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ABSTRACT

To determine whether mainstreaming affects the nonhandicapped student's cognitive schema of the handicapped, a story about a physically handicapped boy was read to 20 fourth grade children in a mainstreamed classroom and 29 nonmainstreamed children. The 10 characteristics attributed to the handicapped boy in the story (acquisition items) and 8 novel characteristics (distractor items) were included in the subsequent recognition memory task. The number of errors made in the memory task reflected the extent to which the acquisition and distractor items were compatible with the Ss' handicap schema content. The closer the Ss' schema content approximated the social stereotype of the handicapped, the more errors they committed. The mainstreamed Ss made significantly fewer errors on the recognition memory test, thus confirming the prediction that mainstreaming results in a less stereotypic handicap schema among the nonhandicapped students. (Author)

Cognitive Effects of Mainstreaming

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Abstract

The purpose of this study is to determine if mainstreaming affects the nonhandicapped students' cognitive schema of the handicapped. A story about a physically handicapped boy was read to 28 fourth grade children in a mainstreamed classroom and 29 nonmainstreamed children. The ten characteristics attributed to the handicapped boy in the story (acquisition items) and eight novel characteristics (distractor items) were included in the subsequent recognition memory task. The number of errors made in the memory task reflected the extent to which the acquisition and distractor items were compatible with the subject's handicap schema content. The closer the subjects' schema content approximated the social stereotype of the handicapped, the more errors they committed. The results were that the mainstreamed subjects made significantly fewer errors on the recognition memory test, thus confirming the prediction that mainstreaming results in a less stereotypic handicap schema among the nonhandicapped students.

Cognitive Effects of Mainstreaming

Mainstreaming, the integration of handicapped and nonhandicapped children in the same educational placement, has been the subject of much research (Jones, Gottlieb, Guskin, & Yoshida, 1978). Despite this fact, little is known about some of the cognitive effects of mainstreaming on the handicapped childrens' understanding and conceptions of the handicapped. The particular question to be addressed in this study is if children consistently attribute specific characteristics to the handicapped and, if so, how these stereotypic conceptions differ between children who are in mainstreamed classes and children who are not.

The notion that a stereotype of handicapped persons exists among children and adults is supported by previous research (Comer & Piliavin, 1975; Rapier, Adelson, Carey, & Croke, 1972). Weinberg (1976) investigated the dimensions on which the disabled are viewed as different by college-age subjects. She employed a person-description questionnaire and asked the subjects to rate a variety of persons, including some with handicaps. The disabled person was rated as less socially skilled, as more dependent, as more politically conservative, and as more personally

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good than the nonhandicapped persons. It was also found that the blind, deaf, and wheelchair persons were all described as being quite similar to each other.

In a subsequent study, Weinberg (1978) investigated whether perceptions of the handicapped were affected by contact with the disabled. Fourth, fifth and sixth grade students were asked to rate a pictured child (able-bodied or disabled) on 26 items. The results indicated that mainstreamed and nonmainstreamed subjects rated the disabled child similarly; that is, nicer, friendlier, playing less, better looking, needing more help, weaker, less happy, more interesting, wanting more attention, talking more, fighting less, and braver. Similarly, in the second experiment, increased contact between handicapped and nonhandicapped college-age students did not affect ratings of the handicapped except in the most intense contact situation where the disabled and able-bodied subjects actually lived together.

In the current study both the concepts and measures differ from Weinberg's (1976, 1978) research. The concept of schema content was substituted for the notion of stereotype, and a recognition memory task replaced the attitude questionnaire.* The use of this concept and measure alleviates some of the problems in administering attitude questionnaires to children (Oskamp, 1977), and allows a concept and measure developed in the field of cognitive psychology to be applied to an important issue in education.

* All materials may be obtained from the author upon request.

Schemata are defined as hypothetical data structures which represent the generic concepts stored in memory. A schema acts as a cognitive template against which new inputs are compared and consequently comprehended and interpreted. Errors result in perception and memory as a function of the goodness of fit between incoming information and schema content. Thus, errors made on a memory task may provide information on specific schema content.

In his classic study, Bartlett (1932) had people read short Indian legends and then tested their recall at various time intervals. He found that subjects systematically distorted their recall of the information presented in the story, and that their distortions became more severe as the time interval increased between the story presentation and questioning. The distortions appeared to be in the direction of the subjects' cultural conceptions of what was logical and conventional. Bartlett concluded that the subjects tried to fit the story into their existing long-term memory structures which he called "schemata". The subjects then forgot the distorted aspects of the legends that were not compatible with their schemata.

Sulin and D)ling (1974) examined the distorting effects of a schema which inv lved the memory for a particular handicapped individual. Subjects read a' assage after being told it was about either Helen Keller or a fictional woman named Carol Harris. Later, the subjects were presented with sentences and asked to identify them as belonging to the passage r not. A key sentence in the recognition memory test was similar to ne second sentence from the original passage but read, "She was deaf, iumb, and blind." Subjects who had been told the passage

was about Helen Keller falsely recognized this test sentence significantly more often than subjects who were told that the character was Carol Harris. This was especially true when the test folowed the initial presentation by a week; fewer errors were made if the test followed the passage by only a few minutes.

In the present study, a story about a handicapped boy was read to the subjects who attended a mainstreamed or nonmainstreamed classroom. In the story, the handicapped boy was described using 10 adjectives, five of a positive nature, five of a negative nature. The subjects were presented a recognition test immediately following the story. The test included 10 attributes from the acquisition set and eight distractor items (not previously mentioned and also balanced in a positive and negative direction). The recognition test was administered again 48 hours after the initial story presentation (at time two). The nature of the handicap schema was inferred from the analysis of childrens' errors on the recognition memory task. The accuracy of the subjects' memory for information about a handicapped child was assumed to be related to the information's compatibility with the contents of the handicap schema. It was inferred that information that was not compatible with existing schema content would be poorly remembered, particularly with the passage of time.

The major prediction involved change score errors. Change score errors refer to questions to which the subjects responded correctly at time one and incorrectly at time two. Included in change score errors are both (a) false alarms - the false attribution of distractor items to the acquisition set and (b) misses - the failure to recognize acquisition items.

The acquisition and distractor items were selected in such a way that subjects with more firmly entrenched stereotypic beliefs about the handicapped made more change score errors. All of the characteristics used in the story to describe the handicapped child were deliberately chosen because they contradicted many of the commonly held stereotypic notions about the handicapped, (e.g., "was smart, was a good ball thrower"). If subjects held the common stereotypes to be true, they made more miss-type errors on the memory task.

Distractor items were comprised of stereotypic beliefs about the handicapped, (e.g., "was a crybaby, got special attention from the teacher"). Consequently, those subjects who held the stereotypes to be true were more likely to state, incorrectly, that the distractor items had been included in the characterization of the handicapped (false alarm). For these reasons, it was predicted that change score errors of both the miss and false alarm variety would be greater among the subjects with more stereotypic beliefs about the handicapped.

The hypothesis tested was that mainstreaming results in a less stereotypic schema of the handicapped among the nonhandicapped students. Thus, the major hypothesis tested in this study was that the subjects in a nonmainstreamed classroom would make significantly more change score errors than would their mainstreamed counterparts.

Method

Subjects

Twenty-eight ten year old fourth graders who attended a mainstreamed classroom comprised the experimental group. Twenty-nine

ten year old fourth graders who attended a nonmainstreamed classroom comprised the control group. The two classrooms were located in different elementary schools, but they were located in the same neighborhood and school district. The two groups were comparable on sex distribution and reading level. The average Ginn reading level score of the experimental group - 9.0, was not significantly different from the average Ginn reading score of the comparison group - 9.7, (t_{55}=1.14). The socio-economic variables were assumed comparable based on discussions with the school principals and the fact that the two schools drew their populations from very similar neighborhoods. Both classrooms were participants in the Title IV-C program, Catalyst for Learning classrooms, and had resource centers, small group activities, and a small cluster of gifted students.

Setting

The mainstreaming program at the experimental school in Ontario, California was in many respects unique. An elementary school for physically handicapped children was propinquitous to the experimental school. The two schools shared the same playground facility and the nonhandicapped and handicapped students attended some of the same assembly programs.

In September, 1980 a mainstreaming program was formally initiated in which a small group of specially chosen physically handicapped students were placed in the appropriate classrooms in the experimental school for part or all of the school day. A physically handicapped girl was integrated into the experimental group classroom for four months, two hours per day prior to the data collection, participating in

math class and lunch. The girl had a congenital orthopedic problem and was affected primarily in her gross motor abilities. She walked with a three-pronged cane and limped, but otherwise appeared normal. She was at grade level academically.

Because of the cooperation and unique physical locations of the school for the handicapped and the experimental school, the students in the experimental classroom were exposed to a wide variety of experiences with and information about the handicapped, over and above their classroom experience. Nine of the experimental students attended special reading and math classes for the gifted which took place at the school for the handicapped. All of the experimental children had daily opportunity to observe and interact with a wide variety of physically handicapped children on the playground during recess and lunch time. The handicapped and nonhandicapped students attended some special assemblies together. The experimental students also participated in an hour-long slide show/workshop at the beginning of the school year, to educate them about handicapping conditions generally as well as to inform them of the special needs and characteristics of the handicapped student in their classroom. At that time the students were allowed to use some common orthopedic devices and received a tour of the school for the handicapped.

There were no physically handicapped students in the nonmainstreamed classroom and no official mainstreaming program in the control school. Two of the control group students with physically handicapped siblings were eliminated from the data analysis.

Procedure

The task was individually administered in the hall outside of the classroom. The experimenter read the following instructions to each of the experimental and control subjects: "You and I will read a short story together and look at the pictures. Afterwards, I will ask you some questions about the story, so please pay attention."

Immediately following the story, the subjects were presented ten descriptors from the acquisition set and eight new distractor items and asked if each had been used in the story to characterize the handicapped boy. The acquisition items and distractor items were half negative and half positive. The order in which he subjects were asked about the descriptors was randomly determined with each subject receiving th same order.

Forty-eight hours later the experimenter readministered the recognition test. The subjects were shown one picture of the handicapped boy from the story and directed, "Remember the story about Johnny, the boy with the crooked legs? Now I'm going to ask you some questions about him. Try to remember the story and think carefully."

Following the recognition test at time one, a forced choice task was given. The subjects were presented a photograph of a young boy with cerebral palsy and were asked to choose those characteristics which best described him. None of the subjects had ever seen the boy pictured in the photograph before. The instructions were as follows: 'This boy is named Michael. He is a real boy, not pretend like the boy in the story you were to remember. I want you to look at the picture and then answer some questions about him." The subjects were asked to choose one of each of 11 pairs of characteristics presented to them, for example, happy

or sad, mad or scared, fast or slow.

Results

The a priori hypothesis that the nonmainstreamed subjects would make significantly more change score errors was tested using a two-tailed t test. The nonmainstreamed subjects made significantly more total errors (5.55) than the mainstreamed subjects (3.93), $t_{55}=2.52$, $p= .015$.

A 2 x 2 x 2 analysis of variance was performed on the type (false alarm or miss) and value (negative or positive) of change score errors made as a function of the type of classroom condition (mainstreamed and nonmainstreamed). The only significant finding was a main effect for classroom condition ($F(1,55) = 6.03$, $MS_e = .082$, $p = .017$). Consequently, the data was collapsed across type of error (false alarm or miss) in the remaining data analyses and discussion.

Forced Choice Task

In the forced choice task, convergence between the two groups occured in every instance except one. The only difference among the 11 pairs of attributes the subjects were asked to choose between occured in the pair weak/strong. In the mainstreamed group, 25 children rated the picture of the handicapped boy "weak" and three rated him strong, compared to 17 "weak" and 12 "strong" in the nonmainstreamed group. A X^2 test yielded this difference significant, $X^2 = 5.42$, $p < .05$).

Schema Content

It was assumed that errors on the memory test reflected incongruity with schema content. Thus, an examination of the items on which

the most errors occured is useful in delineating specific schema content. There was remarkable consistency between the groups on the items on which five or more change score errors occured. False alarm errors in both groups included the following items: (1) tried very hard, (2) liked to share, (3) was always smiling, (4) was cooperative, (5) played with younger children, (6) got special attention from the teacher, (7) was a crybaby. The only attribute included in the story and missed by five or more subjects in both groups was "was stuck up". The only attribute missed by the nonmainstreamed and not missed by the mainstreamed groups, "played the clarinet".

Discussion

The subjects who participated in a mainstreamed classroom made fewer errors on the recognition memory test. Errors occured when a subject's handicap schema content was incompatible with the acquisition and distractor items. The acquisition and distractor items were chosen so as to maximize the number of errors made by subjects whose schema content approximated the general social stereotype of the handicapped. Hence, the findings of this study support the conclusion that mainstreaming results in a less stereotypic handicap schema among the nonhandicapped students. Alternative interpretations of the number of errors made, such as group differences in reading ability and/or socioeconomic status, can be eliminated based on the general comparability of the experimental and control groups.

The present study also delineates specific schema content of the mainstreamed and nonmainstreamed students. In Table 1 are listed the personality and attitude dimensions associated with the handicapped in the research reported here and in Weinberg's (1976) research. It is interesting to note that (1) there is a considerable similarity in the items on which this study's mainstreamed and nonmainstreamed subjects made errors, and; (2) of the seven items in which five or more errors occured, five overlapped with factor items from the Weinberg (1976) study.

Insert Table 1 about here

The first result listed in the preceding paragraph indicates that the critical difference between this study's mainstreamed and nonmainstreamed subjects was in the number of students whose handicap schema approximated the social stereotype of the handicapped, and not the specific characteristics which comprise the subjects' handicap schema content. In other words, fewer mainstreamed subjects adhered to the social handicap stereotype, but, among those students who did, there was general concensus with the nonmainstreamed subjects on what characteristics constituted the stereotype.

Likewise, in the forced choice test, the descriptors chosen by the mainstreamed and nonmainstreamed subjects were practically identical. This provides additional support for the contention that the primary difference between the two groups was in the number of subjects who adhered to the social handicap stereotype, and not in the content of the stereotype.

The similar results obtained in the Weinberg (1976) study and the present one are interesting given the different methods (questionnaire versus memory task) utilized in the data collection. This indicates that there is considerable agreement across subjects and methodologies in the characteristics commonly associated with the handicapped.

Why did the mainstreamed subjects rely less on the social stereotype of the handicapped when responding to the memory test? The most probable reason is that they had a more diversified information base upon which to base their answers. The mainstreamed subjects were exposed to many different types of physically handicapped children, with a variety of characteristics. The notion of a handicapped boy who played the clarinet, for example, was consistent with their experience with handicapped children. They were better able to integrate such information into their handicap schema when it appeared in the story to be remembered. Hence, they made fewer miss errors. Because of their broader experience with the handicapped, the mainstreamed subjects were also less likely to falsely attribute stereotypic characteristics to the handicapped boy in the story. As a result, they made fewer false alarm errors.

An important aspect of this study is the uniqueness of the mainstreaming program studied. The propinquity of the experimental school and a school for the handicapped was a critical feature of this study and something not likely to be found at another school. The sheer variety of the experimental subjects' exposure to handicapped persons may be difficult to replicate elsewhere.

In summary, this study represents a promising approach to studying the cognitive effects of mainstreaming. Through the use of a recognition

memory test, it is concluded that mainstreaming results in a less stereotypic handicap schema among the nonhandicapped students. This result is probably due to the fact that the mainstreamed subjects had first hand experience with the handicapped and hence, relied less than the nonmainstreamed subjects on general social stereotypes for their information about the handicapped.

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Table 1

Comparison Between the Description of the Handicapped

in Weinberg (1976) and Present Study

Weinberg (1976) Factor Items	Item Loadings reported by Weinberg	5+ Error Items by mainstreamed and nonmainstreamed subjects
Happy	.72	Always smiling
Dependent on others for help	.51	Gets special attention from teacher
Self Pitying	.52	Was a crybaby
Conscientious	.43	Tried very hard
Popular	.69	Was stuck up*

* Because this is a miss-type error, it is assumed to be opposite to the attribute included in the schema content.