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A Description of Teacher-Student Verbal Interactions in a Resource Room Versus Regular Classrooms

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The focus of this study was the description and classification of verbal operants as described by Skinner (1957) that were used by a resource room teacher and two regular education teachers, the compliance responses of two students identified as learning disabled who attended all three classes, and the actual tasks that existed in each setting. These descriptions were used to compare the similarities and differences that may account for student success in a resource classroom and lack of success in mainstream classrooms. The results indicated that the verbal operants could be used to determine the tasks that existed in each setting. Comparisons showed that the greatest differences among the settings existed in the type of "mand" stated, the proportion of instructional to management "mands," the frequency of compliance to instructional "mands," and the teacher consequence for compliance or non-compliance with "mands."

The majority of students identified as having a specific learning disability spend at least part of their day in a regular classroom setting. Transfer of appropriate behaviors from the special education setting to the regular education setting is therefore imperative; but programming for maintenance and transfer is rarely part of the special education or regular education program (Stokes & Baer, 1977; Wahler, Berland, & Coe, 1979; Wehman, Abramson, & Norman, 1977). Anderson-Inman, Walker, and Purcell (1984) state:

> If...the purpose of resource rooms is to provide students with skills needed to succeed in regular classes, the content of resource room instruction cannot be decided without reference to the expectations of the regular classroom teacher. (p. 18)

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For behavior to be maintained and to transfer from the special education setting to the regular classroom, it may be necessary to identify and analyze natural contingencies of reinforcement occurring in mainstreamed classrooms, including the behavior and skills that are required for regular classroom success (Hundert, 1982). Anderson-Inman et al., (1984) point out that environmental assessment as preparation for mainstreaming children with handicaps has seldom been implemented. They state, "without empirical knowledge of skills and behaviors required for regular classroom success, attempts to prepare handicapped students for mainstreamed placements are grounded in guesswork" (p. 19). Dunlap, Johnson, Winterling, and Morelli (1987) suggest that a technology of generalization cannot be achieved until attention is increased to the natural environment in which there is no direct control over stimuli and reinforcement.

One reason that transfer from special education classrooms to regular education classrooms has not been successful may be that much of the focus of the research on transfer has been unidirectional; either the teacher's behavior has been observed or the student's behavior has been observed.

This approach ignores the reciprocal nature of teacher-student interactions in the classroom and the context in which it occurs. Sherman and Cromier (1974) have stated that the unidirectional analysis may be a factor in the difficulty that behavior analysts have in achieving transfer. Identifying and analyzing skills and practices necessary for success in the mainstream setting may require an examination of the interactions that occur between students and teachers (Anderson-Inman et al., 1984; Kerr & Zigmond, 1986; Newcomer, 1977).

In addressing the issue of reciprocal causality in research on teaching, Doyle (1979) has suggested examining tasks as a framework for studying the concept. A task as defined by Doyle (1981) is "a set of implicit or explicit instructions about what a person is expected to do to cope successfully with a situation" (p. 2). The task model can be used to focus on the issue of transfer. In Doyle's view, however, an understanding of classroom tasks should include an information-processing view of the mediational strategies students use to navigate classroom environment.

Doyle has classified instructional tasks, as have most others, on the basis of inferred mental operations. A system of classifying instructional tasks devoid of mental operations would provide more useful descriptive data which could be integrated with experimental studies. Johnson and Chase (1981) proposed such a system. Their typology is based on the verbal operants described by Skinner (1957). The typology classifies instructional tasks according to the verbal relation they illustrate (see Table 1).

The tasks which students are asked to perform in classrooms are typically presented through teacher stated mands. A mand is defined as a verbal operant under the functional control of relevant conditions of an establishing operation, an establishing stimulus, or aversive stimulation (Skinner, 1957; Michael, 1982; Michael, 1988). The mand is said to specify its reinforcement. "In common sense terms, in the mand what is said (signed, written, etc.) is determined by what the speaker wants" (Michael, 1982, p. 1).

While verbal operants have been described in various settings (Gutman & Rondal, 1979; Marshal, Hegrenes, & Goldstein, 1973; Martin & Crawford, 1976; McLeish & Martin, 1975), including special education classrooms (Daly, 1987), neither the description of verbal operants nor an instructional typology of verbal operants has been applied toward behavior generality. By describing verbal operants which occur in the classroom (teacher stated mands and the student verbal responses specified) along with the compliance of the students, it may be possible to examine the tasks required in classrooms. This study compared the tasks as they were identified by verbal operants in special and regular classroom settings to provide information for programming transfer.

METHOD

Setting

The study was conducted in three classrooms at a junior high school in a Midwest suburban school district. The classrooms observed were an eighth grade social studies class taught in a resource classroom for students with specific learning disabilities, an eighth grade "low ability" science class, and an eighth grade health class. Twelve students attended the social studies class, 23 students were enrolled in the science class, and 31 students were enrolled in the health class.

Students and Teachers

Two target students were selected by the resource room teacher for observation. Both were 14 year old eighth grade males who attended classes in the resource room for four periods each day. The students were integrated into regular classes for science, health, home arts, and physical education.

The resource room teacher was certified to teach students with learning and behavior disorders. She had been teaching in her current placement for four years. The health and science teachers were certified

Table 1[1]

A typology of instructional tasks based on verbal operants.

Do you want the student to...	The task is...	Examples...
1. say something exactly as you say it?	1. echoic tasks	1. Correctly repeat the following...
2. say something exactly as you wrote it	2. textual tasks	2. Please read and pronounce...
3. write something exactly as you wrote it	3. copy tasks	3. Correctly copy the following...
4. write something exactly as you say it	4. dictation task	4. Correctly spell...as I say them
5. define a term	5. intraverbal (definition task)	5. Define reinforcement...
6. identify descriptions	6. intraverbal (example identification)	6. Which of the following is...
7. state original examples	7. intraverbal (exemplification)	7. Give an original example of...
8. describe environmental events as they occur	8. tact (example component analysis)	8. Identify 3 features of the wines in front of you
9. specify a term that can be used to categorize a group of environmental events	9. tact (example identification task)	9. Which of the tapes illustrates an example of...
10. combine any of the above	10. combination task	10. Describe and give an example of...

[1]Adapted from "Behavior Analysis in Instructional Design: A Functional Typology of Verbal Tasks" by K.R. Johnson and P.N. Chase, 1981, *The Behavior Analyst, 4*, p. 108.

in their respective areas and each had taught in the current placement for thirteen years.

Response Definitions

In each of the classrooms, the total number of teacher-stated mands along with the type of compliance by each of the target students was recorded. When teacher-stated mands were classified as instructional mands which required students to produce a product to complete the task, the verbal operants required by the students were also recorded. The consequences for compliance or non-compliance with instructional mands were recorded and classified.

The operant definition of a teacher-stated mand was an imperative or interrogative vocal, written, or gestural verbal response emitted by the teacher which specified a verbal or nonverbal behavior from the listener. While Skinner (1957) cautions that to identify a verbal operant we need to know the variables of which the response is a function, he adds, "certain formal properties may be so closely associated with specific kinds of variables that the latter may be safely inferred. . .we may say that some responses simply because of formal properties are very

probably mands" (p. 36). Mands were subclassified into five categories. These included: instructional mands, instructional/question mands, instructional management mands, disciplinary management mands, and housekeeping management mands. An instructional mand was defined as a mand that specified or implied reading, writing, listening, or speaking behaviors which were directly related to the lesson being taught or mands that directed the student's attention to specific portions of the material in order to clarify or elaborate instruction. Instructional/question mands were defined as lesson related questions asked by the teacher without designating a specific student to answer. Instructional management mands were defined as mands which specified or implied behaviors which enabled the student to prepare for instruction. These included mands which directed the student's attention to the teacher or the materials used for instruction. Disciplinary management mands were designated as mands which attempted to correct inappropriate student behaviors or which specified appropriate student behaviors necessary to maintain order in the classroom. The housekeeping management mands were those mands which specified behaviors that were appropriate for maintaining order of the classroom materials.

Full compliance by the student was defined as nonverbal behavior that corresponded with the behavior specified by the mand and the provision of the reinforcer specified by the mand or by verbal reciprocal behavior emitted in response to interrogative teacher stated mands.

The verbal operants required by the students to produce a product were defined using the Johnson and Chase (1981) typology of instructional tasks. A task was defined as a "transcription/copy" task when the students were required to write something exactly as it was written by the teacher, from the textbook, or from previously written work by the student. A "transcription/dictation" task was defined as a student response which required the student to write something exactly as it was said by the teacher. Intraverbal tasks were divided into three categories. An "intraverbal/define, describe" task was delineated as one in which students had to define or describe a term which had previously been presented. An "intraverbal/explain, identify" response was defined as one in which students had to recognize a term or description which had previously been presented. An "intraverbal/ exemplification" response was defined as one in which students had to provide an original example from previously stated material.

Teacher responses to the compliance or non-compliance with instructional mands were classified into four categories. "Teacher Recorded" (TR) occurred when the teacher made a written notation of the student's response. "Teacher Looked at/Listened to a Response, with Comment" (LL-C) occurred when a written or oral response emitted by the student evoked an oral, or gestural comment from the teacher. "Teacher Looked at/Listened to a Response, With No Comment" (LL-NC) occurred when the student presented a written product to the teacher or emitted an oral response while the teacher had eye contact with the student, and no written, oral or gestural response was emitted by the teacher. "Unobserved" (U) occurred when the student made a response to an instructional mand which was not observed by the teacher. This category included written responses made by the students which were not checked by the teacher.

Procedures

The researcher videotaped 27 consecutive classroom sessions in each of the three classrooms. All the data were collected during the second six-week grading interim of the year. Tapes of classes in which the major part of the class period was conducted by someone other than the classroom teacher (substitute teachers or guest speakers) or in which the major activity was not instructional (a classroom party) were not used in the analysis. There were 24 tapes of the resource classroom, 24

tapes of the science classroom and 24 tapes of the health classroom which were used for data analysis. A character generator produced a digital read out of the hours, minutes, seconds, and tenth seconds superimposed on the tape. The average length of the sessions observed was 43.7 minutes. In an attempt to partially eliminate reactivity to the presence of the observer and the video equipment, three sessions in each classroom were taped prior to the beginning of data collection.

During the session, any written mands publicly displayed were copied by the researcher. Papers handed out to students were photocopied. A photocopy was made of all written work handed in by the target students. The grade given by the teacher and written comments made by the teacher were noted.

When the videotaping was completed, observation and coding of the tapes was begun. During the first observation of the tapes, coding sheets were used to record each mand emitted by the teacher. When a mand was emitted, the tape was stopped. The time, mand, and type of student compliance were recorded. The mands were then categorized as requiring a vocal or non-vocal response, requiring academic or managerial behavior, and as to whether they were addressed to the whole group or to an individual.

The coding sheets were reviewed to determine the number of mands issued, the number of each type of mand issued, the number of mands issued to the whole group, the number of mands that called for vocal or non-vocal behavior, and the number and type of mands complied with by each of the target students. A summary of each session was included on the coding sheet.

The verbal behavior required by the student to accomplish the task was determined using the Johnson and Chase typology (e.g., a stated task that required a written definition familiar to the student was classified as an intraverbal - define/describe task). This information was recorded on a separate sheet. Tasks such as tests or worksheets that consisted of a number of different required verbal behaviors were divided into subtasks and the verbal behavior for each subtask was listed.

To determine how students were held accountable for compliance with teacher-stated instructional mands, teacher responses to compliance with these mands were examined. Each segment of the video tapes that contained an instructional mand was reviewed. The teacher responses were recorded in the last column of the coding sheet.

Measurement

The responses measured included: teacher stated mands, student compliance with mands, student verbal behaviors, and teacher consequences to compliance. The rate of teacher stated mands emitted in the resource classroom, the health classroom, and the science classroom; the frequency and percentage of student compliance with teacher stated mands by each of the target students in each setting; the frequency and the percentage of student compliance with each category of teacher-stated mands by each of the target students in each category; the frequency of each type of verbal operant required of the students in response to instructional mands in each setting; and the frequency of each category of teacher response to compliance or non-compliance by each student to instructional mands were calculated.

After teacher stated mands had been identified from the video tape recordings of each class session, the number of teacher stated mands was counted for each session. The duration of each session was measured using the digital readout superimposed on the videotape. The total number of mands stated in each setting was divided by the number of minutes that each target student spent in the total number of class sessions observed to determine an overall rate per minute of teacher-stated mands directed toward each of the target students.

Student compliance with teacher stated mands was categorized as full compliance, partial compliance, non-compliance, or

indeterminable compliance. The number of compliance responses in each category was counted to determine the frequency. The percentage of student compliance with teacher stated mands was calculated by tallying the number of mands directed to the entire class and to the target student in each session and tallying the number of mands with which the target student fully complied, partially complied, did not comply, or whose compliance was indeterminable. The number of mands complied with in each category was divided by the number of mands emitted to the class as a whole and to the target student and the quotient multiplied by one hundred to determine the percentage of compliance with mands. The total number of instructional mands was calculated and each type of verbal response required by the student in each setting was calculated. The total number of instructional mands was divided by the total of each verbal operant category to determine a percentage. The total number of instructional mands was also divided by the total of each category of teacher consequence to determine the percentage of each category.

Reliability and Accuracy of Measurement

Accuracy measures were conducted on the timing of 15 randomly selected tapes and the mand and response count on 15 randomly selected coding sheets. An independent observer using a chronometer timed the tapes and compared the times with the digital read-out on the tape. The number of mands and responses on the coding sheets were counted by an independent observer and compared to the experimenter's count.

Interobserver agreement data were collected from a total of 15 sessions, five from each setting. Five independent observers each coded three video tapes and the coding sheets were compared to the original coding sheets. Scores were computed for the number of mands in each setting, the type of compliance to the mand, the direction of the mand, the type of each response specified by the mand, and each of the instructional and management categories of the mands.

RESULTS

All accuracy measures met the criterion of 100% agreement. All interobserver agreement scores were above 75%. The mean agreement score for the number of

Table 2

Mands per minute in the resource, health, and science classrooms.

Resource Classroom		
	Student A	Student B
Total Mands	776.00	921.00
Total Minutes	1007.00	998.70
Mands per minute	00.77	00.92
Health Classroom		
	Student A	Student B
Total Mands	646.00	663.00
Total Minutes	1009.20	1064.50
Mands per minute	00.64	00.62
Science Classroom		
	Student A	Student B
Total Mands	723.00	702.00
Total Minutes	1064.80	1063.50
Mands per minute	00.68	00.66

mands was 88%; for type of compliance, 94%; for direction of the mand, 99%; and for type of response, 97%. Interobserver agreement scores for the categories of mands ranged from 76% for instructional mands to Student B in the resource classroom to 98% for disciplinary management mands to Student B in the resource room. The mean score for all categories across the three settings was 88%.

Comparisons were made among the three classrooms in an effort to determine the variables which could merit further study. The results indicated that teacher stated mands occurred more frequently in the resource classroom than in either of the two regular classrooms. The rate of mands per minute directed to both students was highest in the resource classroom. In the resource classroom the mean rate per minute was 0.77 for Student A and 0.92 for Student B; in the health classroom the rate was 0.64 for Student A and 0.62 for Student B; and in the science classroom the rate was 0.68 for Student A and 0.66 for Student B (see Table 2).

The findings also indicate that both students fully complied with mands more frequently in the resource room than in either of the regular classrooms (see Table 3).

Of the five categories of mands, the greatest percentage of teacher stated mands directed to both students in the resource classroom was Instructional/Question mands (42.0% to Student A and 35.3% to Student B). In the science classroom the highest percentage category to both students was Instructional mands (32.8% to Student A and 33.9% to Student B). In the health class, too, the category with the highest percentage was Instructional mands (27.6% to Student A

Table 3

Frequency and percentage of students' compliance responses to mands.

	Compliance				
Classroom	**Full**	**Partial**	**Non**	**Indeterminable**	**Total**
					Student A
Resource					
Frequency	626. 0	7.0	138.0	5.0	776
Percentage	80.7	*	17.8	*	100
Health					
Frequency	490.0	10.0	101.0	45.0	646
Percentage	75.9	1.5	15.6	7.0	100
Science					
Frequency	563.0	31.0	125.0	4.0	723
Percentage	77.9	4.3	17.3	*	100
					Student B
Resource					
Frequency	758.0	35.0	125.0	3.0	921
Percentage	82.3	3.8	13.6	*	100
Health					
Frequency	499.0	8.0	111.0	45.0	663
Percentage	75.3	1.2	16.7	6.8	100
Science					
Frequency	464.0	23.0	207.0	8.0	702
Percentage	66.1	3.3	29.5	1.1	100

*less than 1 percent

Table 4

Percentage of instructional and management mands directed to target students, type and percentage of mand.

Classroom	Instructional Manag.	Disciplinary Manag.	Housekeeping Manag.	Instructional	Instruct. Question
Resource					
Student A	16.6	8.2	9.0	24.1	42.0
Student B	17.2	10.7	10.3	26.5	35.3
Health					
Student A	21.8	15.0	11.8	27.6	23.8
Student B	23.1	12.5	12.4	28.1	23.8
Science					
Student A	16.6	18.5	17.7	32.8	14.4
Student B	16.2	16.2	18.8	33.9	14.8

and 28.1% to Student B). Table 4 displays this information.

Though the resource classroom had the lowest percentage of Instructional mands, the highest percentage of full compliance with them for both students occurred in the resource classroom (see Figure 1).

The verbal behaviors required by the students most often in the resource classroom were "transcription/copy" (59.8%) and "transcription/dictation" (24.1%). The verbal behaviors required most often in the health classroom were "transcription / copy" (46.3%) and "intraverbal / explain, identify" (44.8%). In the science classroom the two prevailing behaviors were "transcription /copy" (50.2%) and "intraverbal/explain, identify" (40.7%).

In the resource classroom the teacher consequence that most often followed a student response to an instructional mand was the teacher recording of the response (64.2% for Student A and 49.2% for Student B). In the science classroom, 63.3% of the responses made by Student A were unobserved by the teacher while 62.6% of the responses made by Student B were unobserved. In the health classroom the most frequent teacher consequence to student responses was also that the response went unobserved by the teacher (61.2% for Student A and 66.7% for Student B). (See Figure 2.)

DISCUSSION

A summary of the results in the three classrooms indicates that the behaviors expected of students and the consequences which followed these behaviors were not the same in the three settings. While differences occurred in the rate of manding among the classrooms, greater differences occurred among the types of tasks students were asked to perform from class to class. In the resource classroom, the most prevalent type of mand was the Instructional/ Question. This type comprised more than one-third of the mands in the resource classroom. Implicit in the Instructional/ Question is the mand, "If you wish to answer the question, raise your hand. If you do not wish to answer the question, do not raise your hand." Instructional / Question mands can be viewed as probing techniques. The teacher asks questions of the entire class to determine if the students know the information. Corrective feedback can be provided for incorrect responses and questions redirected until correct responses are obtained. In the mainstream settings, less than one-fourth of the mands in the health classroom were Instruc-

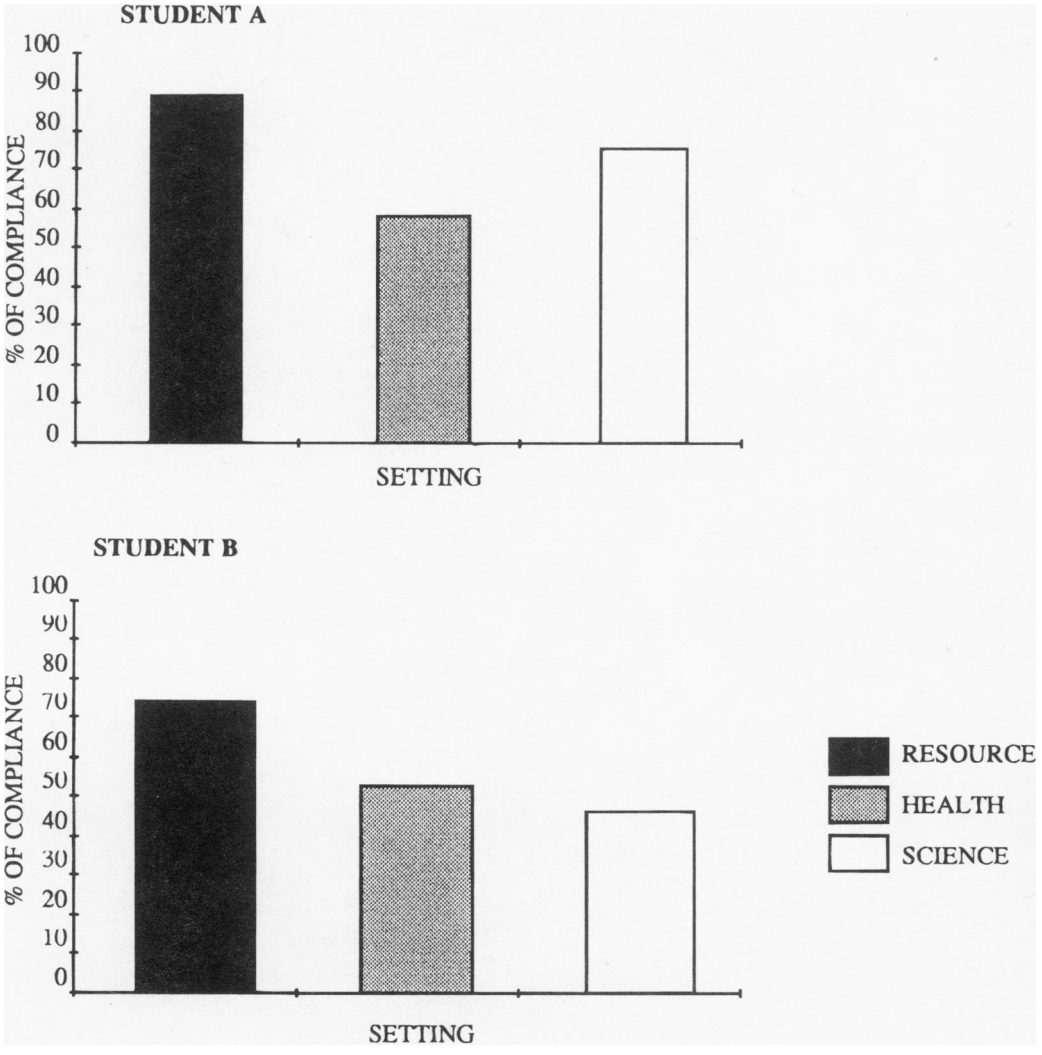

Fig. 1. Percentage of student compliance to instructional mands in the resource, health, and science classrooms.

tional/Question mands and less than one-sixth of the mands in the science classroom were Instructional/Question mands. In both the health and science classes, the Instructional mand was used most frequently. The most frequent Instructional mands directed the students to write a response. While many of the written responses were not recorded or observed by the teachers in the mainstream classrooms, there were more written responses required for which the students were held accountable. Differences were evident not only in the number of responses the student had to produce, but also in the kind of responses. In the resource classroom more than 80 percent of the tasks required transcription behaviors. This was true of just over 50 percent of the tasks in the health classroom, and less than 50 percent of the tasks in the science classroom. The intraverbal behaviors that were necessary for a successful performance-grade exchange in the mainstream classrooms were seldom required in the resource classroom. While shorter and more frequent assignments are often prescribed for special education students, in this instance, lengthening the assignments and requiring more written responses which developed intraverbal rather than transcription behavior may have better prepared the students for the mainstream environment.

A final difference that was evident from the data was the type of consequence for student responses to Instructional mands.

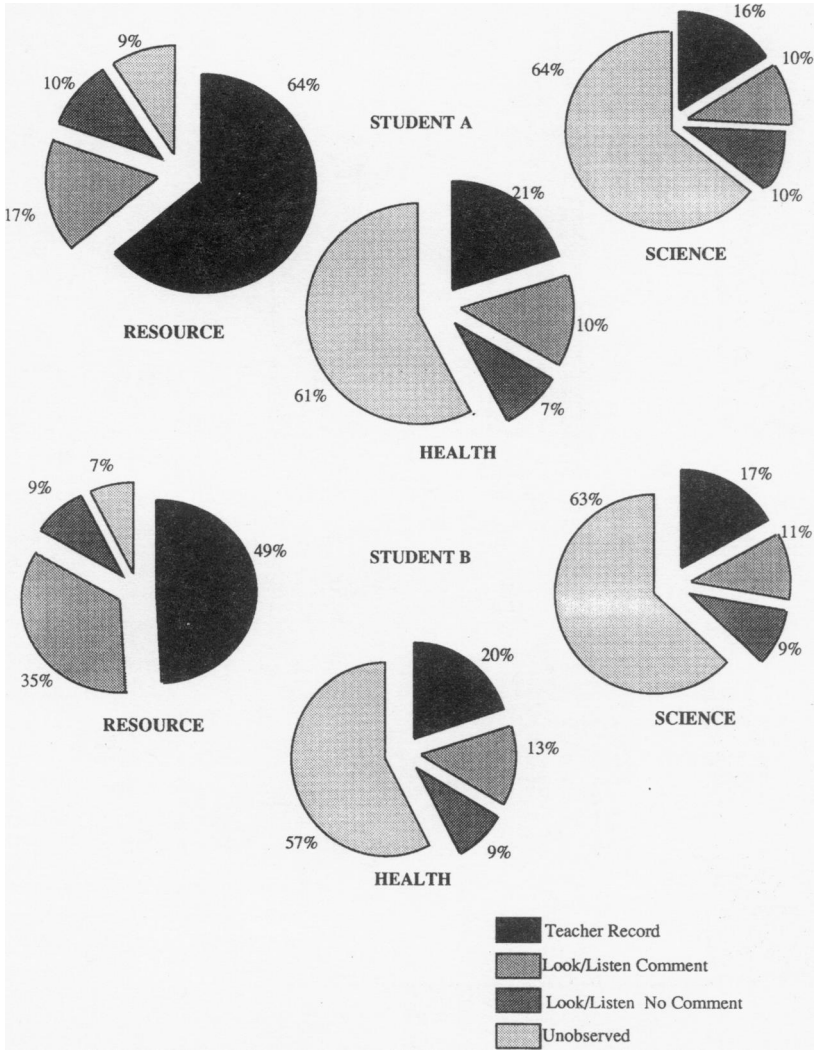

Fig. 2. Percentage of teacher accountability consequences to responses with instructional mands in the resource, health, and science classrooms.

The most frequent consequence in the resource classroom was "Teacher Recorded." The students had little difficulty discriminating which tasks "counted"—they all did. Few instructions were given to the students which were not monitored by the teacher. Every written response by the students was recorded by the teacher. All quizzes, tests, and worksheets were graded and the grades were recorded. Notes were taken in class several times a week and notebooks were periodically checked. When the notebooks were checked, the teacher recorded a grade.

In the mainstream settings, the converse was true. Most tasks did not count. More than 60 percent of the responses by both students to instructional mands were unobserved by the teacher. While class size may have been a factor, the differences seem too great to be attributed to class size alone. Unobserved responses were typically written responses on worksheets, notebooks, and study guides which were not collected or checked by the teacher. In the resource classroom, the schedule of reinforcement for written responses was a continuous one. All responses were recorded. The schedules in the health and science classes were intermittent. While continuous reinforcement is important in shaping new behaviors, a gradual change

in the schedule by the resource room teacher to one more similar to the regular classroom may again have better prepared the students for these settings.

The decision as to which health and science class the students were mainstreamed into was based on an informal assessment by the resource room teacher. Through conversations with the teachers she determined that both classes seemed to be appropriate settings. The teachers reported using a number of different instructional techniques and presenting the same materials through more than one modality. Most of the required reading was done orally in the classrooms. The students were given adequate time to complete assignments, and those who did not finish in the allotted time were given extra time. Both teachers reported a willingness to have special education students in their classrooms. The resource room teacher thus based her decision for placement on the attitudes, expectations, and verbal reports of the mainstream teachers.

The observation and recording of verbal interactions allows for a data-based decision which goes beyond attitudes and expectations. While other observation instruments have been developed, few have enabled an analysis of teacher-student interactions while defining the behavioral and environmental events in observable terms. This study indicates that the verbal operants as described by Skinner (1957) and the verbal typology defined by Johnson and Chase (1981) can provide the very specific data upon which placement decisions must be based.

Descriptive studies do not allow the identification of functional relationships. They are perhaps best judged by the questions asked rather than the questions answered. Some questions suggested by the study which could be addressed through experimental manipulation include: (1) Will behaviors and skills taught in a resource classroom be emitted more frequently in a regular classroom if similar manding behaviors are used by both teachers? (2) Will appropriate behaviors and skills taught in a resource classroom be emitted more frequently in a regular classroom if the verbal responses required of the students are similar in the two classrooms? (3) Will decreasing observation and feedback for student responses to instructional mands in a resource classroom increase compliance responses to instructional mands in regular classrooms?

Bijou, Peterson, and Ault (1968) described a methodology for naturalistic studies that can be interrelated with experimental studies. The parameters include: (1) specifying in objective terms the situation in which the study is conducted (2) defining and recording behavioral and environmental events in observable terms and (3) measuring observer reliability. Using frequency of occurrence rather than narrative data in descriptive studies allows the work of the ecological analyst to be used by the experimental analyst. The data from this study were specified in objective terms, defined and recorded in observable terms, and checked by independent observers for interobserver agreement. The present study has targeted manipulable variables which merit further investigation. Using these variables in an experimental analysis may provide important information for the programming of transfer from the special education setting to the mainstream classroom.

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