Research

Levels of Instructional Difficulty as Related to On-Task Behavior, Task Completion, and Comprehension

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The differences between first experiencing school frustration and finally receiving relief often represent a considerable lapse in time for many primary-age children. To help combat frustration, this study investigated the effects of three stages of instructional manipulation on first- and second-grade students who were functioning at a frustration level. On-task, task-completion, and task-comprehension behaviors were recorded across baseline, independent, instructional, and frustrational conditions. The results showed predictable patterns of performance related to the three levels of instructional difficulty. Educational implications regarding the procedures and results are provided.

Many children experience degrees of instructional frustration before their problems are recognized. The time lapse between first entering school, experiencing difficulty, and receiving some form of instructional relief is critical for these children. Undue delay in providing instructional intervention may actually solidify their feelings of failure, especially in those cases where assessment is withheld until a child is well into a school program, or where special services are withheld contingent upon formal verification and placement. The problem is to help these children who are caught during the initial waiting process.

Thus the authors questioned whether it was possible to identify and provide instructional intervention for children without having to wait for formal verification of discrepant ability. More specifically, the authors wanted (a) to identify these children quickly based on their daily instructional performance and (b) to measure their change in performance when exposed to frustrational, instructional, and independent levels of functions as reflected through daily classroom assignments.

In identifying children with problems and in changing their behavior, two variables that often

appear in the literature (Ayllon & Roberts 1974, Bryan 1974, Drass & Jones 1971, Ferritor, Buckholdt, Hamblin, & Smith 1972, Glavin, Quay, & Werry 1971, Staats & Butterfield 1965, Staats, Mike, Goodwin, & Landeen 1967, Sulzer, Hunt, Ashby, Koniarski, & Krams 1971) were used: task-completion and on-task behavior. A third variable, task-comprehension, was also used because it was observed that clues to correct responses for various language arts tasks for this age level were so readily available that it was possible for them to complete their assignments without really knowing the answers.

METHOD

Subjects

Initial observations were made of reading and reading-related performance of 47 first- and second-grade students attending a Title I rural school. These observations were made to determine which students were functioning consistently at the frustrational level (functioning below a 60% level). From the total sample for the two classrooms, four first graders and four second graders were identified as consistently meeting the criteria for frustrational level. These eight students became the subjects of study. All were between the ages of 6 and 7; none had received any formal or diagnostic testing because this service was not provided until the end of the second grade within this school system.

Personnel

Two regular classroom teachers and four master's-level students assisted with the study. Each teacher provided the language arts assignments for the class for the baseline period, during which the eight subjects were identified as functioning at a frustrational level. These assignments were taken directly from the Macmillan Reading Program for Primary Grades (Harris & Clark 1970) and consisted of reading, drill, and writing activities. The programs outlined in the basal readers teacher's manuals for the two grades were followed consistently. Two graduate students acted as behavioral observers and recorders, and two (one in each classroom) designed and delivered the reading and reading-related assignments for each set of subjects for the remainder of the study.

Procedures

Before the study the graduate students received 20 days of training in two major areas: how to observe and record task-completion, task-comprehension, and on-task behaviors, and how to design and/or alter reading and reading-related assignments so that they would reflect one of three levels of function — frustrational, instructional, or independent.

The following were used as guidelines for conducting observations and illustrate how the behavioral dimensions were distinguished:

(1) Task-completion represented the number of items (elements) completed per assignment; if a response was provided, whether right or wrong, it was given credit as being completed.

(2) Task-comprehension referred to items (elements) that were correctly identified and/or understood on an assignment. Comprehension was assessed on reading assignments by asking four or five questions concerning the content of what was read. On seatwork assignments, where a child was asked to learn letters, sounds, or words, comprehension was assessed by randomly pointing to each task item and asking, "What is it?" For example, if a child was copying the word "three," when asked what it is, he would have to identify it correctly as the word "three" to demonstrate comprehension.

(3) On-task meant engaging in task-oriented behavior.

The observations of each child's behaviors were computed on individual percentage bases. Interrater reliability of the four graduate students exceeded 90% on all three behavior dimensions under direct classroom conditions during the training sessions.

To teach graduate students to alter the level of difficulty of assignments, the authors used the premise that it was possible to produce frustrational, instructional, and independent levels of function for children by changing or controlling

the ratios of known to challenging elements of their assignments. The ratios that were projected as representing each level of function were:

(1) Frustrational level — assignments containing less than 70% of known elements during seatwork activity and less than 90% during reading activity.

(2) Instructional level — a range between 70% and 85% of known elements for seatwork activity and between 93% and 97% of known elements for reading assignments. The range of challenge for these two types of activities represents 15% to 30% and 3% to 7%, respectively.

(3) Independent level — assignments that contain more than 90% of known elements on seatwork activity or more than 97% of known elements in reading.

An element was defined as the smallest complete unit of a task (e.g., a letter, a sound, a word), depending on the task. When manipulating the levels of function, it was anticipated that neither frustrational nor independent conditions would maintain all three behavior dimensions as well as an instructional level.

The study was conducted over a seven-week period and consisted of 21 one-hour teaching sessions conducted on Mondays, Wednesdays, and Fridays. The first six sessions were devoted to collecting baseline information. The other 15 sessions (five weeks) were equally divided into frustrational, instructional, and independent treatments. All subjects remained in their classrooms during baseline but were removed to adjoining rooms during the final 15 sessions as requested by their regular teachers. All sessions were conducted during the school's language arts (reading) hour.

Between the baseline period and the first frustrational session, a one-hour interval was used to assess each of the eight subjects by administering a teacher-made inventory of letter names, sounds, and vocabulary words taken from their Macmillan basal reading programs. The assessment results provided a pool of known, hesitant, and unknown responses specific to each subject; these results were used to prepare assignments. By manipulating the ratio of known to challenging elements within each assignment to reflect a given set of criteria, the frustrational, instructional, and independent levels of function could be produced, as evidenced by each subject's task-completions, task-comprehension, and on-task behavior.

Baseline data for task-completion, task-comprehension, and on-task behavior were collected when the subjects were in their seats and doing assignments given to them by their regular teachers. These assignments consisted of writing ABC's, matching letters to sounds, matching vocabulary words to pictures and to their letter symbols, writing vocabulary words, discriminating between word groups, and reading from basal readers. Task-completion and task-comprehension was always assessed when each subject concluded an assignment, whereas on-task behavior was confined to a 20-minute sampling during seatwork time. The sampling consisted of the observer's scanning the on-task and off-task behavior of the four subjects of each particular age group and recording their behaviors. They would observe for 10 seconds and record for 50 seconds for 20 minutes. Twenty observations were made on each of the eight subjects for each of the six baseline sessions.

These same observations and sampling procedures were used for the final 15 sessions that comprised the three different treatment levels. Based on the initial and ongoing assessment information, all assignments were prepared one day in advance and conformed to the criteria established for a particular level of function. All assignments were taken from the same basal reading programs used by the regular classroom teachers, only the ratios of known to challenging elements were altered. Assignments for sessions 7 through 11 required the subjects to work lessons designed at each subject's level of frustration; sessions 12 through 16 contained assignments that reflected an instructional level for each subject; and sessions 17 through 21 contained assignments that were prepared to produce independent function. Each day the subjects were given their respective assignments, were grouped, and were instructed together

when appropriate; they were then observed and measured as previously specified.

The appropriateness of each set of criteria and their relative strength as reference points for changes in assignments were determined by the respective subjects' performances. Whether predictable changes occurred through controlled manipulation of the curriculum content can be seen in the results of observations.

RESULTS

The results of baseline, frustrational, instructional, and independent treatment conditions were reported separately for the two groups of subjects. Daily performances for each group were reflected as mean percentages of on-task, task-completion, and task-comprehension behavior for each of 21 sessions.

First-Grade Subjects

The percentages of on-task, task-completion, and task-comprehension behavior for this group of subjects are presented in Figure 1. These four subjects completed from 75% to 97% of their tasks during baseline, with a mean of 84%. These percentages were discrepant, however, when compared with the range of mean scores achieved on the other two variables. On-task behavior ranged from 38% to 71%, and task-comprehension behavior ranged from 10% to 20%.

A wide variation across mean percentages was evident when comparing the relative mean percentages between task-completion, on-task, and task-comprehension behavior during baseline. Variation was also manifest within each behavioral dimension. For example, the percentages per sessions fluctuated as much as 22% in task-completion behavior and more than 30% in on-task behavior activities.

The results of the frustrational treatment reflected an extension of baseline performance for the four first graders. Mean percentages during this phase showed a high degree of similarity to baseline conditions. During these five sessions comprehension rose slightly higher than baseline, from 20% to 36%. On-task behavior remained about the same as baseline but with less variation across mean scores, ranging from 47% to 57%. The mean percentages of task-completion behavior took a precipitous drop when compared with baseline; on this variable scores went as low as 41% and no higher than 53%. All total, the mean percentages for the three observational variables were consistently lower than 60% during the five frustrational sessions.

In the instructional treatment, where the ratios of known to challenging information were maintained at an instructional level, first-grade subjects showed marked improvement across all three areas of observation. During the instructional sessions task-completion rates showed means of at least 94% in four of the five sessions; the one remaining session showed a mean of 85%. Task-comprehension was 94% and 95% for the five sessions. On-task behavior averaged 88% during the same time frame. A high degree of congruence occurred between each of the three behavioral variables when compared one with another over the five instructional sessions. Considerable stability in mean scores was noted within each behavior dimension. For example, the variations between the high and low mean scores within the separate on-task, task-completion, and task-comprehension dimensions were only 13%, 12%, and 1%, respectively, during the instructional treatment condition.

Further manipulation was made during the independent treatment. During these five sessions task-completion percentages ranged from 95% to 99% and were associated with 100% task-comprehension. On-task behavior, however, resulted in mean percentages considerably below those observed for task-completion and task-comprehension. On-task behavior did not exceed 65% during the independent condition and fell as low as 48%. Apparently the skills of the subjects and the demands of the tasks left large amounts of time available for additional instruction during this treatment condition.

Second-Grade Subjects

Figure 2 shows the transactions for the second-grade subjects. It illustrates the within and

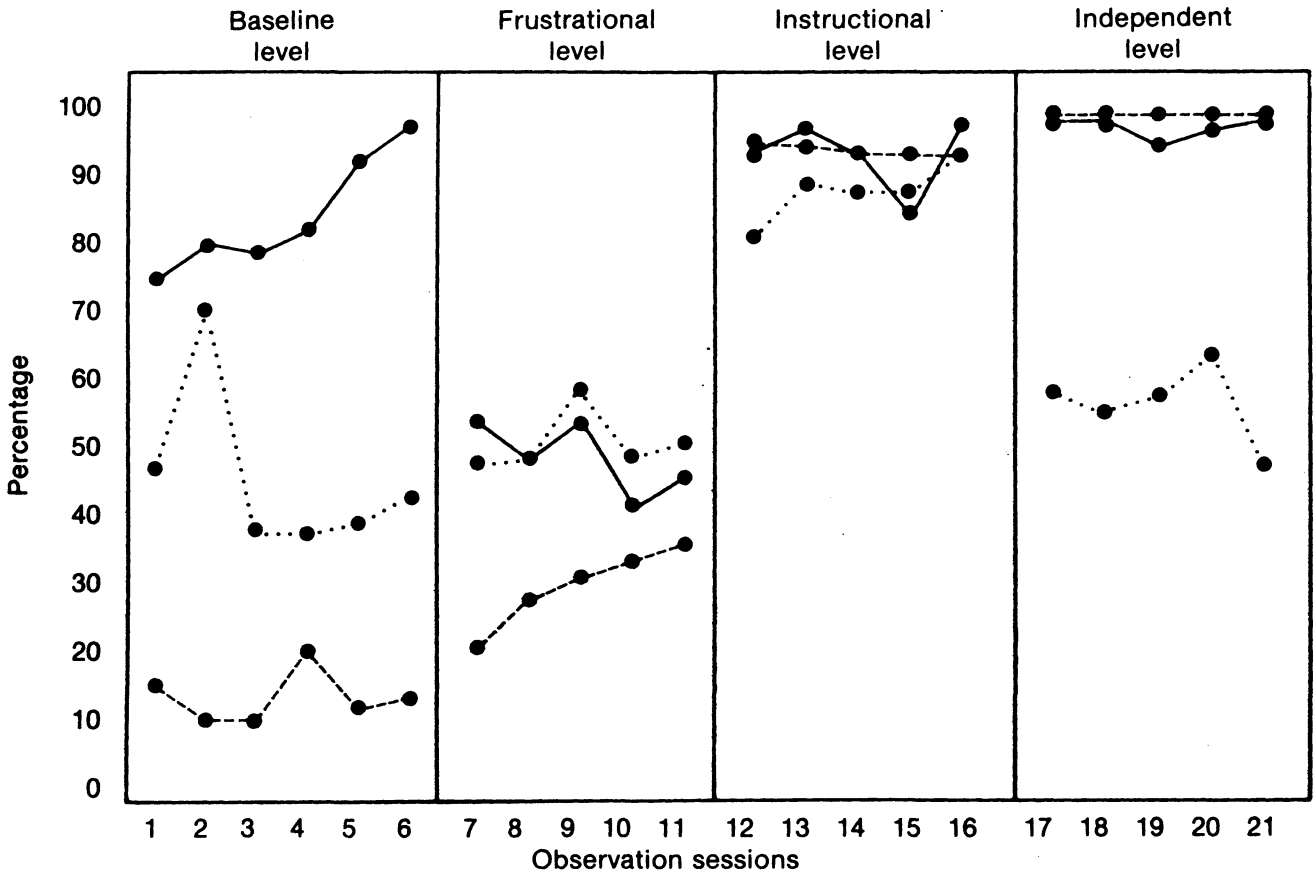


FIGURE 1. Mean percentages of on-task behavior (· · · · · · ·), task-completions (———), and task-comprehension (- - - - - - -) per session for four first-grade subjects on baseline, frustrational, instructional, and independent levels of function.

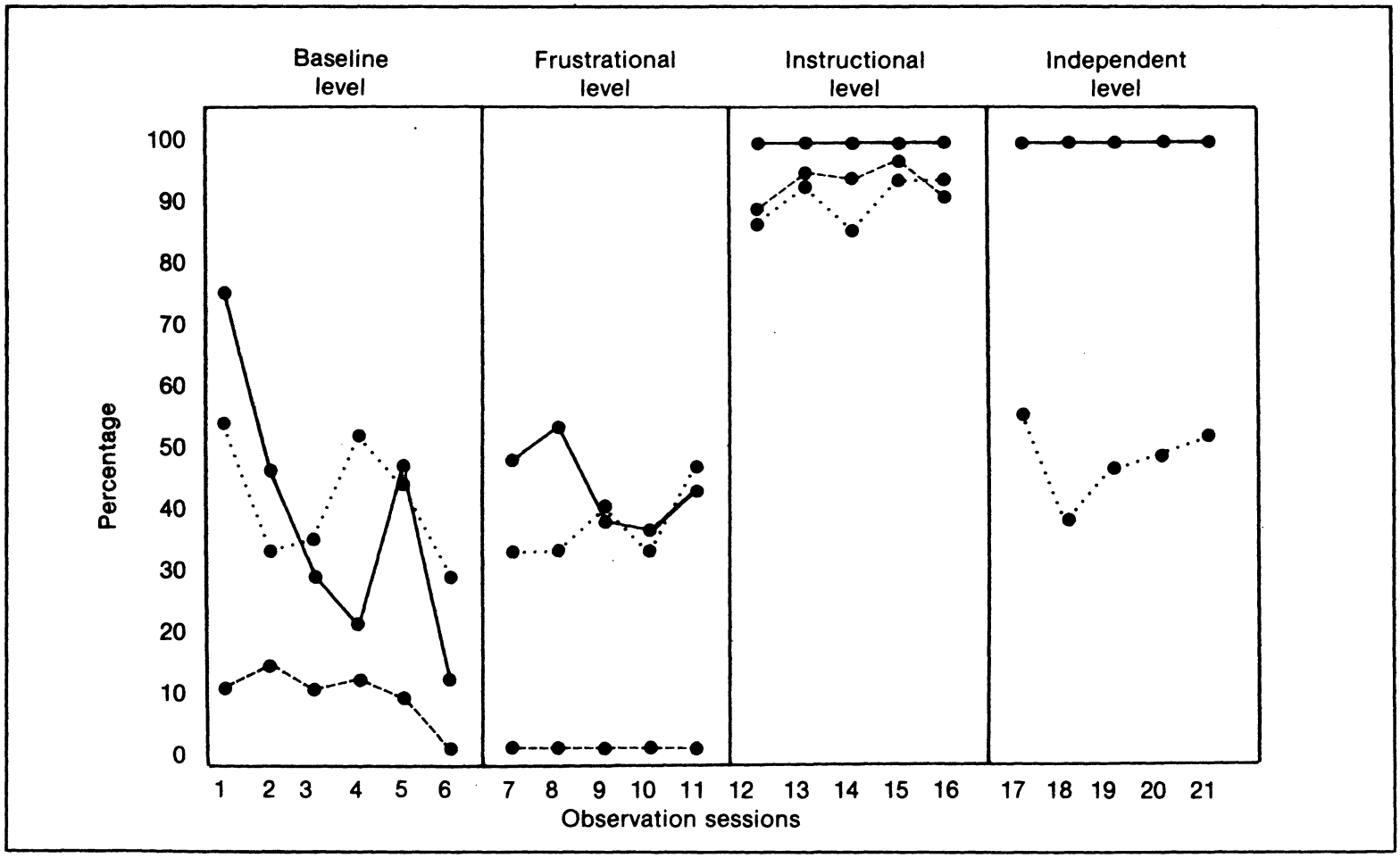


FIGURE 2. Mean percentages of on-task behavior (·····), task-completions (———), and task-comprehension (-------) per session for four second-grade subjects on baseline, frustrational, instructional, and independent levels of function.

between mean percentage differences for the age group across the three observational variables. During the baseline condition a decline in task-related behavior was noted when compared with Figure 1. There was also a similarity in the patterns of fluctuation from one variable to another during this period of decline. In other observations between Figures 1 and 2, the overall behavior patterns of the second-grade subjects were similar to those of first-grade subjects when frustrational, instructional, and independent levels of instruction were enforced. When the level of task difficulty was varied according to specific criteria, predictable patterns of behavior occurred for each level of function.

DISCUSSION

In this study the concept "treatment" did not apply in the usual sense. It did represent somewhat of a change in instructional conditions, but this change was only manifest in the manipulation of the difficulty of assignments for the eight subjects. In this respect the study represented a repeated measures design — one in which the subjects remained constant but the degree of difficulty of material changed. All other instructional conditions remained the same throughout the three treatment conditions.

The study supported an important educational concept, that of the existence of a curvilinear relationship between learning and instructional difficulty. As the levels of difficulty changed within assignments to conform to frustrational, instructional, and independent conditions, the percentages of task-completions, task-comprehension, and on-task behavior for the two groups of subjects also changed. When assignments were too difficult, the percentages of the three behaviors were relatively low for all. When assignments were at an independent level, comprehension and task-completions came too easy, leaving large percentages of off-task behavior. However, when assignments were appropriate and subjects were functioning on an instructional level, the percentages of task-completion, task-comprehension, and on-task behavior were consistently high.

The study showed that at least one form of "markedly discrepant performance" could be determined by observing the classroom behavior of children as they worked routine classroom assignments. In both baseline conditions (see Figures 1 and 2) two types of discrepancies were noted. First, the overall mean percentages in the three observed behaviors were generally low and sometimes considerably below the criteria for an instructional level. For example, approximations of only 50% on-task behavior were not considered acceptable, nor were mean scores of only 10% to 20% comprehension. Second, there was a discrepancy between task-completion rates and corresponding task-comprehension percentages. This situation existed in both groups, but was more obvious in the younger group. The first-grade subjects on an average had completed 84% of their assigned work. However, when asked to identify the various letters or words they had been copying, they were unable to do so as seen by their low percentages of task-comprehension. If on-task and task-completions had been the only performances measured for this group, then instructional intervention would have probably been postponed. Instead, recording the behavior of each subject across the three behavior dimensions resulted in evidence of discrepant ability.

Another important relationship surfaced as part of this study — the relationship between academic success and appropriate classroom behavior. The study showed that task appropriate behaviors were associated with the ability to function at an instructional level. Apparently assignments presented at this level permitted sufficient comprehension and challenge to sustain on-task behavior. In the cases of frustrational and independent levels of function, high percentages of off-task behavior were recorded. Even though a definitive cause/effect relationship between academic success and on-task or task-oriented behavior cannot be drawn from this study, the performances of the subjects

indicate that appropriate curriculum choices were antecedents to appropriate classroom conduct and not vice versa.

Of course the concept of an instructional level is much broader than the dimensions of this study. It is traditionally viewed as meeting a child's individual needs, such as structuring differently for each child, providing learning centers, capitalizing on interest and talent, and making use of strengths and weaknesses. Within the dimensions of this study, it merely meant maintaining an instructional ratio to conform to given sets of criteria. These criteria were used both to identify the eight subjects and to gauge the alteration of each subject's reading and reading-related assignments across frustrational, instructional, and independent levels of function. How well these criteria serve these two purposes are illustrated in the baseline and treatment sessions of Figures 1 and 2. These results showed that by manipulating assignments to conform to a specified criterion level (frustrational, instructional, or independent), behavior change became very predictable as measured by task-completion, task-comprehension, and on-task performace. In summary, the sets of criteria used throughout the study were sufficient to discriminate among the three levels of function, and most important, the criteria used for an instructional level did, in fact, produce the more optional teaching/learning situation for both groups of subjects. Whether these criteria will be able to produce similar results with other student populations is a welcome challenge for the future.

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