

THE EFFECTS OF MATERIAL AND
NONMATERIAL REINFORCEMENT ON THE
PERSEVERANCE BEHAVIOR OF INDIAN CHILDREN

by

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ABSTRACT

This study investigated the effectiveness of material (candy) and nonmaterial (verbal praise) reinforcement in increasing the perseverance behavior of sixty Indian children, age six to eight years, on an object sorting task. The children were divided into two groups according to the degree to which their parents participated in school activities in order to examine the effect that parental participation has on the level of perseverance behavior brought to a task by the Indian child. The effectiveness of the reinforcement was based on the length of time the S persevered at the criterion task without reinforcement. Indian children persevered for significantly longer periods of time following material reinforcement than following no reinforcement. Indian children in the low parental participation group (P₂) persevered at the criterion task for a significantly longer period of time following practice sessions in which they received material reinforcement than following practice sessions in which they received nonmaterial reinforcement. There was no significant difference in the perseverance scores for the material and nonmaterial reinforcement conditions for Indian children in the high parental participation group. Other differences were non-significant.

Examiners: _____

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

Recent changes in The Federal Government's (Canadian) policies¹ regarding the status of Indians in Canada and the attempt on the part of the Federal Government to place the responsibility for Indian education in the hands of the Provincial Governments, thereby forcing the integration of Indian children and non-Indian children, will affect the educational policies and practices of the Provincial Public School Systems.

The Problem

Provincial public schools will be faced with the task of facilitating the integrational process and of accommodating a large number of under achieving students. Most of the attention to date has been focused on attempts to facilitate the integrational process. This focus on integration, as such, is due in part to the reports and recommendations of Hawthorn (1958, 1967), Fairclough (1959), and Waller (1965) who concur with The Royal Commission on Government Organization (1962, p. 153) which states that integration

¹On February 19, 1969, the Government of Canada and the Government of British Columbia concluded an agreement which transfers responsibility for Indian Education from the Department of Indian Affairs and Northern Development to the Province (British Columbia Teachers' Federation Bulletin, March 17, 1969).

be "intensified and prosecuted on a continuing basis". The rationale behind their recommendation for the "intensification of the integration" of Indian children into the public schools is based upon the premise that with the enrolment of the Indian student into integrated schools the Indian child will, when he becomes an adult, be able to compete with the non-Indian in urban and rural employment. Conversely, that without "equal educational opportunity and motivation, it (competition within the non-Indian community) is not likely" (Hawthorn, 1967, p. 106). Thus, according to Waller (1965) and Hawthorn (1967), the "motivational problem" of the Indians, that is, their desire to compete in the non-Indian community, will, in part, be overcome by the integration of Indian and non-Indian school children.

This oversimplified solution, however, is not supported by the subjective observations and evaluative statements of teachers working in the integrated public schools. Teachers in the British Columbia public school system who were interviewed² repeatedly reported "apathy", "lack of attention", "laziness", "non-completion of tasks", and "poor work habits" on the part of the Indian student.

Anthony Paskell, further, records a teacher's experience:

²Data collected in 1967 while researching The Effects of Education on the Acculturation of the Indians of British Columbia, (1968).

Equally disturbing is the apathy. They sprawl in their desks, they daydream, they pick their noses. And their work habits! If she didn't stand over them, coaxing, badgering, even threatening, they wouldn't produce two consecutive words (1968, p. 31).

Finally, Lane (1966) refers to the Indian child's lack of perseverance in task oriented behavior, when she writes that the Indian child has not grown up in a family with a time-sense and that routine, order and completion of tasks is not learned at home.

The above statements suggest that a lack of integration into the public schools is not the sole reason that the Indian fails to complete his education and successfully compete in the non-Indian community. The completion of senior secondary education and/or increased grade-level attainment coupled with integrated education, would, however according to Hawthorn (1967) and Waller (1965), enable the Indian to compete in the non-Indian community.

Other researchers have suggested that low achievement and low grade-level attainment on the part of the lower class children and minority ethnic groups (i.e. Indian, Negro, Mexican-American) are a result of the existence of "value orientations" which are alternatives of the dominant societal "values" (Steen, 1966; Rosen, 1956; Kluckhohn, 1961; Gue, 1967; Butterworth, 1968). Some researchers have stated that the distinctive socialization of these groups (lower class and minority children) poses a barrier to academic achievement and school completion when the school is

organized essentially in terms of middle-class "values" (Parsons, 1966; Lana, 1966; Paskell, 1968; Steen, 1966). Carroll, on the other hand, suggests that under achievement and subsequent low grade-level attainment regardless of class or ethnic group, is

...a state of affairs which results whenever perseverance is less than some "reasonable value", whenever the quality of instruction is poor, whenever time allowed for learning has not been sufficient, or whenever some combination of these conditions has occurred. (Carroll, 1963, p. 731).

If Carroll's Model of School Learning is correct, the following generalizations might be suggested. If minority groups such as Indian children are on an average under achievers and low grade-level drop-outs,³ then under achievement among Indian children may be either a function of poor instruction, insufficient time being allowed for learning, or perseverance on the part of the child. It would seem reasonable to assume that on an average the quality of instruction and the time allowed for learning (in British Columbia classrooms) would be adequate (Carroll's model). Therefore the results of The Royal Commission on Government Organization, 1962 and Annual Report(s) of Department of Citizenship and Immigration, (1956-1966) seem to suggest that under achievement among Indian children (Carroll's model),

³The Royal Commission on Government Organization, 1962 and Annual Report(s) of Department of Citizenship and Immigration, (1956-1966) record that sixth grade Indian children are on an average two school years behind their non-Indian age-mates and that in the year 1960 approximately 70% of the Indian children had withdrawn from school before entering grade ten.

may be a function of Indian student perseverance. Lack of perseverance toward school oriented achievement was also suggested above in the reported subjective observations of the teachers of Indian children.

Statement of the problem. (1) to examine the differential effect of material and nonmaterial reinforcement on the perseverance behavior of Indian children; (2) to examine the effects that parental participation in school activities may have on the level of learned perseverance behavior brought to a task by the Indian child.

Definitions of Terms Used

Indian. The concept "Indian", as used in this paper, includes all individuals recorded by the Division of Vital Statistics as "Indians by racial origin". This concept is not limited to those Indians who are called "registered Indians" as legally defined by the Indian Affairs Branch. Therefore, throughout this paper, the concept "Indian" includes all people of Indian racial origin unless otherwise specified by the prefixed word "registered".

Perseverance. The concept "perseverance" as used in this paper is defined as the amount of time an individual is observed to spend on a criterion task without reinforcement. This definition concurs with those suggested by Carroll (1963), Bloom (1968) and Feather (1962).

Reinforcement. Reinforcement is defined as "the operation of presenting a reinforcement stimulus after, and contingent upon, the completion of a task" (Flanders, 1968).

- a. Material reinforcement. Material reinforcement is defined as a small piece of candy given to the subject(s) following, and contingent upon, the completion of each task. This definition is based on the works of Steen (1966), Terrell (1957, 1958), Cameron and Storm (1965).
- b. Nonmaterial reinforcement. Nonmaterial reinforcement as used in this study is defined as the experimenter (E) saying "good", "that's good" or "fine" immediately following, and contingent upon, the S's completion of each task. The selection of the above verbal reinforcers for Indian subjects is based upon the experimental works of Zigler and Kanzer (1962) and Douvan (1956) who suggest that lower class children are more responsive to verbal "praise" reinforcers ("good", "fine") than they are to verbal "correct" reinforcers ("right", "correct").

Parental participation level. Parental participation levels 1 and 2 (P₁ and P₂) are defined for the purpose of this study as:

P₁ - is a classification into which any child between the age of 6-0 and 8-0 (September, 1968) is placed if his parent or guardian participates in and/or attends more than ten percent (10%) of the school sponsored functions such as P.T.A., Adult Education, or sports activities.

P₂ - is a classification into which any child between the age of 6-0 and 8-0 (September, 1968) is placed if his parent or guardian does not participate (0%) in and/or attend school sponsored functions.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

Much has been written regarding the under achievement of Indian children, value orientations of Indian children, perseverance as related to school achievement and the differential effect of reinforcement on children of different social classes and ethnic groups; but only a brief summary of the relevant research on these problems will be presented here.

Under Achievement of Indian Children

The Federal Government of Canada, in an attempt to assess the degree of school retardation of Indian children, financed an extensive study into this problem. The study was reported in the findings of The Royal Commission on Government Organization, 1962. The Commission found that, on the average, Indian children by the sixth grade are two school years behind their non-Indian age mates, and that during the school year 1960-1961 approximately seventy percent of Canadian Indian children had withdrawn from school before entering grade ten. Similar school retardation and drop-out rates are reported annually in the Annual Report of Department of Citizenship and Immigration (1956-1966).

These reports resulted in two comprehensive studies (Hawthorn, 1958; 1967), which attempted to assess more carefully the degree of

school retardation and to suggest means of remediation. Both of the Hawthorn reports (1958, 1967) seem to have assessed the degree of the problem of school retardation among Indian school children but appear to have failed in their attempts to suggest specific remedial measures. The fact, however, was established that Indian children as a whole are under achievers.⁴

Value Orientations of Indian Children

Gue (1967) in his study of "value orientation" attempted to discover whether the values held by Indian children were different from those values held by non-Indians. Gue found that Indian students, when they responded to his questionnaire of "values", chose the "value" dimension of "Subject-to-Nature" rather than "Mastery-over" or "Harmony-with-Nature". Teachers chose the "value" dimension of "Mastery-over-Nature". The differences between the teachers and the Indian children were statistically significant ($p < .01$). Tefft (1967) in his study found that while both the majority of the Arapaho and Shoshone Indian students held values similar to the non-Indian students, the Arapaho students showed more "despair and disillusionment with their social environment than the majority of white students" (p. 152). Tefft suggested further that the "apathy" and "low aspiration" of the

⁴Under achievers are defined as children who have an I.Q. above the mean for a specific test but yet are two or more grades behind their age mates.

Arapaho students were reflected in their choice of answers on the "Man's control over nature" dimension of the "value" questionnaire.

Butterworth (1968), in an attempt to replicate Gue's study and to discover further whether the "values" of non-Indian and Indian students were different, found that the Indian and non-Indian responses to the "value" questionnaire differed. It was found that in the "problem area" of "Man-Nature Orientation" - that is: "Man-Subject-to-Nature", "Man-in-Harmony-with-Nature", "Man-in-Mastery-over-Nature" - there was a significant difference ($p < .05$) between the responses of the Indian children and the non-Indian children. An inspection of the results suggested that Indian children chose "Harmony-with-Nature" and "Subject-to-Nature" while non-Indian children chose "Subject-to-Nature" and "Mastery-over-Nature". The inconsistency of the pattern of responses to "Man-Nature" questions seemed, however, to reflect a difficulty on the part of the children to comprehend the "Man-Nature" questions.

Rosen (1956, p. 211) suggests that children with "achievement motivation" will, as individuals, "set to attempt to alter their environment to a condition more consonant with their desires", - "Man-over-Nature" - and that children who do not have "achievement motivation" will be content with the inevitable - "Subject-to-Nature". A child who does not attempt to control his environment, according to Tefft (1967) and Rosen (1956), would tend to be

"apathetic" and would tend to have a low level of "aspiration".

The studies of "value" differences between the Indian and non-Indian might be interpreted as attempts to explain the under achievement generally found among Indian children. It is suggested that Indian children may feel that they are unable to modify their environment whereas non-Indian children may feel that they are able to modify their environment. Furthermore, Coleman (1966, p. 23), in his work, Equality of Educational Opportunity states that,

a pupil attitude factor which appears to have a stronger relationship to achievement than do all the 'school' factors together is the extent to which an individual feels that he has some control over his destiny (environmental control).

Thus, it would appear that the Indian child's "attitudes" or "values" as outlined above may be an important factor in school achievement.

Perseverance and School Achievement

Research on perseverance and learning in young children, although a relatively new area of investigation, has both an experimental and theoretical history. Much of the research on perseverance and learning can be traced from instrumental conditioning studies of children's learning in a variety of experimental situations (Nakamura and Ellis, 1964; Amsel and Ward, 1965; Steen, 1966; Semler, 1967).

Carroll (1963, p. 728), in presenting his theoretical model of school learning, states that,

a learner who (in view of his aptitude, the quality of the instruction, and his ability to understand the instruction) needs a certain amount of time to learn a task, may or may not be willing to persevere for that amount of time in trying to learn.

Thus, theoretically, it would seem that the time spent on learning (perseverance) is perhaps a key to mastery of material to be learned. Carroll's basic assumption is that aptitude determines the rate of learning and that given enough time for the learning to take place, most, if not all, students can achieve mastery of material to be learned, if they are willing to devote the amount of time needed to the learning (Bloom, 1968).

Further, the research by Trabasso (1968, p. 32) suggests that learning is composed of two subprocesses: "an attentional phase ..., and an associational phase". The main difference between children who learn quickly and those who learn slowly is the length of the initial attention phase. Thus, according to Carroll's model of learning, perseverance and the length of time provided would be the requisites of the attentional phase of learning. Trabasso (1968) further suggests that deficits in learning by children might lie in their inability to persevere in the task.

Perseverance-in-learning is itself, however, a function of many other variables. It is a function partly of what is ordinarily called "motivation" or "desire to learn".

But there are many reasons for desiring to learn a given thing: To please the teacher, to please one's parents or friends, to get good grades or other external rewards, to achieve self-confidence in one's learning ability, to feed one's self-esteem, to avoid disapproval - all these can operate in place of or in addition to any incentive for learning... (Carroll, 1963, p. 729).

The "desire to learn", "motivation" or "achievement motivation" according to the social psychologist is largely a function of the early environment of the child. Davis (1944) notes the critical role of anxiety as a reinforcement for achievement strivings in the middle class training scheme. Erickson's study (1947) reveals a picture of the environment of the middle class child as making early and consistent demands for personal attainment whereas lower class children do not seem to be taught achievement strivings as early nor as systematically. Douvan's (1956, p. 223) study concludes that,

the pattern of achievement motivation a child develops depends on the class sub-culture in which he is trained, and is functional to the values and behavior requirements with which he will be confronted as he assumes adulthood within that setting.

The above statements, therefore, would suggest that the perseverance level of the child would be a function of "motivation" of the child and that the "motivation" would be affected by the child's learning environment.

Cameron and Storm (1965) further suggest that the "motivation" of minorities such as the Canadian Indians, who "have lost many if not most of their distinctive cultural features, are reflections of socio-economic level rather than specific racial or cultural background" (p. 463). It may be reasonable to assume, then, that if perseverance is a key to the mastery of material to be learned (Carroll, 1963; Trabasso, 1968) and if perseverance is a function of "motivation" to learn (Carroll, 1963) and if "motivation" to learn is affected by early environmental training, then the level of perseverance-in-learning will be affected by the differential environmental training of the various social classes. That is to say, "students vary in the amount of perseverance they bring to a learning task" (Bloom, 1968) and the amount of perseverance brought to a learning task is affected by the environment in which the child is raised.

Social Class and the Nature of the Reinforcement in Learning

Not only does the preschool social class environment affect the level of perseverance that a child brings to a learning task but recent research suggests that the early environment of the child has an affect on the relative values of certain reinforcements for children of different social-class backgrounds. In an experiment involving the solution to a series of motor tasks, Douvan (1956) found that middle class subjects maintained approximately the same

level of "achievement motivation" when told they had reached a norm (nonmaterial reinforcement) as when they were promised a sum of money (material reinforcement). The "motivation" of lower class subjects, on the other hand, dropped significantly when material reward was absent. Terrell and Kennedy (1957) found that children, a preponderance of whom were from lower class backgrounds, required significantly more trials to learn a "larger-than" response when given a light flash (nonmaterial reinforcement) as an indication of a correct response, than when given material reinforcement (candy). Terrell (1958), in a similar experiment performed with middle class children, found that children assigned to the light flash condition learned somewhat faster than those who received candy (material reinforcement). Terrell, Durkin and Wiesley (1959), further report that

...middle class children learn more quickly when given a nonmaterial incentive than when given a material incentive, while the reverse is true of lower class children (p. 271).

Finally, Cameron and Storm (1965) found that although there were no significant differences among Indians, middle class and working class white children when material rewards were present there were significant differences when nonmaterial rewards were present. "Middle class white children performed better than Indian children and working (lower) class whites" (p. 462).

More specifically, Travers states:

For many years the slogan used as a basis for curriculum design was that the curriculum should be related to the needs of the child. It is perhaps more precise to say that if learning is to occur, the reinforcers provided should be related to the needs of the child. (1964, p. 79).

Thus, as a student finds "the effort rewarding (reinforcing), he is likely to spend more time on a particular learning task" (i.e. persevere longer) (Bloom, 1968, p. 6).

CHAPTER III

AN ANALYSIS OF THE LITERATURE AND STATEMENT OF THE HYPOTHESES

From the foregoing discussion, it is expected that a child brings to a learning task a level of perseverance (entering behavior) and it appears that the level of perseverance brought to the learning task is affected by past experience with that type of task and by the environment in which the child was reared. Furthermore, it appears that the child may persevere longer on a particular learning task if the reinforcements obtained through persevering are "valued" by the child. This chapter, therefore, will analyse the literature reviewed, in an attempt to establish a framework for the formulation and testing of the hypotheses generated.

Perseverance

The literature on perseverance reviewed above, in contrast to the literature regarding "value" differences, suggests means by which learning may be affected by the social class environment in which the child is reared. However, the literature relevant to learning and perseverance suggests that the behavior of the child can be modified. Furthermore, the literature on "value differences" has very little application to the classroom "per se" as little can be done by the classroom teacher to modify the child's home environment.

While the learning model proposed by Carroll (1963) and Bloom (1968) suggests that regardless of these measurable "value" differences perseverance in learning may be increased and that possibly, under achievement can be remediated.

Carroll's model (1963) of school learning involves five elements - three residing in the individual and two stemming from external conditions. Factors in the individual are

(1) aptitude - the amount of time needed to learn the task under optimal instructional conditions; (2) ability to understand instruction; and (3) perseverance - the amount of time the learner is willing to engage actively in learning.

Factors in external conditions are "(4) opportunity - time allowed for learning, and (5) the quality of instruction" (p. 729).

Given a population of Indian children enrolled in schools throughout the Province of British Columbia, the only variable in Carroll's model which is probably not fairly normally distributed is the variable, perseverance. This is substantiated by the studies of Cameron and Storm (1965), Douvan (1956) and Sewell, Haller and Straus (1957) which suggest that perseverance, as a function of "achievement motivation", has a positively skewed distribution among children of lower classes and children of ethnic minorities. If the above is assumed to be correct then it could also be suggested that under achievement, as defined by Carroll (1963), among Indian

children may be attributed in part to their low level of perseverance-in-learning. This latter suggestion is supported by the subjective reports of teachers of Indian children recorded in Chapter One.

The subjective reports of the teachers are confirmed by a study conducted by Dave (1963), who hypothesized, on the basis of the literature, that the home environment relevant to educational achievement might be studied in terms of six variables: (1) achievement press, (2) language models in the home, (3) academic guidance provided in the home, (4) stimulation provided in the home to explore various aspects of the larger environment, (5) intellectual interests and activity in the home, and (6) the work habits emphasized in the home. The results of Dave's study showed that the over-all index of the home environment had a correlation of .80 with the total score on the achievement battery. The correlation of .80 may be contrasted with the much lower correlation (usually less than .50) between school achievement and other indices of the home environment such as socio-economic status, education of parents, occupational status, or social class. It is, therefore, tentatively suggested that it may be what the parents do which most influences the achievement of their children. That is, if the parent encourages the child to participate in school related activities and if the parent participates in school related activities, it would seem reasonable to assume that parental interest in, and participation in,

school activities may affect the entering behavior level of a child.

Reinforcement

How can the perseverance behavior of a child be modified? The literature on reinforcement and perseverance suggests that if a child is reinforced for persevering behavior, the child will tend to persevere longer (Nakamura and Lowenkron, 1964; Nakamura and Boroczi, 1965; Steen, 1966; Semler, 1967; McManis, 1967). Hence, Bloom (1968) suggests that as a student finds a task reinforcing he (the student) is likely to persevere longer. Bloom (1968) further states that "frequency of reward and evidence of success in learning can increase the student's perseverance in a learning situation" (p. 7).

The first postulate that this research study will attempt to test is whether Indian children who are given reinforcement will persevere longer than Indian children who are not given reinforcement.

Types of reinforcement. The literature on social class and nature of reinforcement in learning (Terrell & Kennedy, 1957; Terrell, 1958; Terrell, Durkin & Wiesley, 1959; Cameron & Storm, 1965) suggests that children of different social classes differ in their responses to various reinforcers. It is further suggested that Indian children respond better to material reinforcement than to nonmaterial reinforcement.

Whereas the nonmaterial reinforcement used in all of the above studies was a "light flash" which signalled to the child

that his response was correct, in order to make the present study more applicable to the classroom the nonmaterial reinforcement contingent on the successful completion of a task is defined as the verbal reinforcer "good", "that's good" or "fine".

The second postulate this study will attempt to test is whether Indian children who are given material reinforcement will persevere longer than Indian children who are given nonmaterial reinforcement.

Pilot Study

Before proceeding to the statement of the third and fourth postulates it is necessary to give a brief description of the pilot study carried out during the summer of 1968, the results of which suggest the final two postulates.

In an attempt to assess the effectiveness of the apparatus to be used in this experimental study, and, further, to attempt to eliminate any problems that might arise in the administration of the experiment, a pilot study was carried out at the Tsartlip Indian Day School, Brentwood Bay, B.C. Sixteen children ranging in age from 5-0 to 8-0 years were randomly assigned to two treatment groups, material reinforcement and control.

The children were asked to sort twenty beads into two groups. The experiment was divided into three treatment tasks and one

criterion task. During each treatment task the children sorted twenty beads into two groups. Following, and contingent upon, the completion of each treatment task the Ss in the material reinforcement group were given one candy. The Ss in the control group were given no reinforcement. In the criterion task the children were asked to sort beads (450) into two groups. The measurement of perseverance was the number of seconds the S sorted beads without reinforcement.

The pilot study yielded a number of interesting results. First, the children were not able to understand the instructions, therefore, the instructions were modified. (Appendices A and B). Second, the criterion task was found to be too simple, therefore it was modified. (A description of the modified task is in this chapter under the heading of "Criterion Measure"). Finally, it was found, contrary to expectations, that three children in the control group persevered longer than did children in the material reinforcement group.

The above finding suggests that perhaps all Indian children do not have the same level of perseverance and that if this is so, what might be used as a measure of entering behavior level? In a discussion of the pilot study results with the teachers at the school, it was first suggested that perhaps the parent's occupational perseverance (i.e. the number of months the parent worked in a year) might be used as an index of the child's possible level of perseverance. However, after further discussion with the teachers

and an Indian mother it was evident that parent occupational perseverance may not yield a satisfactory perseverance level.

It was suggested that in the subjective evaluation of the teachers, the best index of perseverance on the part of the child is the child's parent's participation in school activities. The teachers and the Indian mother agreed that if the child's parent or guardian participated in school functions the child tended to persevere-in-learning. The study by Dave (1963) further supported this observation.

Further evidence that a level of perseverance behavior is brought to a task by a child (i.e. entering behavior) was also found in Steen's study (1966). Steen reports:

an unexpected result was found in the superior performance of the Mexican group receiving no reinforcement (N=30). Four children in this group persisted for extremely long periods. This finding has suggested that the effects of learning materials and learning histories of children be investigated. (1966, p. 56-57)

Thus, in light of the above comments, it was felt that it would be profitable to investigate the effects of parental participation on the entering level of behavior of the children.

Imitation Behavior

The rationale for the inclusion of parental participation in school activities as a index of entering perseverance behavior of

the child is based in part on the subjective statements reported above, on the study by Dave (1963) and in part on the theories of imitation learning behavior expounded by Bandura and Walters (1963), Bandura, Ross and Ross (1964) and Bandura (1965).

Bandura and Walters (1963) suggest that imitative behavior on the part of children is often rewarded by the model, (an individual exhibiting a certain behavior), and, providing that the model exhibits socially effective behavior, the imitative behavior of the child brings rewarding consequences from others in the child's environment. Bandura and Walters further state that behavior patterns are most rapidly acquired through the combined influence of models and differential reinforcement. In a later study Bandura, Ross and Ross (1964) found the children imitated models who were observed to amass rewards as a result of their behavior. "The children were more inclined to reproduce the behavior of the rewarded model", than the behavior of the non-rewarded model or the punished model (1964, p. 50).

Although "parental participation in school activities" may not appear to have direct relevance to perseverance-in-learning on the part of the child, it is suggested that, based on the subjective evaluation of teachers and on Dave's study (1963), children whose parents do participate tend to persevere longer in learning activities

than children whose parents do not participate. Furthermore, it is suggested that children may persevere in school because they imitate, and are reinforced for, some correlate behavior of parental school participation found in their home environment, such as reading, work habits, or questioning. Thus, children may persevere because their parents show an interest in their learning and reinforce the child's perseverance-in-learning.

Because the subjective evidence suggests that parental school participation may be a variable in the entering perseverance level of the child, the children in this study were divided into two groups on the basis of their parent's participation in school activities. Group one were the children of parents who participated in school activities and group two were the children of parents who did not participate in school activities (see definition). Data for this division of pupils were obtained from the principal and from the teachers of the children. The data were collected by asking the principal and the classroom teacher to identify the children who fell into the two categories. Children assigned to parental participation level 1 (P₁) were those children whose parents participated in school activities more than ten percent of the time. Children assigned to parental participation level 2 (P₂) were those children whose parents did not participate in school activities.

The third postulate this thesis will attempt to test is thus, whether Indian children in P₁ will persevere longer than children in P₂, regardless of the reinforcements that are given.

The fourth postulate this thesis will attempt to test is related to parental participation levels as outlined above and the possible interactions there may be between the parental participation level and treatment conditions. Rucinski (1968, p. 368) in his study suggests that "middle-class children are more likely than lower-class children to be included in parental discussions", and middle-class children are more likely to receive social rewards from their parents than are lower-class children. Furthermore, "it is not surprising that need achievement, i.e., the 'desire to master' is greater in the middle class than in the lower class" (p. 368). Rucinski, on the basis of these observations, suggests that children who interact with their parents and receive social rewards from their parents would be more responsive to nonmaterial reinforcement. Therefore, if children of parents who participate in school are reinforced socially by their parents for perseverance-in-learning, as is suggested above, it seems likely that P₁ children would persevere longer in the nonmaterial reinforcement condition than would P₂ children. Terrall, Durkin and Wiesley's (1959) study would also suggest that the middle class child or as defined

by Rucinski (1968), the child who has interactions with his parents and receives social rewards from his parents, would make more responses to nonmaterial reinforcement than to material reinforcement. Therefore, it is postulated that the P₂ child will persevere longer in the material reinforcement condition than in the nonmaterial reinforcement condition.

Because the literature regarding the differential effects of reinforcement variables upon middle-class children is not conclusive (Kulberg, 1967; Douvan, 1956), the literature suggests that the differential reinforcement variable will not affect the P₁ child to the same degree as the P₂ child. Therefore it is postulated that the P₁ child will persevere equally well in both the material and nonmaterial reinforcement condition, whereas the P₂ child will persevere longer in the material reinforcement condition than in the nonmaterial reinforcement condition.

The Research Model and Criterion Measure

The research model. Most researchers (Zigler, 1958, 1962; Terrall, 1959; Steen, 1966; Semler, 1967) suggest that the learning model which uses operant conditioning would be most useful in pursuing the question of the effect of differential reinforcement on persevering behavior. Operant learning

situations, in addition, most clearly indicate the relationship between the response and the reinforcement conditions.

Operant learning is also the "experimental situation most nearly resembling natural learning conditions" (Steen, 1966, p. 12).

The basic assumption concerning behavior which is made in the present study of perseverance among Indian children is that "when certain stimuli (reinforcers) closely follow a certain behavior (response) they (reinforcement) increase the probability of that behavior occurring in the future" (Staats and Staats, 1964, p. 47). The reinforcers in this study are material and nonmaterial. The response to be reinforced is perseverance at a task. The task is the sorting of beads and their placement in appropriate places.

Criterion measure. The use of perseverance at a task as the criterion variable is consistent with the reinforcement model used and the previous research in perseverance. Generally, the research in perseverance (Zigler, 1962; Semler, 1967; McManis, 1967) is patterned so that the subject is confronted in the criterion task with a very difficult or insoluble task and is unrestricted in either time or number of attempts he can work at it. The reinforcement is provided during the conditioning period (treatment task) and the measure of

perseverance (number of seconds) is made during the subject's attempt at the difficult or insoluble criterion task (Steen, 1966). This measure is sometimes referred to in the literature as temporal persistence (total number of seconds), while the use of total number of trials as a measure is analogous to resistance to extinction. (N.T. Feather, 1962).

The research on perseverance is generally divided into three groups. The first class comprises studies which are concerned with perseverance as a trait or with uniformity of behavior. The second class of studies comprises those in which perseverance is conceived as a motivational phenomenon. This group attempts to consider situations and personality parameters. The third class of studies comprises those which are concerned with the problem of extinction - both temporal and quantitative. "Although they are not commonly discussed as perseverance studies, the structure of the situation is to some extent similar to that employed in studies where perseverance is conceived as a trait" (Feather, 1962, p. 95).

This third class of studies is the one from which this study is designed. The subject (S) is exposed to different types of reinforcement (treatment task) and the measure of perseverance (criterion task) is the number of seconds he continues in an activity following the termination of reinforcement.

The design of the present study provides two types of sessions - the treatment session in which Ss are differentially reinforced, and the criterion session in which perseverance is measured.

The tasks used in the treatment sessions and the criterion session are similar. The treatment tasks consisted of sorting cubes, discs, and beads into like groups and depositing them in the appropriate places. The criterion task consisted of sorting a box of beads of three different colors (black, white and green). This task was used to obtain a measure of perseverance. The difference between the material used in criterion task and treatment task was one of shape, size, color and number of objects to be sorted. In the treatment task S was instructed to sort twenty objects - (a) cubes and discs; (b) discs and white beads; (c) white beads and black beads - while in the criterion task S was instructed to sort 450 black, white and green beads. What is assumed and supported by reinforcement theory is that the differential effects of the material, nonmaterial and control conditions in the treatment sessions will affect the subsequent performance on the criterion task.

Hypotheses

The following hypotheses derived from the above stated postulates are tested in this study:

1. Indian children in parental participation 1 (P₁) will have significantly higher perseverance scores on the criterion task than will Indian children in parental participation 2 (P₂).
2. Indian children who are given no reinforcement (control) will have significantly lower perseverance scores on the criterion task than will Indian children who are given material or nonmaterial reinforcement.
3. Indian children in P₁, when given nonmaterial reinforcement, will have significantly higher perseverance scores on the criterion task than will Indian children in P₂ when given nonmaterial reinforcement.
4. Indian children in P₁, when given material reinforcement, will have significantly lower perseverance scores on the criterion task than will Indian children in P₂ when given material reinforcement.
5. Indian children in P₂, when given material reinforcement, will have significantly higher perseverance scores on the criterion task than will Indian children in P₂ when given nonmaterial reinforcement.
6. Indian children in P₁, when given material reinforcement, will not differ significantly, in their perseverance scores on the criterion task, from Indian children in P₁ when given nonmaterial reinforcement.

CHAPTER IV

METHOD OF THE STUDY

Experimental Design

Subjects. The subjects (Ss) were 60 Indian children, both male and female, who were randomly assigned to the three treatment groups after the P was determined. The chronological age range was 6-0 to 8-0 years (as of September, 1968). The children were enrolled in two Indian Day Schools - one located on the Tsartlip Indian Reservation, Brentwood Bay, B.C. and one on the Duncan Indian Reservation, Duncan, B.C. Children from both reserves belong to the same Indian linguistic group and both reserves are located within ten miles of an urban center.

Procedure. Prior to the treatment session, the experimenter (E) spent from thirty to forty-five minutes in the classroom situation in order to familiarize the children with his presence and to attempt to avoid the problem involved in refusal to participate. During this period of time and throughout the treatment and criterion tasks, the E, keeping in mind Rosenthal (1966) and Rosenthal and Jacobson's (1968) experiments with the effect of the experimenter's differential treatment of Ss and the effect the differential treatment has upon the results of the study, consistently treated all Ss in a friendly manner.

Prior to the treatment session E administered a color discrimination task to each subject. The task was to match three colored beads with colored plastic templates. The simple color discrimination task was administered to ensure that S could discriminate between black, white and green beads so that in the treatment and the criterion task S would be able to sort the beads into the appropriate places without undue anxiety.

Assignment of subjects. The Ss were divided into groups on the basis of parental participation. The Ss were then assigned on a random basis either to one of two reinforcement conditions or to the control condition. Randomization across treatment groups was achieved by drawing from the two groups (P₁ and P₂) and assigning the first name to treatment 1 (material reinforcement), the second name to treatment 2 (nonmaterial reinforcement), and the third name to the control condition. The sequence was repeated until ten Ss were assigned to each cell as indicated in Table 1.

TABLE 1.
Experimental Design

Parental Participation	Types of Reinforcement		
	<u>Material</u>	<u>Nonmaterial</u>	<u>Control</u>
(1)	S ₁	S ₂₁	S ₄₁
	⋮	⋮	⋮
	S ₁₀	S ₃₀	S ₅₀
(2)	S ₁₁	S ₃₁	S ₅₁
	⋮	⋮	⋮
	S ₂₀	S ₄₀	S ₆₀

Experimental apparatus. The apparatus was the top of a green table 23 inches tall. The dimensions of the table top were 2 feet x 2 feet with a three-sided screen 2 feet high attached to the table top. The table was drilled with three 2 inch holes, which held three pieces of 2 inch plastic tubing. The lower ends of the tube emptied into three separate containers. On either side of the holes was a space for a box to hold the items used in the experiment. The apparatus could, therefore, be easily used by both right- or left-handed Ss. A 2 foot screen was provided to prevent distraction of the Ss with timing apparatus and to further prevent any social reinforcement by E during the experimental task. The timing device

was a stop-watch used to record the length of perseverance behavior during the criterion session. Five templets of plastic were fitted over the holes to vary the task from treatment to criterion sessions. The order in which the templets were used is as follows: (a) treatment session 1 - red templet with square hole and yellow templet with slot; (b) treatment session 2 - white templet with round hole and yellow templet with slot; (c) treatment session 3 - white templet with round hole and black templet with round hole; (d) criterion session - white templet with round hole, black templet with round hole and green templet with round hole.

Experimental procedures. Each S was taken individually from the classroom to a room provided by the school. Three short treatment sessions and one criterion session were held for each S. In the three treatment sessions S received instructions (see Appendix A) and was reinforced for performance according to his group assignment. Group 1 Ss were given material reinforcement (candy). Group 2 Ss were given nonmaterial reinforcement ("good", "that's good" or "fine!"). The third group was a control and Ss received no reinforcement.

The E offered the same directions for each treatment session regardless of treatment group. The only variable which was systematically manipulated was the reinforcement contingent upon the completion of the task of the particular group. That is, contingent upon sorting twenty objects, group 1 received material reinforcement (candy); group 2 received nonmaterial reinforcement ("good", "that's good", or "fine"); group 3 (control) received no reinforcement. At the completion of the three treatment sessions Ss in the reinforcement groups received a total of three reinforcements (material or nonmaterial).

In the treatment and criterion sessions the S was seated at the table on which was placed a box of materials to be sorted. The E told S that he would be playing a game with the objects. The directions are included in Appendix A and B.

The criterion task involved a box of 450 colored beads (black, white and green). During the criterion session the instructions were changed and E moved to another part of the room and busied himself with paper and pencil. (Instructions for criterion session - Appendix B). The S was set to the task and the E recorded the time S persevered at the task. Time was recorded when S either

stopped for thirty seconds, walked away from equipment, or expressed a desire to stop. If S persisted for fifteen minutes (fifteen minutes was established during the pilot study as the maximum time required to work on the task to separate perseverers and non-perseverers), time was recorded.

A 2 x 3 factorial design was used with ten Ss in each cell. The factors were parental participation (P₁ and P₂) and treatment (material, nonmaterial reinforcement and control).

CHAPTER V

RESULTS AND DISCUSSION

The dependent variable in this study was perseverance as defined by the number of seconds S worked at the sorting task without reinforcement.

Before analyzing the results, the data were inspected for normality of distribution. Since there was a skewed distribution in the data, it was corrected for through a transformation of the raw data by use of the Freeman-Tukey square-root transformation (Meredith & Wong, 1961).

Table 2 presents the mean scores on the transformed data for treatment condition and parental participation. The results of the analyses of variance on the transformed data are summarized in Table 3.

TABLE 2
Mean Transformed Data for Perseverance Scores

Parental Participation	Treatment Condition			Mean
	Material	Nonmaterial	Control	
1 (High)	52.75	53.91	49.52	52.39
2 (Low)	57.36	49.07	44.95	50.46
Mean	55.06	51.49	47.23	

TABLE 3

Summary ANOVA on Transformed Data for
Perseverance Scores as Related to Types of
Reinforcement and Parental Participation

Source	df	MS	F
Treatment (T)	2	306.70	5.27**
Parental Participation (P)	1	38.37	.66
(T x P)	2	144.86	2.49
Error	54	58.25	-
Total	59	-	-

**
p < .01

The main effect of treatment was significant at the .01 level ($F(2/54) = 5.27$). The main effect for parental participation and for the interaction, treatment by parental participation, was not significant.

The significant main effect of material and nonmaterial reinforcement reported in Table 3 was analysed using Scheffé's method of a posteriori comparison. The results reported in Table 4 show the treatment groups in which differences were located. The difference between the group receiving material reinforcement and the control group was significant at the .05 level ($F(2/57) = 10.50$). No significant differences were observed for the comparisons between the group receiving material reinforcement and the group receiving nonmaterial reinforcement ($F(2/57) = 2.19$), and between the group

receiving nonmaterial reinforcement and the control group ($\underline{F}(2/57) = 3.10$).

TABLE 4

Results of Scheffé Tests Between
Three Treatment Groups on Perseverance

Treatment Groups	df	F^a
Material vs Control	2/57	10.50*
Material vs Nonmaterial	2/57	2.19
Nonmaterial vs Control	2/57	3.10

^aCritical value of F , .05 for Scheffé 6.30

* $p < .05$

Subsequent analysis of treatment by parental participation interactions involved t tests for planned comparisons stated in hypotheses three, four, five and six. The results of the t test comparisons are summarized in Table 5.

As can be seen in Table 5 the differences for the interactions between nonmaterial P_2 and material P_2 were significant at the .05 level ($t(54) = 2.43$). However, the comparisons material P_1 versus material P_2 , nonmaterial P_2 versus nonmaterial P_1 , and material P_1 versus nonmaterial P_1 , did not differ significantly from one another ($t = 1.35$; $t = 1.42$; $t = .37$). The differences for the interactions between material P_1 and material P_2 ($t = 1.35$) and nonmaterial P_2 and nonmaterial P_1 ($t = 1.42$) were not significant at the .05 level. However, the results indicate that both

comparisons were significant at the .07 level. Thus, it may be concluded that material reinforcement seems to influence perseverance, however, only when conditions employed in stratification for parental participation 2 (P_2) are met.

TABLE 5

Summary of t Tests
Between Groups on Perseverance Task

Group	df	t
Nonmaterial $P_2 <$ Nonmaterial P_1 (49.07) (53.91)	54	1.42 ^a
Material $P_1 <$ Material P_2 (52.75) (57.36)	54	1.35 ^a
Nonmaterial $P_2 <$ Material P_2 (49.07) (57.36)	54	2.43 ^{a*}
Material $P_1 =$ Nonmaterial P_1 (52.75) (53.91)	54	.37 ^b

^a one-tailed test.

^b two-tailed test.

* $p < .05$

The results of this experiment would lead to a consideration of the specific hypotheses of this study, and to their acceptance or rejection.

Hypothesis one which stated that Indian children in P_1 will have significantly higher perseverance scores on the criterion

task than will Indian children in P₂, was not supported by this study.

Hypothesis two which stated that Indian children who are given no reinforcement (control) will have significantly lower perseverance scores on the criterion task than will Indian children who are given material or nonmaterial reinforcement, was supported in part, in that subsequent post-hoc Scheffé analysis revealed a significant difference ($p < .05$) between the group receiving material reinforcement and the control group.

Hypotheses three and four which stated that Indian children in P₁, when given material reinforcement, will have significantly lower perseverance scores on the criterion task than will Indian children in P₂ when given nonmaterial reinforcement, and, that Indian children in P₁, when given material reinforcement, will have significantly lower perseverance scores on the criterion task than will Indian children in P₂ when given material reinforcement, were not supported at the .05 level. However, the results of the planned t comparisons were significant at the .07 level.

Hypotheses five and six which stated that Indian children in P₂, when given material reinforcement, will have significantly

higher perseverance scores on the criterion task than will Indian children in P₂ when given nonmaterial reinforcement, and, Indian children in P₁, when given material reinforcement, will not differ significantly in their perseverance scores on the criterion task, from Indian children in P₁ when given nonmaterial reinforcement, were supported by this study.

Hypothesis five was supported in that a significant difference ($p < .05$) was found between the mean perseverance score of the nonmaterial P₂ and material P₂. Hypothesis six was also supported in that no significant difference was found between the mean perseverance scores of material P₁ and nonmaterial P₁.

The results of the Scheffé comparisons (Table 4) indicate that perseverance, as defined in this study, was influenced by the reinforcement contingent on the completion of the task. The significant comparison ($F(2/57) = 10.50; p < .05$) between the material reinforcement and control conditions indicate that Ss in P₂ persevere longer when given material reinforcement than when given no reinforcement. This finding is in accordance with a number of other studies (Terrell & Kennedy, 1957; Terrell, 1958; Cameron & Storm, 1965) which suggest that material reinforcement among lower-class children is a more effective source of reinforcement in discrimination type tasks than is no reinforcement (control condition).

Unlike earlier studies, however, the present investigation found no significant difference between material and nonmaterial reinforcement conditions. The nonsignificant comparison between material and nonmaterial reinforcement conditions is not unexpected when the mean perseverance data in Table 2 are examined.

The planned t tests reported in Table 5 between nonmaterial P_2 and material P_2 ($t(54) = 2.43$; $p < .05$), and material P_1 and nonmaterial P_1 ($t(54) = .37$), result in findings similar to those anticipated in the studies by Kulberg (1967) and Douvan (1956). Kulberg found no significant differences in his study. Douvan found that S_s , from homes where children were encouraged to "achieve" in school, would respond on anagram and motor tests in a relatively consistent manner despite variations in the reinforcement conditions, while S_s , from homes where children are not encouraged to "achieve" in school, responded significantly better on anagram and motor tests when given material reinforcement than when given symbolic reinforcement. In the present experiment it was found that there were no significant differences in the perseverance behavior of S_s in P_1 between material and nonmaterial reinforcement, whereas a significant difference was found, at the .05 level ($t(54) = 2.43$), in the perseverance behavior of S_s in P_2 between nonmaterial and

material reinforcement.

The non-significant results of the planned t test ($t(54) = 1.35$) between material P_1 and material P_2 (see Table 5) further support Douvan's (1956) results. Douvan found similar results ($t = .27$; $p > .30$) ($N = 313$) in that there was no significant difference between the mean scores of the anagram and motor tests of S_s from homes where children were encouraged to "achieve" in school and the mean scores of S_s from homes where children were not encouraged to "achieve" in school when given material reinforcement.

Thus, it would seem that the results of Douvan's (1956) study with social class groups and the present study with Indian children suggest that material reinforcement may act as an effective means of increasing task performance for most young children regardless of their social class or ethnic group.

The non-significant result of the planned t test ($t(54) = 1.42$) between nonmaterial P_2 and nonmaterial P_1 (see Table 5) was unexpected. It would seem that if material reinforcement is more effective than nonmaterial reinforcement with S_s from homes where achievement in school is not encouraged (see above and Terrell & Kennedy, 1957; Douvan, 1956; Kulberg, 1967) and if there is no significant effect of material and nonmaterial reinforcement on the responses of S_s from homes where achievement

in school is encouraged, then it would seem reasonable to assume that nonmaterial reinforcement would be more effective as reinforcement for Ss from homes where achievement is encouraged than for Ss from homes where achievement is not encouraged. A tentative explanation for the non-significant results might be that in this experiment the stratification of Ss into P₁ and P₂ may not differentiate sufficiently between homes where perseverance-in-learning is reinforced, and homes where perseverance-in-learning is not reinforced. It is suggested therefore, that future studies in the area of interactional effects of reinforcement conditions with parental participation, as defined in this study, will call for more pronounced attempts to differentiate more precisely possible bases for parental participation stratification. The lack of significant results in treatment by parental participation ($F(2/54) = 2.49$) further supports the need for a clearer differentiation of parental participation stratification.

Implications for Indian Education.

Several implications arise from this experiment. There is evidence which supports the idea that parental participation in school activities does interact with reinforcement conditions in terms of the perseverance tasks of children. It is further suggested by Dave (1965) that parental interest in learning (as measured in this study - parental participation in school activities)

is a relevant variable in the child's interest in learning, the child's school achievement and the length of the child's attention span. It would seem likely, therefore, that if parents of young Indian children participated in school activities and reinforced their child's perseverance-in-learning, that perhaps the child would persevere in school tasks regardless of the types of reinforcement provided by the teacher. If, in addition, a child's perseverance at school tasks is an essential element in learning, as is suggested by Carroll (1963) and Bloom (1968), then it would seem reasonable to suppose that the learning of young children might be improved by reinforcing the child's perseverance behavior with material reinforcement. If the perseverance of the child is increased, then perhaps under achievement within the framework of Carroll's model (1963), which suggests that under achievement results whenever perseverance is less than some "reasonable value", whenever the quality of instruction is poor, whenever time allowed for learning is insufficient, or whenever any combination of the three occur, may be alleviated to some extent.

It may also be reasonable to assume that increased perseverance on the part of the Indian child, in terms of time, may improve his rate of learning. This suggestion is based upon studies reported by Trabasso (1968). Trabasso conceives of learning as being made up of two subprocesses, one of which is "an attentional phase where the learner is viewed as searching among several possible features

of the stimulus patterns until he attends to those features which are relevant" (1968, p. 32). This phase of learning according to Carroll's model (1963) is composed of three factors: "(1) opportunity - the time allowed for learning, (2) perseverance - the amount of time the learner is willing to engage actively in learning, and (3) aptitude - the amount of time needed to learn" (1963, p. 730). The second subprocess according to Trabasso is the "associational phase where the learner attaches correct responses to those features he has selected as relevant" (1968, p. 32). This associational phase according to the results reported by Trabasso is similar regardless of the differences in the attentional phase. Thus, the main difference between learners is "the length of the initial attentional phase" (1968, p. 32) required to select the stimuli which are relevant. It would seem reasonable to assume that an increase in the length of time a child perseveres may result in a decrease in the number of times the child would return to the necessary attentional phase of learning, and a subsequent increase in the total rate of learning. For, if a child does not persevere until he "attends to those features which are relevant" (1968, p. 32), then the correct responses will not be made during the associational phase. The non-persevering child would then have to return to the attentional phase in an attempt to locate the relevant features of the stimulus situation. On the other hand, a child who perseveres until the relevant features of the stimulus situation are attended

to, should not need to return as often to the attention phase and the responses made in the associational phase would more likely be correct. Thus, it would seem that if perseverance could be increased among Indian children, then the length of time required for learning would decrease.

A further implication relevant to education of Indian children and educational research arises from this experiment. A number of studies (Cameron & Storm, 1965; Storm, 1965; Zigler & deLabry, 1962; and Zigler & Kanzer, 1962) tend to equate lower-social class and minority ethnic groups. However, from the results of the present experiment it would appear that differences do exist within minority groups. Thus, any general predictions based upon minority ethnic groups as belonging entirely to the lower social class may lead to erroneous interpretations. The present study seems to support the results reported by Dave (1965) that encouragement to achieve; language models; academic guidance; stimulation; intellectual interest; and work habits emphasized in the home are better indices of future academic success than are socio-economic status, education of parents, occupational status, or social class.

The results of the present study seem to suggest that educational research into minority ethnic groups needs to consider other variables of the home environment than those listed by such researchers as Blishen (1967) and Hollingshead (1957). If the results of this experiment are further supported by subsequent

educational research, it would seem that techniques based upon Dave's (1965) environmental process variables may enable the schools to analyze the home environment in order to arrive at a best strategy for the school and home to provide the environmental conditions necessary for school achievement.

The results of this experiment further suggest that parents with low levels of education and social status may nevertheless be able to provide some of the environmental conditions necessary for educational achievement such as: interest in the child's school work, reinforcement of completion of school tasks, and reinforcement of good work habits.

Limitations of this Experiment

The sample in this study was small and certainly cannot be considered completely representative of the Indian population of British Columbia. There are Indians in British Columbia who live in less proximity to concentrations of non-Indians than the group from which this sample was drawn. Other groups live closer to concentrations of non-Indians (Hawthorn, et al., 1958). Further, refinements are necessary in the definition of parental participation if this means of stratifying Indian children is to be useful in future educational research.

Studies are necessary to determine which aspects of the Indian child's home environment are relevant to successful academic

participation in integrated and non-integrated schools. This study suggests tentatively, however, that the parental participation in school activities does seem to interact to some degree to increase the effectiveness of reinforcement in tasks calling for perseverance on the part of the child.

Some degree of support is given to the assumption that response-contingent reinforcers do not have a simple set of properties that affect performance in a uniform manner. It would seem that the experiment suggests that the effectiveness of reinforcers is dependent on such variables as the characteristics of the subject's past reinforcement experiences and the nature of the reinforcers themselves. Thus, it should perhaps not be surprising to find that seemingly minor variations among studies often produce quite different empirical results.

Summary

The influence of material and nonmaterial reinforcement on task perseverance was studied with sixty Indian children (N=60), both male and female, age 6-0 to 8-0 years (September, 1968) who were enrolled in two Indian Bay Schools located on southern Vancouver Island. The children were stratified into two groups according to their parental participation in school functions.

In this study perseverance was defined as the amount of time a S was observed to spend on a sorting task without reinforcement.

Ss were tested individually on a criterion task following three treatment tasks where, contingent upon the completion of the task, they were given material, nonmaterial or no reinforcement.

The results of the study lent support to part of hypothesis two, in that the difference on the criterion task between the group receiving material reinforcement and the control group was significant at the .05 level. The results of the study lent support to hypothesis five which suggest that material reinforcement seems to be effective in increasing an Indian child's perseverance at a task, if the child's parents do not participate in school functions. The results of the study also support hypothesis six which seems to suggest that nonmaterial reinforcement and material reinforcement do not differ significantly one from another in increasing an Indian child's perseverance at a task, if the child's parents participate in school functions.

Hypothesis one was not supported by this study. Hypotheses three and four were not supported by this study at the .05 level. However, the result of the planned t comparisons were significant at the .07 level. It was suggested that hypotheses one, three and four were rejected due to a lack of rigor in the definition of parental participation.

In conclusion, this study demonstrated that perseverance of Indian children might be modified through the use of reinforcement

contingent on responses and, further, that the degree of parental participation in school activities seems to interact with the effectiveness of various kinds of reinforcement.

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APPENDIX A

Instructions (Treatment Sessions)

This is a game with these (hold up white discs, wooden cubes, green beads, black beads, white beads). The way you play the game is to pick up one of these (white disc) out of the box and put it in there (point to the correct hole), or pick up one of these (cube) out of the box and put it in there (point to the correct hole). You must only pick up one at a time. If any of these (beads, discs, cubes) fall on the floor just leave it there. Do not pick them up.

Now I will show you how to play the game. (E demonstrates how to pick up the bead, disc, or cube and put it in the correct hole). Do you see how to do it? (When S indicates he/she understands, E continues). Remember pick them up one at a time. Now, you are ready to start. O.K. START

The instruction and demonstrations are repeated at the beginning of each treatment session, with the exception that the words discs and cubes; discs and white beads; white beads and black beads are used in treatment sessions one, two, and three, respectively.

APPENDIX B

Instructions (Criterion Session)

Now that you know how to do it I want to see if you can do this game. This time the game is different. This time you will use these (hold up green, black, and white beads). The way you do it this time is to pick out one of these (white bead) and put it in this hole, and pick out one of these (black bead) and put it in this hole, and pick out one of these (green bead) and put it in this hole. Remember you are to pick them out one at a time. If any of the beads fall on the floor leave it. Do not pick it up.

Now listen to me carefully. While you are doing this I am going to do some work over there (point to desk) so when you want to stop or when you are tired of the game you can stand up or call me. Remember you can play as long as you want or you can stop when you want. O.K.? START.

For every five minutes S worked at the task E said, "You can work as long as you want or you can stop when you want."

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