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ABSTRACT

This study investigated test-wiseness in a sample of urban high school seniors. Fifty-four academically talented black and minority students were matched on reading comprehension scores from the California Achievement Tests and were assigned to cells in a seven-group, before/after design. Specially constructed forms of the 1973 Iowa Silent Reading Tests, Reading Comprehension, were developed as criterion measures. Control groups one and two received no treatment. Placebo groups one and two received 15.87 hours of instruction in effective study techniques, instruction irrelevant to the analysis. Experimental groups one, two, and three received 15.33 hours of instruction in test-wiseness, and experimental group three received an additional 15.33 hours of instruction in psycholinguistic reading strategies. Results of the analyses suggest several patterns of improvement in test-wiseness which deserve further inquiry. (Author)

A Psycholinguistic Approach to Training Urban High School Students in Test-Taking Strategies: A Directional Effort [1]

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[1] This article is a summary of a doctoral dissertation prepared under the direction of Drs. Morton Botel and Ralph C. Preston at the University of Pennsylvania in 1976.

Abstract

This study investigated test-wiseness in a sample of urban high school seniors. Fifty-four academically talented Black and minority students were matched on reading comprehension scores from the California Achievement Tests and assigned to cells in a seven-group, before-after design. Specially constructed forms of the 1973 Iowa Silent Reading Tests, Reading Comprehension, were developed as criterion measures. Control Groups 1 and 2 received no treatment. Placebo Groups 1 and 2 received 15.87 hours of instruction in effective study techniques, instruction irrelevant to the analysis. Experimental Groups 1, 2 and 3 received 15.33 hours of instruction in test-wiseness, and Experimental Group 3 received an additional 15.33 hours of instruction in psycholinguistic reading strategies. Results of the analyses suggested several patterns of improvement in test-wiseness which deserve further inquiry.

It is a commonly accepted fact that working-class Blacks and other economically "disadvantaged" minorities do not do as well on standardized tests as middle-class Whites (Stanley, 1965; Stanley and Porter, 1967; Brill, 1974). In addition to the inferior quality of education in many large urban areas, one of the reasons frequently given for the poor test performance of Blacks is "cultural bias"— that is, the tests look for values and acquired skills consistent with the mainstream of the American middle and upper class. Concern over reading failure in urban schools has recently drawn attention to variations in the language patterns of Black school children. Roberts (1970), Hutchinson (1972) and Wolfram and Fasold (1974) discussed findings related to the "linguistic bias" of language development and reading/language arts achievement tests. William Raspberry (1974) pointed to the questionable validity of a good many tests in the areas of employment and promotion that pose yet another problem in teaching minorities. To Raspberry, "the solution is not to throw out the tests but to insist on making the tests do what they allege to do, and to give minorities the wherewithal to pass them— by teaching them how to pass tests, if necessary" (Raspberry, 1974:19).

Aside from construct validity and other possible delimiting factors discussed above, Erickson (1972) argued that poor test-taking ability should also be an important consideration in judging the value of a standardized test result. It has been established that "... certain subsets of the popula[illegible] Black

students, rural students, etc.) score lower on achievement or aptitude tests than the population at large. Future research should attempt to examine the part played by test-wiseness in these mean differences" (Slakter, Koehler and Hampton, 1970: 253).

The best and most extensive work in test-wiseness has been done by Jason Millman and his associates who defined this concept as follows: "Test-wiseness is defined as a subject's capacity to utilize the characteristics and formats of the test and/or the test-taking situation to receive a high score. Test-wiseness is logically independent of the examinee's knowledge of the subject matter for which items are supposedly measures... it will be restricted to the actual taking of (not preparing for) objective achievement and aptitude tests" (Millman, Bishop and Ebel, 1965:707). Millman and his associates also presented an outline of test-wiseness principles. Objective evidence for the existence of test-wiseness has been the concern of a number of investigations (Ardiff, 1965; Kreit, 1968; Diamond and Evans, 1972), and objective evidence for the teachability of test-wiseness has been obtained in investigations at all educational levels, preschool to college (Gibb, 1964; Wahlstrom and Boersma, 1968; Slakter, Koehler and Hampton, 1970; Oakland, 1972; Callenbach, 1973; Langer, Wark and Johnson, 1973). The bulk of the research on the teachability of test-wiseness has been conducted on White populations.

Previous studies of the effect of coaching on college

admissions test scores (Dyer, 1953; French, 1955; French and Dear, 1959; Malcolm, 1961) have been essentially negative. In the previous study most relevant to this investigation, Roberts and Oppenheim (1966) sought to determine whether Black students who had received less adequate public school instruction and who were less able in Scholastic Aptitude Test performance than the subjects in previous studies might benefit more from special instruction. While there were statistically significant differences in gain scores between some of the experimental groups and their controls, the outcome of the study, like the outcome of earlier studies, was generally negative.

Recent psycholinguistic research and Chomsky's theory of generative-transformational grammar have provided models of the reader's processes of extracting information from spoken and written language. Several psycholinguistic models of reading have been proposed to explain the language processing involved in the comprehension process (Goodman, 1970; Smith, 1971; Ruddell, 1970). Kenneth Goodman (Smith, Goodman and Meredith, 1970) has identified four kinds of cue systems in a psycholinguistic view of the reading process: (1) cue systems within words-- phonics, word recognition, little words in new words, affixes, recurrent spelling patterns; (2) cue systems in the flow of language-- patterns of word order or function, inflections, function words, intonation, contextual meanings of nearby words and whole sentences or paragraphs, redundancy in language; (3) cues within the reader, what he brings to

language-- language facility, dialect differences, physiology, learned responses to graphic cues, experiential and conceptual backgrounds; and (4) cues external to language and the reader-- pictures, prompting, concrete objects, skill charts. Reading comprehension is seen as message reconstruction, and comprehension depends on the reader's using all the psycholinguistic cues available to him. Cue systems in the flow of language and cues within the reader would seem to be the most pertinent cues at the secondary level (Mavrogenes, 1975).

The problem investigated in this study falls under the general heading of test-wiseness. The definition of test-wiseness used here is the ability to understand the questions by which level of attainment is being assessed, as well as to utilize the most efficient approach available when answering these items (Erickson, 1972). Further, the ability to manifest test-taking skills which utilize the characteristics and format of a test and/or test-taking situation in order to receive a score commensurate with the abilities being measured (Oakland, 1972). The aspect of psycholinguistics considered here is Goodman's (Smith, Goodman, Meredith, 1970) concept of psycholinguistic cues or devices within language that operate in reading to cue meaning.

Three hypothesized responses were formulated as follows: (1) Test-taking strategies for reading comprehension tests can be taught by classroom instruction; (2) The knowledge gained will subsequently enable a test-wise examinee to obtain a higher

score on a standardized test than an equally knowledgeable examinee who lacks test sophistication; and (3) Test-taking strategies for reading comprehension tests, which include a consideration of psycholinguistic cue systems in the flow of language, will enable an examinee to obtain a higher score on a standardized reading comprehension test than test-taking strategies which do not consider psycholinguistic cues.

Method

Subjects

Fifty-four academically talented twelfth-grade students (Ss) at an inner-city, comprehensive high school in Philadelphia, Pennsylvania were included in the study. Ninety-six percent of the Ss were Black and four percent were Puerto Rican. Females constituted ninety-six percent of the sample. An attempt was made to match all Ss on scores from the California Achievement Tests-Reading Comprehension (CAT) taken in eleventh grade. The percentile band of 34-51 was selected as the criterion on which Ss would be matched. However, only 30 Ss out of the total subject pool were found to meet this criterion. Fifteen of the remaining Ss were selected on the criterion of program judgment and nine Ss were selected on the criterion of teacher judgment.

The Ss selected for inclusion in the study on the criterion of program judgment had CAT scores below the thirty-fourth percentile (N=12) or incomplete records (N=3). All Ss selected on the basis of program judgment were enrolled in either the AFNA Program, the Motivation Program or the Commercial/Academic Program. Since Ss in each of these programs were required to

maintain a high level of academic performance, it was assumed that they had a level of reading achievement sufficient for the requirements of the study and that their CAT scores were not true indicators of their level of reading efficiency. It was further assumed that Ss with incomplete records maintained a level of reading achievement sufficient for inclusion in the study.

The nine Ss selected for the study on the criterion of teacher judgment were all enrolled in the Commercial Program and had CAT scores below the thirty-fourth percentile (N=7) or incomplete records (N=2). English teachers were asked to evaluate the performance of these Ss on textbook materials and supplementary reading assigned in class. In each case, the English teacher expressed doubt that the CAT scores were true indicators of the student's reading achievement. The investigator, therefore, assumed that the nine Ss in the teacher judgment category met the criterion for reading achievement established for the study.

The realities of working in a school setting made the random assignment of Ss to the cells in the research design impractical. The most serious constraint to complete randomization was the rostering problem which was exacerbated by the implementation of a court-ordered plan to provide additional periods of reading for Title 1 senior high school students.

A subject pool of 26 Ss whose rosters had been pre-set by the Chairperson of the English Department in the spring

semester of their junior year was established. These Ss were randomly assigned to each of 3 Experimental groups (X-1, X-2 and X-3). A subject pool of thirteen Ss whose rosters included English classes during the second, third or sixth periods was established for Placebo groups. These Ss were randomly assigned to each of 2 Placebo groups (P-1 and P-2). Finally, the remaining 15 Ss were randomly assigned to each of 2 Control groups (C-1 and C-2). A Kruskal-Wallis one-way analysis of variance test was run on the eleventh-grade CAT scores of the seven groups. The results were not statistically significant, demonstrating that each of the seven groups in the research design was equal with respect to general reading ability. Table 1 summarizes additional data on student characteristics.

Insert Table 1 about here

Instrumentation

Experimental Subtests. Specially constructed forms of the 1973 Iowa Silent Reading Tests-Reading Comprehension, Level 1, Forms E and F, were developed as criterion measures. A random selection of half the item pool was selected to construct test 1C; the remaining half was used to construct test 2C. Part A of the criterion tests contained 38 items and measured the student's ability to answer questions based on short passages to which he had ready access. Part B contained 12 items and measured the student's ability to answer questions based on a

longer, essay-type passage where short-term retention was required. In the above notation, C denotes a test with "clean" items-- that is, items which contain no test-wiseness cues. (Secondary or test-wiseness cues).

Faults common to multiple-choice items were incorporated into items in tests 1C and 2C to produce tests 1F and 2F. The 5 item faults selected for the study were: (1) Association between stem and alternative such that a name or phrase is repeated in both the stem and correct alternative; (2) Specific determiners (all, never, etc.) used in the distractors; (3) Correct alternatives which are longer and in some cases more specific than the other distractors; (4) Grammatical clues in the stem, i.e., the use of "a" but not "an," the use of plurals in the stem with only one alternative being plural and the presence of distractors which do not follow grammatically from the stem; and (5) Similarity or oppositeness, i.e., the correct option is one of two similar statements or one of two options which state the idea or fact diametrically opposite. The 12 questions in Part B were not rewritten so as to contain item faults. In the above notation, F denotes a test with a combination of "faulted" and "clean" items. Examples of each of the 5 item faults follow:

Association: The word rig, as used in this passage to describe a ring-dropping trick, means-

(a) buggy (c) jewelry

(b) costume * (d) trick

Specific determiners: This passage suggests that a word does not appear in the dictionary until it is-

(e) registered with every state government.

(f) defined by all experts in linguistics.

(g) approved by every regional office of the Modern Language Association.

*(h) used by many people.

Longer correct alternative: How was the drum carried from place to place?

*(e) By lengthening the cow's ears and tails, thereby creating handy grips for carrying.

(f) By a ring in the cow's nose.

(g) By a handle on the cow's back.

(h) By a strap around the middle of the cow.

Grammatical clues: The hand tools used in carving were made of an-

(a) stone substance.

(b) hard, white substance.

*(c) iron substance.

(d) wood substance.

Similarity: According to the passage, the sigma effect of the Fahraeus-Lindqvist phenomenon is related to-

(a) the flow of liquid through the kidney.

*(b) the muscular contractions of the kidney.

(c) the kidney's transmission of fluids.

(d) the diameter of the red cells flowing through the kidney's blood vessels.

Oppositeness: Which of the following had the greatest influence on the style of the African sculptor?

(e) His individual taste.

*(f) The artistic style favored by his people.

(g) The art works favored by other nations.

(h) His desire to please the village chief.

Test-Wiseness Curriculum. A 99 page curriculum consisting of the following 6 sections:

(1) The multiple-choice type of test item-- introduced Ss to the structure of the multiple-choice item and discussed the 3 common forms of such items.

(2) Basic strategies of taking multiple-choice tests-- presented Jason Millman's et al. (1965) "An Outline of Test-Wiseness Principles" and "Elaboration of Selected Principles" adapted by Merlin Wahlstrom to match the language level of ninth-grade Ss in his 1968 study.

(3) Basic strategies of answering reading comprehension test items-- trained Ss to identify the general skill being tested by each type of item and to utilize appropriate strategies for each distinct type of item.

(4) Test-making-- provided experiments in test construction designed to make test-taking strategies presented in the previous 3 sections accessible to the student through an inductive process (cf. Botel, 1974).

(5) Summary-- recapitulated basic strategies of taking multiple-choice tests and strategies of answering reading comprehension test items.

(6) Problems for practice-- included sample reading

comprehension tests and tests of test-wiseness for reinforcement of test-wiseness principles.

Psycholinguistics Cues Curriculum. An 85 page curriculum consisting of the following 9 sections:

(1) Patterns of word order or function— exercises designed to illustrate the importance of position within sentence patterns to the meaning of unfamiliar words.

(2) Inflection and inflectional agreement— emphasized importance of inflectional cues to meaning and the significance of consistency in the pattern of use of inflectional endings.

(3) Lexical/grammatical morphemes— reviewed meaning of common prefixes, roots and suffixes.

(4) Function words— reviewed the small number of words in English which have little or no meaning but which perform important functions as structure cues.

(5) Intonation— exercises which demonstrated the role of punctuation in representing intonation in the written language.

(6) Contextual meaning— reviewed strategies for utilizing the syntactic and semantic cues present in larger units of language in comprehending unfamiliar words.

(7) Redundancy (Discourse markers)— exercises in unity, coherence and emphasis designed to illustrate importance of repetitious cues to the same "bit" of information.

(8) Redundancy (Logical ordering of a passage)— drills which allowed the Ss to make a closer analysis of supporting sentences and their role in the expansion of the main thought.

(9) Language games-- further set of lively exercises designed to refine the students' perception of word structure.

Procedure

The experimental design developed by the investigator for this investigation was a modification of the Wahlstrom and Boersma research design (Wahlstrom and Boersma, 1968:416). Table 2 specifies the design used in the present research.

Insert Table 2 about here

The independent variable for Experimental Groups X-1 and X-2 was the Test-Wiseness Curriculum. The Test-Wiseness Curriculum and the Psycholinguistic Cues Curriculum were the independent variables for Experimental Group X-3. Dependent variables for all Experimental groups were scores on Posttests 2F or 2C.

The investigation was conducted over a period of 47 days. The sessions were held daily, Monday to Friday, except for official school holidays and special assembly programs. The time allowed for presenting treatments to groups was approximately 92 minutes or 2 class periods daily. Classes were held in a separate classroom facility, the school cafeteria and the locker room area. Specific classroom procedures are presented for each group below:

C-1 and C-2. On Day 1 of the experiment, Pretests were administered to the 15 Ss in the Control groups. During the

next 10 days, Ss attended their regular classes and received no treatment. On Day 12, Posttests were administered to the Control groups.

P-1 and P-2. Pretests were administered to the Placebo groups on Day 13 of the study. From Day 14 to Day 23, Ss were instructed in effective study methods. This instruction did not include a consideration of test-wiseness or psycholinguistic cues and was, therefore, irrelevant to the analysis. On Day 24, Posttests were administered to the Placebo groups.

X-1, X-2 and X-3. On Day 25 of the experiment, Pretests were administered to Ss in the Experimental groups. From Day 26 to Day 35, Ss were instructed in test-wiseness from the Test-Wiseness Curriculum. The balanced approach to the Test-Wiseness Curriculum included the following major activities: (1) investigator's discussions; (2) small group discussions; and (3) practice tasks. Each 92 minute session provided approximately 25 minutes for investigator's discussions, 37 minutes for small group discussions and 30 minutes for practice tasks. Some "principles" of learning which were applied in presenting experimental treatments to groups were "learning by doing," repetitive practice, positive reinforcements, maintenance of cooperative group atmosphere for learning, organization of knowledge from simplified wholes to more complex wholes and learning with understanding. Posttests were administered to groups X-1 and X-2 on Day 36. From Day 37 to Day 46, group X-3 received instruction in psycholinguistic

reading strategies from the Psycholinguistic Cues Curriculum. The balanced approach to the curriculum described above remained in effect. On Day 47, Posttest 2C was administered to Ss in group X-3.

Following completion of the training sessions, interviews were conducted with 6 Ss, 2Ss from each of the 3 Experimental groups, whom the investigator felt experienced the most "significant" growth during training. The investigator returned to the school near the end of the school year to present experimental treatments to interested Ss in the Control and Placebo groups and to instruct interested members of the English faculty in the procedures for administering the curricula.

Results and Discussion

There was evidence of treatment effects for the Experimental groups, although the differences between the groups on the Experimental Subtests were not statistically significant at the .05 level of confidence. The Pretest means were higher than had been expected, suggesting that the test was "easy." Consequently, there was little room for the Ss to demonstrate impressive improvement. Furthermore, the investigator had no way of determining with certainty where Ss in the Control, Placebo and Experimental groups would fall in comparison with norms established for Black and minority populations only. It is probable that Ss in this investigation, 56% of whom had percentiles ranging from 34-51 on the CAT, would fall in the upper quartile in comparison with Black and minority students only.

Consequently, there would be little room for improvement in performance from Pretest to Posttest.

Item-analysis revealed improvement in the application of the Guessing Strategy for Experimental Groups 1 and 3 and movement in the predicted direction on the mean and range scores on Part A for Experimental Group 3. Ogive curves revealed a decrease in the variability of Posttest scores on Part A for Experimental Group 1 and on Part B for Experimental Group 3.

A comparison was made between the CAT-Reading Comprehension scores in eleventh and twelfth grade for 44 of the 54 Ss who participated in the study. Walsh test results indicated no significant differences between CAT scores for the Control groups, Placebo groups and Experimental Groups 1 and 3. However, the twelfth grade reading comprehension scores for Experimental Group 2 were significantly higher than the eleventh grade scores at the .062 level of confidence.

Several Ss demonstrated improvement by as much as 140 points on the SAT-Verbal taken after training. Evidence from student interviews conducted after training and unsolicited letters written by Ss who were not a part of the formal study but who received training in test-wiseness for the College Boards suggested positive effects in the affective domain (see also McPhail, 1978).

The statistical results, as such, tend to support earlier findings by Roberts and Oppenheim (1966) which cast doubt on the expectation that short-term instruction in test-taking

strategies given on a wide scale would be of significant benefit to "disadvantaged" Ss. However, results of the analyses suggested several patterns of improvement in test-wiseness which deserve further inquiry.

It would be interesting in future replications of this study to have Control Group 2, Placebo Group 2 and Experimental Group 2 take Posttest 2F which contained the same content as Pretest 1C, except for the inclusion of item faults in the Posttest items. This would provide a more adequate basis for determining if the Ss could be taught to respond to the presence of test-wiseness cues in test items. It would also be interesting to present the curricula in a programmed format and to see if this format would lead to increased student achievement. Longitudinal studies are needed to evaluate long-range gains in test performance and the relative permanence of positive attitudes toward the test-taking situation. Definitive conclusions as to the effectiveness of the Test-Wiseness Curriculum and the Psycholinguistic Cues Curriculum must await future replications of this exploratory study and modification of the instructional model and research design based on the findings and implications of this investigation.

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TABLE 1

SUMMARY OF STUDENT CHARACTERISTICS

Group	Mean Age	Sex		Ethnic Membership		Academic Program				Total Hours of Experimental Instruction	Attendance Rate During Experimental Instruction
		Females	Males	Black	Puerto Rican	M[a]	A[b]	C[c]	C/A[d]		
C-1	16.86	7		6	1	2		3	2		
C-2	16.75	8		7	1	4		4			
P-1	17.00	6		6		2	3	1			
P-2	16.67	7		7		3	4			15.87	62.80%
X-1	16.78	9		9		6	1	2			
X-2	16.71	7	1	7	1	6	1	1		15.33	83.00%
X-3	16.44	8	1	8	1	7	1		1	30.67	78.00%
Totals		52	2	50	4	30	10	11	3		

[a]Motivation Program
[b]AFNA Program
[c]Commercial Program
[d]Commercial/Academic Program

TABLE 2

RESEARCH DESIGN

Group	n	Pretest	Treatment	Time Period	Posttest
C[a]1	7	1F[d]	YY[f]	Day 1-Day 12	2C
C2	8	1C[e]	YY	Day 1-Day 12	2F
P[b]1	6	1F	SS[g]	Day 13-Day 24	2C
P2	7	1C	SS	Day 13-Day 24	2F
X[c]1	9	1F	TW[h]	Day 25-Day 36	2C
X2	8	1C	TW	Day 25-Day 36	2F
X3	9	1F	TW + PC[i]	Day 37-Day 47	2C

[a] Control group

[b] Placebo group

[c] Experimental group

[d] Test containing selected secondary cues incorporated into stems and/or alternatives

[e] Test containing no selected secondary cues incorporated into stems or alternatives

[f] No treatment

[g] Instruction in study skills not including test-wiseness or psycholinguistic cues

[h] Instruction in test-wiseness from the Test-Wiseness Curriculum

[i] Instruction in psycholinguistic cues from the Psycholinguistic Cues Curriculum