for any peer behavior directed to the target child. The observer must also consider this behavior to be aversive.

Child Social Attention (Non-Aversive)(Sc+). This category is defined in the same manner as Sc-. However, in this case the observer does not judge the behavior to be aversive.

Opposition (O). This category is scored for target child behaviors that are non-compliances with adult instructions. The non-compliance must last the full interval.

Aversive Opposition (O-). This category is a qualifier to opposition (O) and also to rule violation (RV). The observer must consider this behavior to be aversive.

Rule Violation (RV). This category is scored for any instance of the target child's violating any standing or temporary rules of the setting.

Compliance (C). This category is scored for target child compliance with adult instructions.

Complaint (CP). This category is scored for any instance of verbal and non-verbal complaint by the target child.

Self Stimulation (S). This category is scored for any instance of the target child's manipulation of his body.

Object Play (Op). This category is scored for any instance of the target child's simple manipulation of objects.

Self Talk (T). This category is scored for any instance of recognizable language spoken by the target child to himself.

Sustained Non-Interaction (NI). This category is scored for a full 10 seconds of a child's non-interaction with people or objects.

Sustained Schoolwork (Ss). This category is scored for a full 10 seconds of schoolwork by the target child.

Sustained Toy Play (St). This category is scored for a full 10 seconds of target child's play with objects.

Sustained Work (SW). This category is scored for a full 10 seconds of work by the target child.

Sustained Attending (SA). This category is scored for a full 10 seconds of attention towards a person(s) or event by the target child.

Approach Child (Ac). This category is scored for any spontaneous approach to adults by the target child.

Approach Adult (Aa). This category is scored for any spontaneous approach to adults by the target child.

Social Interaction Child (SIc). This category is scored for any interaction between peers and the target child.

Social Interaction Adult (SIa). This category is scored for any interaction between adults and the target child.

Mand-Child (Mc). This category is scored for any instance of the target child commanding a peer.

Mand-Adult (Ma). This category is scored for any instance of the target child commanding an adult.

APPENDIX B

THE COMPUTATION OF RELIABILITY COEFFICIENTS

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The cover sheet totals of occurrence in each behavior code as scored by the reliability checker was compared to the cover sheet totals of the observer. Then the smaller figure was divided by the larger. Sample data might appear in this manner:

	behavior categories					
checker	6	12	3	4	4	9
observer	7	15	1	2	6	8
reliability	86	80	33	50	67	89

The overall quotient was computed by this formula:

$$\frac{\sum \text{(reliability of each category x the number of instances of that behavior scored by the observer)}}{\sum \text{(the total number of occurrences in all categories scored by the observer + all occurrences scored by the checker but not scored by the observer)}}$$

VITA

Thomas David Coe was born in Columbus, Ohio on February 20, 1950. Moving to Cincinnati at an early age, he was schooled in that city and graduated in June, 1968 from Woodward High School. That fall he entered Maryville College, in Maryville, Tennessee, and he received a Bachelor of Arts, cum laude, in June 1972, with a major in religion.

Following his marriage in September, 1972 to the former Leslie Drake of Columbus, Ohio, he entered the Graduate School of the University of Tennessee, Knoxville, the same month. After a year in Tennessee's Experimental Psychology program, he transferred to the Psychology Department's School Psychology program and began working as a graduate research assistant at the Child Behavior Institute, under the direction of Dr. Robert G. Wahler. At the Child Behavior Institute, he served as the school program director while preparing several articles for publication and presentation at professional meetings. He received the Doctor of Philosophy degree with a major in Psychology in August, 1976.