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NON-VERBAL BEHAVIOR AS AN INDICATOR OF ACADEMIC ACHIEVEMENT AND POTENTIAL

BY

RICHARD DALE JOHNSON

A THESIS

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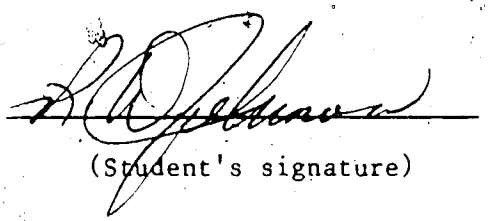

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled NON-VERBAL BEHAVIOR AS AN INDICATOR OF ACADEMIC ACHIEVEMENT AND POTENTIAL submitted by RICHARD DALE JOHNSON in partial fulfilment of the requirements for the degree of MASTER OF EDUCATION.

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Jean Shart

Date: September 2, 1982

DEDICATION

This thesis is dedicated to my wife Sheila, our daughter Patti Jean, and our son Craig. They have all given so generously of their time to provide me the opportunity to complete this endeavour. Their inspiration was constant, their sacrifice great, both were appreciated more than words can express.

Appreciation is extended to Betty Benson. Her efforts, and belief in this endeavour resulted in the original manuscript.

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It is also dedicated to those special caregivers who continue to provide me with the desire and stamina to pursue goals.

Richard Dale Johnson

ABSTRACT

The purpose of the study was to determine what kinds of achievement and accomplishment information could be obtained from careful observation, at a distance, of body movement behaviors exhibited by students at regular classroom desk work. The body movement behaviors were designated as separate dimensions of body stance, tool use, multiple variables, process/product, and psychological time/intensity. These body dimensions were independently rated by three trained observers on five students, selected at random, in each of seven grade seven classrooms. Observations were made on a timed and patterned schedule for a total of six minutes. Classroom teachers rated all students present on the day of the observations, on behavior and performance using the teacher rating scales provided.

All schools, principals, teachers, and students had volunteered to participate in the study. As well, special techniques were employed to assure anonymity of students.

Observer ratings, teacher ratings, Canadian Cognitive Ability Test measures (verbal and nonverbal Intelligence Quotients), and Edmonton Public School Board Achievement Tests scores (Enlgish Decoding, English Comprehension, and Mathematics), were analyzed using Pearson Product Moment Correlations. Paired observer agreement calculations were also performed on the observer rating data.

Significant positive correlations were found between body movement dimensions and both verbal and nonverbal intelligence quotient measures of the Canadian Cognitive Abilities Test. Significant correlations were not found between body movement dimensions and the teacher ratings, or the Edmonton Public School Board Achievement Tests scores.

Results of the study indicate that design and methodology of the study were perhaps lacking in vigor and precision.

Suggestions for future research include: larger population size, increased observation time, decreased body movement dimension number, and increased number of subject area tests to be included in analyses. A more intensive and rigourous training period for observers was also suggested.

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The research was made possible due to the Edmonton Public School Board for granting permission to conduct this study.

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CHAPTER I

FORMAT OF THE STUDY

Introduction

This study investigated selected non-speech behaviors of grade seven students with a view to determine what these behaviors might reveal about the actual academic achievement or potential for academic accomplishment of the students relative to the classroom academic tasks at hand.

The non-speech behaviors in this study refer to the observable body movements manifest in students engaged in the performance of assigned desk work in their regular classrooms. These behaviors would exclude oral speech, written communication, and organized sign language from the total array of inter-human communication modes.

A working hypothesis of this study was that certain non-verbal behaviors, subsumed under the body movement construct, might be valid indicators of successful academic performance and scholastic aptitude.

Support for this study is found in the works of European investigators like Montagner (1984) who has found that the pre-verbal stage behaviors used to communicate intentions and emotions in children continue to be used after speech has been established. These behaviors continue to show the same sequences

in the same context as they did in pre-verbal stages. Other investigators such as Gardner (1983) in the United States, believe that careful observations of children at play and at classroom work will provide an accurate estimate of the intelligence of these children. Further support is found in the claims of many experienced teachers who say they can determine, from observing at a distance, which children are applying themselves and are successfully accomplishing their work.

Given the hypothesis that non-voiced behaviors manifested in the classroom are valid indicators of academic potential and achievement; the basic thrust of the study became that of 1) identifying what part of the total array of non-voiced behaviors observable in the classroom could be utilized as indicators, and 2) demonstrating empirically that these behaviors were valid indicators.

The first task was particularly challenging. A four-point rating scale like that of Bishop (1983) was adopted by this investigation, and more than one observer was used to simultaneously rate each student like Blackham and Silberman (1982). This study, however, is not a direct extension of these or any other study.

Previous personal experience of the author as an observer in studies of children at play, viewing television, and at school work provided some basic information about body movements that would be manifest in classroom situations. The array of these body

movements were subjected to scrutiny with a view to select those classroom non-oral behaviors which would be useful as indicators of academic potential and accomplishment. One criterion for selection was the condition that these non-speech behaviors could be measured through observation guided by a rating scale.

The five body movement dimensions selected in this manner are listed as follows:

1. Body stance - this includes head, arms, hands, legs and feet.
2. Tool use - tools would include pen, pencil, books, mathematical sets, paper and any other required materials.
3. Multiple variables - meaningful and intentional movements carried on simultaneously by the student.
4. Process/Product - those behaviors that together provide for the task at hand to be successfully completed while the movements are taking place.
5. Psychological time/intensity - an approach to the task at hand. Ability to create a psychological time and space in which to complete the task.

It was expected that these five dimensions would provide a variety of body movements that would be both related to the assigned desk work and manifest on a continuous basis for rating by the observers. Each dimension could then be rated on a timed basis to allow for recognition of subtle nuances and changes over time. The ratings on the five dimensions might provide for a variety of

non-speech behaviors or communications related to the academic achievement and accomplishment of the students observed.

The five dimensions thus selected were used in the training of the observers. The observers had been used in other observational studies and were trained on both live and video taped classroom situations specifically for this investigation.

The study was conducted in a field study methodology and attempts to plumb dimensions of non-oral behaviors or communications that are related to the accomplishment potential and academic achievements of the students.

Seven classes of grade seven students from six Junior High Schools were selected by the Edmonton Public School Board to participate. The study was conducted during the week prior to the Christmas school recess in December of 1985.

All principals, teachers, and students had volunteered to participate. The trained observers rated five students from each classroom on the five dimensions selected for six minutes. During the same class period the classroom teachers evaluated every student present in the class on behaviors and performance. Observer ratings were statistically correlated to the teacher evaluations, the scores of earlier verbal and non-verbal I.Q. ratings of the Canadian Cognitive Abilities Test (CCAT) and to the Edmonton Public School Board Achievement Tests in English Decoding, English Comprehension, and Mathematics (E.P.S.B. Achievement Tests).

Summary

This study [illegible]d observers to gather data on the non-speech or body movement communications of grade seven students engaged in assigned work in their regular classrooms.

Observer ratings, teacher evaluations, grade six CCAT results, and E.P.S.B. Achievement Test scores were subjected to the statistical procedure of Pearson product-moment intercorrelations to validate the observer data which were part of this study.

Results of the study were written in thesis format with conclusions based on the analysis of the data. Implications for further research were discussed, and suggestions were made for teachers.

CHAPTER II

LITERATURE REVIEW

Introduction

Several areas of literature were examined to obtain pertinent information about those aspects of human communication central to the theme of this study.

Several definitions have been included to delineate those modes of communication that could be expected to be, 1) non-verbal or non-voiced, 2) visible for observation in a normal classroom setting, and 3) meaningful in terms of the main hypothesis of this investigation. It was hypothesized that there is a positive relationship between non-speech or body movement behaviors of students and their intellectual achievement and accomplishment potential.

The literature review included studies employing both observers as raters (used in 'on task' studies), and observers as judges (used in sports, dance movement, and infant studies).

The five body movement dimensions of this study with their distinct literature base will be presented in order.

Webster's New Collegiate Dictionary defines communication as: a process by which information is exchanged between individuals through a common system of symbols, signs, or behavior.

The American College Dictionary defines communication as: the imparting and interchange of thoughts, opinions, or information by speech, writing, or signs.

From these definitions those modes that appear to belong to non-verbal, non-voiced, or body movement dimension are signs, behaviors, gestures, and perhaps certain symbols.

Non-verbal communication, extra-verbal communication, non-verbal cues, and non-verbal behaviors, as well as body language, are all found in the literature. Some distinctions are made regarding the use of and the meaningful intent of the two terms, non-verbal behaviors and non-verbal communications. Non-verbal behavior refers to an act, movement, position, or gesture - in other words a non-oral or non-voiced behavior.

"Most now recognize that non-verbal behavior involves both innate and learned aspects, with the individual essentially learning how to use a system of communication that has deep evolutionary roots..." (Buck, 1982, p. 29).

Non-verbal communication refers to the content, origin, intention, and contextual meaning of non-verbal behaviors.

"It is often insufficient to respond to others simply on the basis of what is intentionally being conveyed. Successful social interaction also depends on the ability to go beyond what is being communicated verbally, by making inferences about the underlying feelings and motivations of others on the basis of nonverbal cues" (Feldman et al., p. 263).

The present study is concerned with only those modes of human communication that are considered non-verbal or non-voiced by their nature. The contention here is that students would be thinking - therefore involved in inner speech which would produce visible body movements as they attend to the task at hand. These conditions would prevail for the entire time that they were being observed. The observers could then observe and rate salient features of each body movement dimension and become aware of subtle changes and nuances over the course of the observation time. The present study uses five body movement dimensions as criteria to be observed and rated. These dimensions include body stance, tool use, multiple variables, process/product, and psycholgical time/intensity.

Body stance as communication

Body stance is the first of these dimensions. The literature refers to whole body movements as well as separate parts of the body being able to produce non- verbal behaviors. The whole body, the head (including facial expression), hands, arms, legs, and feet are all included in the body stance dimension. The communication modes of infants and children provided examples of body stance as one mode of non-speech or body movement communication. "...the newborn infant comes equipped with a series of complex behaviors for communication and for eliciting the appropriate nurturing responses from adults around him" (Brazelton, 1979, p. 84).

The use of the whole body by infants in efforts to orient to caretakers, to gain nourishment, and to respond to various auditory

and visual stimuli also appears in the literature, Bullowa et al (1979), Feldman et al (1982), and Sime (1980) to name but a few. As the child grows and matures the body stance and selected gestures and facial expressions appear to become more integrated and form the basis of non-speech behaviors or body movements that are the communication of the child's intentions, moods, and thoughts to others and to itself.

"For all of us body language is as effective as speech. For the small child it tends to be the predominant way of expressing his thoughts" (Sime, 1980, p. 94). This repertoire of intentional and meaningful gestures and movements appears to remain with the child and forms the basis for language development. "...even when they begin to use language as the main mode of communication they continue to show the same sequences of behaviors as before, in the same context with the same functions" (Montagner, 1984, p. 60).

The literature also provided many examples of the development of facial expression as a mode of communication. "Another area of investigation - sometimes called kinesics - that of human postures and movements including facial expressions, clearly belong here" (Sebeok, 1972, p. 155).

The literature contained many studies of facial expressions of infants (Brazelton, 1979). These studies tend to describe such events as the cry face, closed eyed episodes, near smiles, smiles, open eyed stares, gazes, soft-eyed gaze, and deictic gaze. Studies with older children and adults were also investigated. In these

studies the consensus appears to be that facial expressions are one mode of communication used to express various aspects of mood, ih[illegible], and thought. These expressions are more easily understood when viewed live and in the context of the existing environmental conditions. Some evidence supports the contention that humans are capable of correctly identifying facial expression communuication from photographs as well (Young, 1973).

In much of the literature, references are made to special gestures of hands and arms that appear to indicate communication of 'search' - hand and/or arm sweeps in the immediate environment, and emotional contents like 'accusation' - finger pointing, 'oh, please' - palms up reaching gestures, Bullowa et al (1979), Feldman et al (1982), and Szasz (1978), for example. In older children certain gestures remain the same - finger pointing for instance, however the main developmental change appears to be that of incorporating several body movements, gestures, and facial expressions into one 'message'! Montagner, 1984 has stated: "Perhaps the most magical sequence within this category (pacifying-or-attaching) is a tilt of the head over one shoulder combined with a smile" (p. 61).

Several studies including those of Montagner, Camras, and Sime; indicated that the early gestural, body stance, and facial expression repertoire of the children becomes modified, stylized, and individualized as the children grow and mature. These non-voiced or body movement behaviors appear to persist - first as

carriers of the language, and later as modifiers of speech and as personal, non-oral behavior traits. In children it provides for language acquisition. "...untaught extra-verbal communication, which is part of everyone's enculturation and may be built on biologically given forms, not only starts to develop ahead of language but provides a foundation for the emergence of language" (Bullowa et al, 1979, p. 14). In the adult form these non-speech behaviors become recognizable characteristics of the person.

"Movement as revealed in our gestures, unconscious movements ('shadow' movements), body carriage and our working actions, is always 'ourselves.'....The body speaks clearly, and is usually understood and recognized at a non-verbal level - much of our communication and relationships depend upon this" (North, 1972, p. 6).

Tool use as communication

The second body movement dimension was introduced to examine the use of books, pens, paper, pencils, or other materials, considered tools, by students while engaged in desk work.

The literature reviewed did not refer to any specific behaviors as tool use however, certain behaviors of infants and children bear distinct similarities to tool use behaviors. Pointing with a finger, gesturing with a clenched fist, and 'palms up' hand movements appear to be special uses of hands to produce behaviors that communicate specific information. Studies by Camras, Zivin, Saarni, and Field in Feldman et al (1982), for

example, mention the combination of certain facial expressions coupled with special gestures that together communicate an entire expression of present being. Thus a frown with tightly pressed lips, a focussed stare, a clenched fist, and a hitting action with the arm, together communicated anger or frustration, attack or intent to attack or defend, with emphasis. Such references bear a resemblance to the use of a club (tool) to communicate a state of present being.

Animal studies tend to equate the use of tools with certain levels of intelligence. In her studies of Chimpanzees, Goodall (1976, pp. 222-225), describes the use of sticks and blades of grass to fish for termites as tool use. The selection of the tool material as well as the ability to use it successfully are both used to illustrate animal intelligence. These behaviors appear to be age dependent and developmental by nature.

The experiments of Yerkes (1973) describe the use of sticks and ropes (tools) by a Gorilla. From these experiments Yerkes equated the sudden discovery of how to use these tools by the Gorilla, to the phenomenon of insight in human infants.

The present investigation concerns the use of those items and materials, previously mentioned as tools, in specific ways to communicate something about the achievement or accomplishment potential of the tool user.

We have in mind such things as the reversal of the pencil in the hand in order to use the eraser tip to turn pages in a text

book; the use of the elbow or forearm to maintain the proper in a workbook or text as the desk work proceeds. As well, the normal use of pens, pencils, and other materials as tools would be examined to determine the degree of appropriateness, efficiency, and expertness exhibited. The use of more than one tool at a time would also be anticipated and observed. Here we might find the elbow used to hold the text open, a ruler used to mark the line or problem being attended to, as the work was done with a pen or pencil.

The connection between skilled movements and thinking has been made by the English psychologist Sir Fredric Bartlett. Gardner (1983) writes about this phenomenon and quotes Bartlett as follows: "...much of what we ordinarily call thinking - routine as well as innovative - partakes of the same principles that have been uncovered in overtly physical manifestations of skill." (pp. 208-209).

The tool use dimension was expected to communicate varying degrees of skills and abilities related to the potentials of student achievement and accomplishment.

Multiple variables as communication

This dimension was incorporated into the study to acknowledge the fact that human behaviors and actions are often found in multiples that are performed in concert and enhance the ongoing communication mode. Such behaviors as 'doodling' on a note pad while engaged in a telephone conversation, or the cycling of a

paper boy as he steers his bicycle with one hand and skillfully throws the rolled-up newspaper onto the porch with the other. In such behaviors there appears to be a focus on the task at hand and another set of activities with a different focus being attended to simultaneously. Even if these actions have become habitual, they are by their nature, movements that have the capacity to enhance non-verbal communication. The ability to attend to multiple foci in such a way that the task at hand or main focus is enhanced rather than encumbered appears to be of some significance with regard to intellectual ability. "Yet as Roger Sperry, the doyen of American neurophysiologists, has shrewedly pointed out, one should look upon mental activity as a means to the end of executing actions" (Gardner, 1983, p. 210).

Several areas of literature (Bullowa et al, Feldman et al, and North), dealt with multiple behaviors that, taken together, are the non-speech or body movement communication. That is, these behaviors appear as a cluster or sequence that gain their meaning by the fact that they do appear in sets or patterns.

"Qualities such as decisiveness, persistence, attention, ability to relate to others, leadership, etc., are seen in specific movement configurations" (North, 1971, introduction, x).

The observers in this study were trained to attend to the presence, extent, and/or absence of multiple variables exhibited by the students. Configurations of body movements would perhaps be associated with student performance of task. "In assessing the

physical and mental capacities of a person for a specific task, his habitual movement forms can give clear indications of his ability or otherwise to perform it..." (Laban, 1956, p. 18).

Process/product as communication

The nature of school work assignments is such that a process must be followed in order to complete the assignment or a portion thereof. It also results in a product or partial product in most cases. These conditions prompted the inclusion of this dimension in the present study.

The literature provides some direct references to such a dimension of behaviors observed in childrens' game play activities, or to problem solving activities. "We see play as practice in assembling bits of behaviors (or means) into unusual sequences" (Sylva, Bruner, Genova, 1976, p. 245). These researchers conducted a series of experiments with children in play situations with built-in problem solving tasks. Their contention is that in these situations the children with prior play experience do better because they are able to shift the emphasis in a task from ends to means, from product to process.

"The children with prior play experience did as well in solving the problem as those children who had been shown the principle of making a tool appropriate to the task" (Sylva, Bruner, Genova, 1976, p. 245). It was deemed appropriate, from previous experience as a teacher and as an observer of children in classroom settings, to include the dimension of process/product in this

investigation. Those children that appear to be able to perform the process of the assignment in an efficient and continuous fashion, might differ from those unable to do so in some discernable manner. We have in mind the behaviors that at a distance communicate some continuity of action, some indication of progress being made on the task at hand.

Psychological time/intensity as communication

This is the last of the non-speech or body movement dimensions included in the study. Psychological time deals with the concept of an internal time dimension that allows for the organization of thought and action. "Through internal speech, which takes the form of a dialogue where a person listens to what he or she has to say to himself or herself, the person influences his or her own behavior" (Wiens, 1983, p. 148). The intensity component appears in the literature on both infant and child studies. It appears to begin with a combination of body movement and eye movement. "Together with orienting body movement, gaze is the first means by which we can detect to what infants are paying attention" (Bullowa, 1979, p. 23). Attention, attention span, and selective attention have all been areas of study. "It is vital for the infant to develop the ability to recognize these signals to which it is important for him to pay attention, if he is to survive" (Junker, 1979, p. 307).

Vygotsky follows the developmental stages of thinking with reference to the changes in attention. At first attention is paid

to a whole unit, then attention is paid to some traits more than others, next comes centering of attention, then deliberate attention which allows for comparison and differentiation, then attention becomes voluntary, and the individual is capable of mature thinking and understanding. The two terms attention and intensity are of course not synonymous, however the quality of the attention paid to the task at hand is perhaps best viewed as an intensity factor. This is a rather tenuous relationship and some decisions had to be made based on knowledge of classroom activities and experience as an observer. The contention was that the body movement behaviors attendent upon the attention to the task at hand would communicate varying degrees of perceived intensity. The psychological time component has been investigated by Condon using sound film at the micro (frame-by-frame) level. He reports his findings on temporal synchrony as follows: "such integration (or organization) is manifested in the synchronized timing or changing together of the aspects of behavior with each other, both speech and body motion" (Condon, 1979, p. 131).

We had in mind for this discussion the non-speech behaviors or body movements that would communicate that the student in thought would be creating a psychological time component relative to the inner speech, and that this set of behaviors would simultaneously communicate some degree of intensity via the deliberate attention aspects exhibited through posture, facial expressions, and action sequences.

One might find a student engrossed in the t k at hand with rapt attention being paid to the task, the time, the teacher, and perhaps to nearby classmates - each in turn with no loss of orderliness or efficiency. The observers were trained to be alert to actual attentive behaviors and to feigned activities.

With their unobstructed view of the students, observers could attend to and rate this dimension during the observation period.

"Modern psychological research on the development of memory, attention, perception and learning views performance as a product of adaptive activity" (Wiens, 1983, p. 145).

Observers as judges

Literature was reviewed concerning the use of observers in various scientific and non-scientific situations. As well, personal experience as an observer of children in schoolroom settings and play situations was considered, and an interview with a certified gymnastics observer judge was conducted. From these areas of investigation the concept of both selection and training of the observers used in this study was developed.

It was anticipated that inter-observer agreement measures w d be employed as a measure of observer reliability, as well, the observers had been used in other studies which could provide another measure of reliability.

One article in particular (Review of Educational Research Journal) was helpful in the format of this study. Criteria listed in this article include: observational measures of classroom

behavior, direct links between behavioral measures and academic achievement investigated, and the student employed as the unit of analysis (Hoge and Luce, 1979).

In recent conversations with Mr. F. Tally, Associate Professor, Department of Physical Education and Sport Studies, University of Alberta, an opportunity was granted to discuss the role of certified judges of gymnastic events. In all such sports the judges have served an apprenticeship before being certified. The judges must have an unobstructed view of the entire routine, and observe many movements, procedures, gestures, and relationships in a time frame of a few seconds duration. The determination of a score or rating is dependent upon the ability of the judge to mentally measure the performance being viewed against what a perfect performance would have been like. The observers used in this study were also expected to maintain an unobstructed view of the students and observe many movements, gestures, and relationships in a time frame of fifteen seconds, then record their scores.

In scientific studies observers can be used to make observations and record these observations on an ordinal scale, a checklist, a cardinal scale, or some form of table or chart, as in 'on task' studies like those in Blackham & Silberman (1980). Observers in scientific and other situations may also be required to make some interpretation or judgement relative to the observation before rating or recording. We might cite the

observers of gymnastic competitions, rodeo and other sporting events, as well as the observers used in child studies like Bishop (1983). The observers for this investigation were required to interpret the non-voiced or body movement dimensions and rate them on a four-point scale in cardinal numbers. The field study method used in this investigation was patterned after those used in ethological studies.

"In recent years, researchers have begun to apply the concepts and methods of ethology to the study of humans, and especially human children" (Feldman, 1982, p. 3).

The methods of ethology are closely allied to those described in the field of enquiry referred to as educational ethnography.

> "'Ethnography of schools' is therefore a little narrower (than educational ethnography) in that it refers to educational and enculturative processes that are related to schools and intentional schooling, though this concept leaves room for studies of playgrounds, play groups, patterns of violence in schools, and other aspects of school-related life" (Spindler, 1982; p. 2).

Both methodologies rely on observation as a means of gathering data, both record observation for analysis, and both are conducted in a normal or natural setting. However, as Feldman (1982) states, "Perhaps the most important characteristic of the ethological approach is its reliance on direct observation and careful description of behaviors. (p. 3) This approach of direct

observation perhaps more closely resembles the intent of the present investigation.

Summary

This chapter has presented the review of the literature conducted for this investigation. An attempt was made to relate each of the five body movement or non-voiced behaviors of the study to pertinent literature citations and/or to personal experience as a teacher, a counsellor, and an observer.

These five dimensions formed the basis on which the hypothesis of the study were to be tested. In each instance the literature citations have been used to support the thesis that body movement or non-voiced behavior communicates some aspects of student achievement potentials which can be observed and rated.

Selected literature from many disciplines, such as psychology, psychobiology, biology, medicine, and semiotics, were reviewed for this study. As well, literature pertinent to observers and observers as judges was examined.

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

This chapter discusses the design of the study and the methods used to gather the data.

Separate sections deal with the subjects used in this study, and the observers used in this study and their training. Other sections deal with the procedures used in rating body movements and the criteria used to rate the five body movement dimensions. The instruments used to gather data are discussed. As well, the research hypotheses are presented.

Subjects used in the study

Six Junior High Schools were selected by the Edmonton Public School Board to participate in this study. The schools were all located on the south side of the city within a three mile radius of the University of Alberta. Within these schools seven classes of grade seven students were chosen by the principals of the schools involved. In all cases the schools, principals, teachers and students had volunteered to participate and were aware of the procedures used to provide anonymity, and cognizant of the fact that they could withdraw from the study at any time if they chose to do so (see procedures for randomly selecting students, schools, and classrooms, Appendix, p. 68). From each class of grade seven

students the three observers selected five students, that were clearly visible to them, for each observation.

The mandate of the study asked for the school principal to assign the observers to classrooms in such a manner that the following conditions would prevail:

1. Regular classrooms only would be assigned.
2. Normal subject assignments would be worked on during the class period that the observers were present. Subjects requested were Mathematics and/or English.
3. The regular classroom teacher would be in charge of the classroom on the day of observation.

Due to incomplete CCAT and E.P.S.B. Achievement Tests data on some of the students observed, a total of twenty-six students were ultimately used in this study. Of these, nine were male and seventeen were female.

Procedure used in rating body movement

Three kinds of data were collected in this study as follows:

1. In-class ratings on the five body movement dimensions.
2. Standardized achievement and ability measures from the grade six school year for each student observed. This testing is routinely done in May or June of each year.
3. Teacher ratings of every student in each class on behaviors and performance on the day of the observations.

Each of the three kinds of data and the procedures employed in their collection will be described in turn.

1. In-class ratings on the five body movement dimensions

The non-verbal communication data were gathered by the trained observers as follows: Observers were instructed to be as unobtrusive as possible in the classrooms. This meant that they would be seated to one side, and slightly back of the middle, of the classrooms in each case. This position allowed the observers an unobstructed view, from a slight angle behind and to the side, of the students. The three observers were seated in close proximity to the students and to one another, yet spaced so that the observations would be made independently. From this vantage point in the classroom the observers had an unobstructed view of most of the students. The leader of the three observers would then indicate certain students that were clearly visible from that position - the other observers could agree or disagree by head movements (nodding or turning head from side to side), until five students had been identified and unanimously agreed upon. Those students selected would be identified on the observer recording sheets as to gender (boy, girl), row number (row one was closest to observers), and desk position (each row of desks was numbered from front to back). Identifying characteristics such as 'blue sweater', 'pigtails', or 'brown trousers', were often used to ensure that the same students were being viewed. Thus, student number one on the observer sheet could be identified as R (for row) 2, D (for desk) 5, blue shirt, boy; for the purposes of one observation period.

The students selected for observation did not know they were being observed, their identity was also kept hidden from the classroom teacher and the principal of the school in all cases.

The observers waited for the students to settle into their classroom routine. A pattern of viewing and recording had been practiced during training that assured the observations would be on a timed and sequential basis as per observation procedure and schedule diagram (see Appendix, page 67). The leader signalled the start of the observation time, and the stop watches were started. Observations of the five body movement dimensions of the students were conducted for a period of fifteen seconds. The leader then signalled a halt and scores of the five body movement dimensions were independently rated and entered on the Observer Recording Sheets by each of the three observers. During the fifteen seconds of observation each observer followed his or her observation pattern and monitored the body movement dimensions of each student on his or her schedule. During the recording time, between each fifteen seconds of observation, observers filled in the recording sheet spaces using whole numbers from one to four The numbers assigned to each space (body movement dimension) for each student was based on the judged significance of what those movements or behaviors had communicated to the observer during the observation time. This sequence of events was repeated until three minutes of observations were completed. The leader then signalled a short break while each observer filed the first sheet and affixed

another Observer Recording Sheet to their clipboard. Again the leader signalled a start and the sequences outlined above were continued for another three minutes of observation and recording. The leader then signalled a halt. A copy of the student seating plan was obtained from the teacher, and the observers quietly left the room. Armed with the seating plan and their Observer Recording Sheets the three observers proceeded to the school office.

Arrangements had been made with the school principals to allow the observers access to the student files in the school office at each participating school.

Using the seating plan the observers were able to identify the observed students and obtain their cummulative files from the school secretary.

2. Standardized achievement ability measures

The student cummulative files had gummed labels affixed to the outside containing the grade six scores and measures for both CCAT and E.P.S.B. Achievement Tests. The verbal and non-verbal I.Q. scores from the CCAT are recorded as whole numbers, the E.P.S.B. Achievement Test measures are recorded as raw scores. The observers used the CCAT and E.P.S.B. Achievement Tests Recording Charts (see Appendix, page 65), to record the following data (Example).

Student name - Jane Doe

School name - Urban Junior High School

Date - December 20, 1985

CCAT verbal IQ score - 96

CCAT non-verbal I.Q. score - 103

E.R.S.B. Achievement Test raw scores for English Decoding - 36

English Comprehension - 65; and Mathematics - 60

The observers then left the school office and returned to the classroom to await the end of the class period.

3. Teacher rating of students

The classroom teachers had been given a class set of Teacher Rating Scale sheets (see Appendix, page 66) at the start of the observation period by the observers.

The teacher was to rate each student present that day on categories of behaviors. Each of the behaviors was to be checked off by the teacher on a four category scale of activity of none, little, some, or much. In addition the teacher was to rate each student on his/her performance during that class period, on a scale from one to four.

The behavior categories had been deliberately included on the Teacher Rating Scale sheets in an attempt to divert the teather from discovering the intent of the observation study. This was an attempt to minimize any teacher bias that might flaw the data gathered. The task of rating each student in the class was also an

attempt to divert teacher attention from those students selected for the observation study.

At the end of the class period the observers collected the class set of Teacher Rating Scale sheets, thanked the teacher and other school personnel involved in the observation study and returned all data collection instruments to the university for storage.

This procedure was repeated by the three observers for each of the seven classrooms of the six schools involved in this study.

Criteria for rating body movement dimensions

Each of the five body movement dimensions was rated on a four-point scale. The criterion employed for assessing each of the dimensions is as follows:

Body stance dimensions

The body stance includes head, arms, hands, legs, and feet.

Rating scale

1. The student seated in the desk facing any way, but not on task.
2. The student is leaning forward with arms on the desk and focused on the work to be done. Intermittent or short work periods.
3. The student is making necessary body, eye, and hand movements and actions with focussed attention to task. Continuous work during observation time.

4. The student appears ultimately competent in all things. In addition this competence appears protracted. While in action the student is aware of and responds to selected features of his/her milieu such as teacher comments, the time, and the students around him/her.

Tool use dimension

The tools of the task include pens or pencils, books, mathematical sets, and any other school work materials.

Rating scale

1. The pen or pencil is on the desk top, or the book or paper to be read is on the desk top. The student is not yet on task.
2. The pen or pencil is held in a way that is appropriate to its use, or the book or paper is adjusted to provide the proper position for reading or writing. The student attends to the task at hand only. Sporadic or on-off endeavors.
3. The pen or pencil is being used in an appropriate manner, or the book or paper is being focused upon and the appropriate movements such as the turning of pages are carried out. Focus is on the task and work performed for extended time periods.
4. The use of the pen or pencil and other items necessary to the work at hand is efficient and proper. The manipulation of the tools is smooth and in accord with the assignment. Movements are endowed with extra significance, perhaps using tools for unique purposes within the framework of the task (turning pages with eraser tip of pencil).

Multiple variables dimension

This group of behaviors covers the range of intentional movements and operations that are carried on by the students at one time.

The student could be solving a math problem as the text is manipulated to provide the proper page of problems, as the pencil hand is making the necessary writing movements and the feet are quietly moving to the pace of the pencil movements and the head is nodding as the problem is worked to completion.

Rating scale

1. The use of only those tools necessary to perform the task.
2. The inclusion of body movement changes that are complimentary to the main task appear only from time to time.
3. The inclusion of bodily movements and tool manipulations that are complimentary to one another as well as congruent to and simultaneous with the task.
4. The concert of bodily movements, tool use, and task requirements carried out in an intentional, efficient and timely fashion. All facets of the task and certain elements in the environment are attended to in a competent manner.

Process/product dimensions

These acts and behaviors are a combination of behaviors that together provide the task at hand to be completed successfully. The student becomes involved in the task in a manner that goes beyond the simple solving of the math problem or the reading of a

paragraph or chapter. The student is involved consciously and unconsciously in the task and the entire gestalt of actions becomes complete and efficient.

Rating scale

1. Only the task at hand is being attended to by the student.
2. The task at hand becomes focused and habitual or automatic in appearance. Intermittent and/or short time periods on task.
3. Actions and movements appear to enhance the performance. Involvement in task is sustained.
4. The student involves him/herself in the task in a way that indicates that the task has a focus, and a pattern that is a part of the product produced and is unique to that student. Other things are attended to and often incorporated into the task at hand.

Psychological time/intensity dimension

This variable refers to the way in which the student approaches the work at hand. The ability to create a psychological time and space in which to perform a task is perhaps best perceived as an intensity. The student can be aware of many things - the teacher, the time, the students around him/her, and still maintain a concentration on the task.

Rating scale

1. The student appears to lack purposeful focus and attention.
2. The student is focused and attentive, the task only is worked on. Still intermittent periods of unfocused attention.

3. The intensity of the student is more selective to the task and the movements become tied to the task and surroundings. Intensity is more pronounced and prolonged.

4. The student appears totally involved and rapt in thought. Entire task operation is incorporated into competent excellence for extended periods of time. This level of function is not reached by all students.

Criteria used to develop rating scales

The criteria used in this study to develop the scales from one to four have been adapted from studies carried out with children watching television and children engaged in schoolwork (J. Bishop, 1983, and J. Bishop, 1985).

The four ratings have been extended from the two styles, proposed by Professor J. Bishop in 1983 to include a category one where the student is not yet on task, and a category two where the student is attending intermittently or sporadically to the task. Category three deals with students that are working on the task at hand more consistently and efficiently, and category four encompasses the body movements exhibited by those few students that work at high levels of competence and appear to be efficient and intense in their application to the task at hand for extended periods of time.

This scale from one to four, provided for the rating of a full range of body movement dimensions that might be exhibited by the students and rated by the observers.

Observers and their training

The observers selected for this study were university students who had prior experience in observing children. This experience was deemed valuable to the study.

These students were trained using live and video taped learning behaviors of children in preparation for their school observations. The five dimensions to be observed were outlined and the use of a scale from one to four was explained in relation to the five dimensions. The Observer Recording Sheets were provided and explained to the observers. Practice with these sheets was provided to assure familiarity with the sheets and accuracy of recordings. Observers were instructed in the procedures necessary for them to become as unobtrusive as possible in a classroom setting. The observers were trained to be attentive to the actions, changes in actions, use of materials, and work done by the students. They watched for variations of focus, competence persistency, and intensity. This required that they be aware of the whole student in his or her environment, and attend to the non-speech communication of each student observed. The sequence of observations, the timing of observations, and scoring of variables were practiced to assure ease of recording.

Instruments used in the study

The Observer Recording Sheet (see Appendix, page 64) - These sheets contained charts to record on a time basis the ratings for body stance, tool use, multiple variables, process/product, and

psychological time/intensity dimensions. As well there was a space to record the names of each student.

The Teacher Rating Scale (see Appendix, page 66). Each sheet had space for student name, date of observations, name of teacher and name of school. A check list of student activities and a four point scale to report on the performance of the student.

The CCAT and E.P.S.B. Achievement Tests Recording Chart (see Appendix, page 65) - These sheets had spaces to record name of student, name of school, and date. As well there were spaces to record the CCAT non-verbal and verbal I.Q. scores, and the E.P.S.B. Achievement Tests measures on English Decoding, English Comprehension, and Mathematics.

The Achievement Tests (CCAT and E.P.S.B.) provide scores from the grade six year on these measures for the students observed in this study. The data were gathered from the schools using Observer Recording Sheets, Teacher Rating Scales, and Achievement Test Recording Charts. The data then consisted of two sheets from each of three observers, a Teacher Rating Scale sheet for each student present on the day of the observation, and the information from the Achievement Tests on each of the five students observed on that day. The data were later checked to ensure the completeness of each sheet and assembled for processing. A copy of the data sheet is in the Appendix (page 72).

Research hypotheses

Hypothesis I

The ratings by trained observers of body movement dimensions can be effected with a satisfactory degree of inter-observer reliability.

Hypothesis II

The five dimensions of body movement can be discriminated by the trained observers.

Hypothesis III

The body movement ratings will be positively correlated with measures of intelligence.

Hypothesis IV

The body movement ratings will be found to show a positive relationship to student academic achievement measures.

Hypothesis V

The body movement ratings will be found to show a positive relationship to the teacher ratings of student performance on the day of the observation study.

Summary

This chapter has presented the design and method of the study. Procedures used in the study were presented as well. The characteristics of the students observed and the observers trained for this study were presented and discussed. Rating criteria for body movement dimensions as well as the dimensions themselves were

presented. The research hypotheses developed for this study were also presented.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

The findings of the study are presented and discussed in this chapter. Data have been derived from three major sources:

1. In-class observations of the five body movement dimensions.
2. CCAT verbal and non-verbal I.Q. ratings, and E.P.S.B. English Decoding, English Comprehension, and Mathematics Achievement Test measures (from the grade six school year of the students).
3. Teacher ratings of students (made on the day of the observation).

The salient features of the data are presented and then discussed relative to the testing of hypotheses. Some speculative and tentative explanations of the findings are presented as well. The findings are presented relative to the five hypotheses.

Data pertaining to Hypothesis I

The Paired Observer Agreement Tables were generated from data obtained in the classrooms by the observers and recorded on Observer Recorder Sheets (see Appendix, page 64). Using the Observation Procedure and Schedule Diagram (see Appendix, page 67), it was possible to determine the number of times the student was being rated by any given pair of observers. These paired observer

ratings were then organized into tables (Tables 1, 2 and 3) as follows.

Each student selected for the construction of these tables had been observed by the designated pair of observers a total of twenty-four times in two separate viewing sessions, each of three minutes duration.

Tables 1, 2, and 3 clearly show a high level of paired observer agreement on all body movement dimensions for the fifteen students selected. Observer agreement of seventy-five percent is acceptable in most observation studies.

Hypothesis I stated that a satisfactory degree of inter-observer reliability would be possible using trained observers. The percentage figures in tables 1, 2, and 3 would suggest that Hypothesis I is confirmed by the data of this study.

TABLE 1

Paired observer agreement figures for the five body movement dimensions of students 1 to 5.

Paired Observer Agreement

observer 1 x observer 2

Student Observed	Body Movement Dimensions i	ii	iii	iv	v	Totals	Percent
1	4	3	4	3	4	18	90
2	3	4	4	3	4	18	90
3	4	4	3	4	4	19	95
4	4	3	4	4	3		
5	4	3	4	4	3	18	90
Totals	19	17	19	18	18		
Percent	95	85	95	90	90		

Total possible agreements across the variables observed is twenty. Total possible scores for any one dimension for five students is twenty.

The dimensions observed were:

i - body stance

ii - tool use

iii - multiple variables

iv - process/product

v - psychological time/intensity

Table 1 shows the number out of four observations in which observers 1 and 2 awarded the same rating (on a four point scale) to these five students selected from the total population of twenty-six. The table indicates that the two observers agreed on their ratings, for each student and each body movement dimension, 85% to 95% of the time.

1/

TABLE 2

Paired observer agreement figures for the five body movement dimensions of students 6 to 10.

Paired Observer Agreement

observer 1 x observer 3

Student Observed	Body Movement Dimensions i	ii	iii	iv	v	Totals	Percent
6	3	3	4	4	3	17	85
7	4	2	4	4	4	18	90
8	4	4	4	4	4	[illegible]	[illegible]
9	4	3	4	4	4	[illegible]	[illegible]
10	4	4	4	3	3	18	[illegible]
Totals	19	16	20	19	18		
Percent	95	80	100	95	90		

Total possible agreements across the variables observed is twenty. Total possible score for any one dimension for five students is twenty.

The dimensions observed were:

i - body stance

ii - tool use

iii - multiple variables

iv - process/product

v - psychological time/intensity

Table 2 shows the number out of four observations in which observers 1 and 3 awarded the same rating (on a four point scale) to these different five students selected from the remaining student population. The table indicated that the observers agreed on their ratings, for each student and each body movement dimension, 80% to 100% of the time.

TABLE 3

Paired observer agreement figures for the five body movement dimensions of students 11 to 15.

Paired Observer Agreement

observer 2 x observer 3

Student Observed	Body Movement Dimensions i	ii	iii	iv	v	Totals	Percent
11	3	4	4	4	2	17	85
12	4	3	4	4	4	19	95
13	4	4	3	3	4	18	90
14	4	3	4	4	3	18	90
15	4	4	3	4	4	19	95
Totals	19	18	18	19	17		
Percent	95	90	90	95	85		

Total possible agreements across the variables observed is twenty. Total possible score for any one dimension for five students is twenty.

The dimensions observed were:

i - body stance

ii - tool use

iii - multiple variables

iv - process/product

v - psychological time/intensity

Table 3 shows the number out of four observations in which observers 2 and 3 awarded the same rating (on a four point scale) to these different five students selected from the remaining student population. The table indicated that the observers agreed on their ratings, for each student and each body movement dimension, 85% to 95% of the time.

Data pertaining to Hypothesis II

The data from all three sources were used to generate the Pearson Product Moment Intercorrelations contained in Table 4. The first five rows of this table present the figures pertinent to this discussion.

Hypothesis II stated that the five dimensions of body movement could be discriminated by the observers. The range of correlations for the five body movment dimensions are from 0.885 to 0.968, indicating that these dimensions are very highly correlated. The high levels found would perhaps indicate that the observers were unable to accurately discriminate among them. The data therefore do not confirm Hypothesis II. In view of these high correlations is it still possible to maintain that there are five separate body movement dimensions? Perhaps the nature of the body movement dimensions are such that, even with trained observers, there is a tendency to blend the ratings. There is also the possibility that, while the dimensions are distinct, they are not of equal strength in their ability to be discerned separately in the communication of non-speech behaviors.

The fact that the body stance has components of head, eyes, arms, hands, legs, and feet that must be attended to by the observers, whereas the other dimensions have fewer components could be of some concern here. If the observers were indeed taking more time to discern the features of the body stance than any of the other four dimensions, then perhaps some type of blending factor

was operating. Further research could be directed toward the methodology of viewing times that might be required to successfully discriminate among the body movement dimensions. Studies could also be tried where a smaller number of body movement dimensions were employed. A change in the time allowed for observing the dimensions might also serve to permit the desired discrimination.

Data pertaining to Hypothesis III

The data generated by this study that are concerned with Hypothesis III can be found in rows 6 and 7 of Table 4. It was hypothesized that the body movement dimensions would show a positive relationship to measures of intelligence. The correlations between the verbal and non-verbal CCAT I.Q. measures and the five body movement dimensions range from 0.290 to 0.407. With 0.330 being significant at the .05 level it is evident that six of the ten correlations reach this level. Therefore the data of this study indicate that body movement-ratings correlate positively with measures of intelligence. Even though the I.Q. measures were from the grade six school year, it is perhaps to be expected that such measures are somewhat stable over time, and therefore support for Hypothesis III could be expected from the data.

Data pertaining to Hypothesis IV

The pertinent data concerning Hypothesis IV can be found in rows 8, 9, and 10 of Table 4.

TABLE 4

Pearson Product Moment Intercorrelations of the Five Body Movement Dimensions, Verbal and Non-verbal I.Q.s, Achievement Tests, and Teacher Ratings

	ROW	COLUMN										
Body stance	1	1.000										
Tool use	2	0.938+										
Multiple variables	3	0.902+	0.951+									
Process/product	4	0.916+	0.949+	0.965+								
Psych. time/intensity	5	0.968+	0.911+	0.885+	0.925+							
Verbal I.Q.	6	0.309	0.350*	0.324	0.294	0.331*						
Non-verbal I.Q.	7	0.407*	0.327*	0.336*	0.290	0.399*	0.636					
English decoding	8	0.240	0.259	0.248	0.281	0.217	0.555+	0.487**				
English Comprehension	9	0.136	0.125	0.141	0.052	0.108	0.621	0.621	0.474			
Mathematics	10	0.287	0.199	0.173	0.170	0.263	0.590+	0.772+	0.598+	0.693+		
Teacher Rating	11	0.187	0.245	0.216	0.265	0.202	0.414*	0.526+	0.536	0.139	0.364*	1.000
		1	2	3	4	5	6	7	8	9	10	11

Factors significant > .05 level * N=26

Factors significant > .01 level **

Factors significant > .005 level+

It had been hypothesized that the body movement dimensions of this study would be positively related to student academic achievement measures. The correlations from Table 4 show a range from 0.052 to 0.287. These correlations are all below the .05 level of significance, therefore Hypothesis IV cannot be supported by the data of this study. The achievement measures used in this study were the raw scores obtained by the students on system normed tests administered in their grade six school year.

It was previously mentioned that I.Q. measures tend to be stable over time. This may not be the case for system normed achievement tests. It might be reasonable to presume that the raw scores on the grade six Achievement Test would differ from similar tests given a year later. Thus the body movement dimension scores obtained in this study were being compared in an improper fashion. One might also consider the format of the study, with such a short observation period, to also be adding to the discrepent findings. This study would not then constitute a final test of Hypothesis IV. More research would be necessary to determine how more recent tests of student achievement might correlate with body movement dimensions. Format changes that included more observation time could also be included in future research. The E.P.S.B. mandate was for only a brief observation study in regular classrooms. In retrospect it appears that this may have forced undue restrictions of time, and restraints on the type of classroom assignments that were encountered. The principals of the schools had been asked to

provide classrooms where English or Mathematics assignments would be worked on by the students - these conditions did not always prevail.

Data pertaining to Hypothesis V

The pertinent data concerning Hypothesis V is contained in row 11 of Table 4. It was hypothesized that there would be positive correlations between body movement dimensions as rated by the observers and the teacher ratings of student performance on the day of the study. The correlations found in this study range from 0.187 to 0.265. All are below the .05 level of significance, the data of this study do not show a positive relationship to the teacher ratings and Hypothesis V is not confirmed by the data of the study.

It was anticipated that the teachers would be cognizant of the relative abilities of their students from the experience of teaching the students since the start of the school term in September and from the results of the mid-term exams in November.

It was also anticipated that some teachers might rate their students, in part at least, from a knowledge of the CCAT I.Q. measures, and the E.P.S.B. Achievement Test scores, which would have been available to teachers from student cummulative files.

The methodology of the study had been deliberately planned to minimize any teacher bias by keeping the observed students unknown to the teachers, and by the design of the Teacher Rating Scale. The lack of correlation between observer and teacher ratings might

indicate that the teachers did indeed rate their students on the knowledge of previous classroom achievement, or on the basis of the November midterm exams, or the CCAT I.Q. measures and the E.P.S.B. Achievement Test scores, or some combination of these factors.

Teacher ratings and student achievement test scores in Mathematics and English Decoding might indicate that this was the case. The methodology of the study must also be examined. Certain aspects of the methodology have already been found to be suspect, and perhaps this is another case in point. However, positive correlations were found between the observer ratings and both the verbal and non-verbal CCAT I.Q. measures. These data might indicate that the body movement dimensions do communicate something about student potentials that are worthy of consideration. Therefore, teachers perhaps would still benefit by incorporating some facets of observation training in their repertoire of teaching skills.

Summary

The findings have been presented and discussed relative to the five hypotheses developed for this study.

Data supporting the hypothesis that ratings by trained observers can be effected with a satisfactory degree of inter-observer reliability were found. As well, some support was found for the hypothesis that the ratings of the body movement dimensions would be positively related to measures of student intelligence potentials.

The remaining hypotheses concerning the discrimination of the five body movement dimensions, the relationships between body movement dimensions and achievement measures, and teacher ratings, were not supported by the data of this study.

The methodology of the study was discussed relative to its role as a contributing factor to the lack of support for some hypotheses. Some speculative explanations of this lack of support were also presented. Suggestions were made concerning possible changes in designs and methodologi[illegible]or further r[illegible]rch.

This was an exploratory stud[illegible]o investigate possible relationships between body movem[illegible]imensions and the academic and achievement potentials of student[illegible]. As such it generated data gathered by trained observers and[illegible]mpared these statistically to standardized and system normed test scores on a small population (N=26) of grade seven students within the E.P.S.B. system.

The findings of this study have perhaps added some worthwhile data to the area of classroom observation studies, and to the possi[illegible] significance of observation skills to the classroom teaching situation.

SUMMARY, CONCLUSIONS, AND SUGGESTIONS

Introduction

The summary presents procedures and instruments used, and suggestions for further investigations. Presented are suggestions for teachers based on the findings of this research. As well, some conclusions are made, based on the data generated.

Procedures used in the study

The schools, students, and teachers involved in the study had volunteered to participate and had been selected by the Edmonton Public School Board.

An observation instrument employing trained observers was used to gather data from students at desk work in normal classroom settings. Special formats were followed to assure anonymity of the students and to provide a safe-guard against observer and teacher bias.

The statistical and mathematical procedures used included Pearson Product Moment Intercorrelations, and calculations of paired observer data agreement.

The data gathered were stored until all observations had been made.

The observers were trained in observation techniques and instructed in procedures to use with the research instruments. As

well they were familiarized with the use of stopwatches and clipboards, and methods requiring them to be unobtrusive, yet maintain an unobstructed view of the students in the classroom.

Instruments used in this study

Observer Recording Sheets contained categories of body stance, tool use, multiple variables, process/product, and psychological time/intensity. All measures were rated on a four-point scale. Teacher Rating Scales asked the teacher to rate each student on his/her conduct and performance the day of the observations on a four-point scale. The CCAT figures represent scores on verbal and non-verbal I.Q. measures. The E.P.S.B. Achievement Tests gave raw scores on English Decoding, English Comprehension, and Mathematics. Copies of these instruments are presented in the Appendix.

Data Preparation Procedures

At the completion of the study all data sheets were retrieved from storage and examined. Those with incomplete information were discarded and a total of twenty-six complete sets of data remained. Observation data were totalled for each of the five measures and averaged for each student. Teacher Rating Scales figures, and the CCAT and E.P.S.B. Achievement Test measures were left untreated. These data were then compiled into chart form (Raw Data Chart, Appendix, page 72) and submitted for statistical analyses.

Inspection of Analyses Data

From visual inspection of the data charts it appeared that all instruments tend to show high scores for certain students who consistently do well on assigned schoolroom tasks. Both the observers and the classroom teachers tended to rate female students higher than did the CCAT or E.P.S.B. measures. The measures for observer reliability expressed as percent agreement (Tables 1, 2 and 3) indicate that there was high paired observer agreement both across the variables and among the students observed. This high agreement coupled with the high correlations indicates the reliability and consistency of the observers. Observer reliability is a must in all such observation studies.

As suggested in Chapter IV, it was thought that the teachers were possibly rating students, in part at least, on their knowledge of the midterm end point tests and observers were rating students on the dynamics of the process of learning. The data of this study would appear to support the following conclusions.

1. There is a relationship between observer data and the verbal and non-verbal I.Q. measures of the Canadian Cognitive Abilities Test. The focus on the process rather than the product, the emphasis on the observation of subtle yet meaningful changes in body movement dimensions produced positive statistical connections with these I.Q. ratings of the CCAT.

2. Data gathered by observers was vital to this study. It suggests that teachers would benefit from the inclusion of dynamic aspects of student activities in conjunction with the static and end point test information in their evaluations.
3. The nature of the non-speech aspect of learning might suggest that the observers captured some aspects of creativity, as indicated by correlations with non-verbal I.Q. scores. The connection with both process and creativity opens an area of learning dynamic being neglected by current emphasis on product and end point tests.
4. The non-oral communication of the students which was observed in this study had a focus on the dynamics of the learning process as expressed by the body movement dimensions of the students.

Implications for future research

The use of observers does not appear to be disruptive to regular classroom routines. To obtain even more penetrating information, longer periods of observation might be undertaken. An attempt to encompass a larger student population in future studies is indicated. The small number of students observed in this study suggests the need for a larger sample. Future studies should strive for a student population of from seventy to one-hundred. A larger sample would provide more degrees of freedom, more variation, and more commonalities within. The procedure design for observations could be changed to permit a greater length of time

for observation before recording. The total observation time could be increased to provide an even longer non-speech communication period to be monitored. Observer training techniques to improve their ability to monitor the non-speech communication of students, might also be suggested.

The use of double blind study techniques is vital when studying classroom dynamics. In medical studies with prescription drugs a double blind technique can be vital where medication and placebo preparations are known by only one person on the medical team. The content of these preparations are then kept blind from the nurses and the patients to assure that both benefits and side effects are bias free. Observation studies in classrooms employing a similar double blind technique would be assured of some control of teacher and/or observer bias.

Data should be gathered from standardized tests separately from observations as done in this study. Doing so assures blindness of test and observers separately. Observers are therefore unaware of prior student achievement, ability, or performances during observations.

A range of test results should be strived for including ability tests, achievement tests, reading tests, science and mathematics, tests of school subjects in the social sciences, and music and art measures.

The Teacher Rating Scale could be constructed to resemble and more closely follow the format of the Observer Rating Scale. In

this way the teacher ratings might be forced into assessing current action on the part of students rather than assessing the students wholly or in part, on past performance.

The CCAT and E.P.S.B. Achievement Tests are standard within the Edmonton Public School Board. The CCAT scores are standardized in their format. These test scores are printed on labels which are sent to the schools and affixed to the student's cumulative record folder. The accessibility of these CCAT measures to teachers could provide the possibility for a judgement of abilities that might become a self-fulfilling prophecy to those students with high and low test scores. In these circumstances the teacher bequeaths some responsibilities to the test and ignores the opportunity to affect directly the teacher/learning functions of the changing child.

Several authors (Gardner, Montagner, North, and Vygotsky) from the literature reviewed for Chapter II suggested the need for a more dynamic and comprehensive evaluation of students than what is provided by present day achievement and I.Q. tests. Longitudinal studies would provide a chance to examine the predictability of observations over time. Additional observations by trained personnel would provide reliable data concerning the dynamic aspects of student learning. The need for more research appears evident.

Suggestions for Teachers

Teachers are advised to employ their observational skills when assessing students. Doing so would allow them to be more sensitive

to the body movement dimensions as functions of the teaching/learning process. These skills could allow them to more adequately serve the present and past process interactions in the teaching/learning act.

Hence, this study would suggest that the following aspects be addressed:

1. Strive for a greater population size in future research.
2. Incorporate into data, achievement tests from a wide range of subject areas.
3. Align observer scoring procedures and teacher rating scales to be more compatible as far as findings for analysis.
4. Link the data of these findings to other dimensions of school achievement, creativity, and life in general.
5. Create more effective ways of observing the dynamics of the teacher/student/learning act.
6. Encourage teachers to devote more attention to the 'here and now' of the learning process. This would free teacher time by allowing them to attend to those students with difficulty.

Suggestions for future investigations

Observer training could be enriched by using training periods devoted to each body movement dimension as viewed first on videotape and then in classrooms. The time involved here would be more extensive than what was possible for this study, however the rewards could be far greater. More training would perhaps enable the observers to discriminate the five dimensions. Longer periods

of time for observing in future studies could also provide benefits. Highly trained observers viewing for one minute would provide a four-fold increase over the exposure provided by the present format. Observation variables might also be reconsidered and re-evaluated.

Teacher ratings might also be greatly enhanced by an innovative Teacher Rating Scale. This scale would more closely resemble the Observer Rating Scale in scope and principle. Thus a two fold approach to the dynamics of student learning might be achieved. The dynamics of the non-oral body movement communication demands that observers be capable of capturing and recording these features quickly and efficiently. This initial venture illustrated that trained personnel could reach high levels of inter-observer reliability. More training and innovative data gathering instruments could only serve to enhance this condition. The dynamics of observable aspects of body movement communications must be bet' ddressed. The connection to the CCAT I.Q. measures found in the study, include perhaps some creativity factor. Both the observers and the teachers picked this up as a positive relationship. When dynamics of a learning situation are observed and judged the affective realm of being is involved. The condition of human existenc eds any dichotomies of verbal and non-verbal or conscious and s nscious. Researchers like Hall (1959) wishing to include culture, Vygotsky (1978) insisting that the affective realm be considered, and Gardner (1983) suggesting

some seven intelligence categories; are all addressing this view. Others like Laban (1956) and Bartlett (1983) write about the kinesthetic - thought involvement in all human movement communications.

The present study has shown some statistically significant positive relationships in the dynamics of these communications. Teachers were expected to consider some of these same characteristics in their evaluation of students. Some positive relationships were found. Further research with highly trained observers, under less restrictive time limits might be expected to show even greater relationships. The recommendations of this chapter including innovative research instruments, more observer time for viewing and recording, larger student population samples, and repeat observations of same students at spaced intervals, would all enhance the probabilities and possibilities of gaining more data about the dynamics of body movement communications.

So let me do penance by Reading-The-Teaching-Learning-Process with you. I believe with H.G. Wells that education is a race between civilization and disaster. I believe with H[illegible]dams that a great teacher affects eternity, but never lives long enough to discover that truth. I believe with George Bernard Shaw, although he did not intend to be read this way, that teachers must sacrifice the joys of doing some things so that their students may have the choice of doing anything. Finally, I believe with Rudyard Kipling, that every successful teacher is something of a failed artist, who turns to the most wondrous and intractable material in the world, the ever growing human being and creates such marvelous differences on certain rare occasions, that evil is diminished and lif- is, just a little, enhanced.

(Jennings, F., 1975).

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Appendix

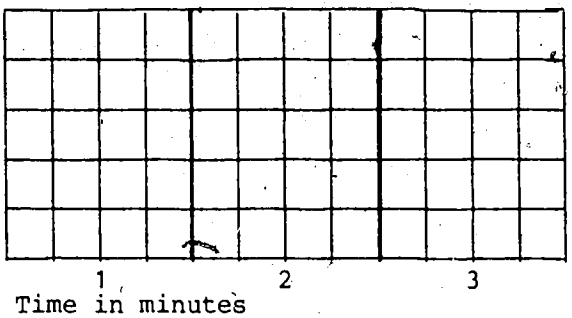
The Appendix contains samples of the following documents and instruments:

1. Observer Recording Sheet.
2. CCAT and E.P.S.B. Achievement Tests Recording Chart.
3. Teacher Rating Scale.
4. Observation Procedure and Schedule Diagram.
5. Procedures for randomly selecting students, schools, and classrooms.
6. Copy of letter to Edmonton Public School Board.
7. Photocopy of Research Proposal.
8. Instruction sheet for observers.
9. Raw Data of this study chart.

Observer Recording Sheet

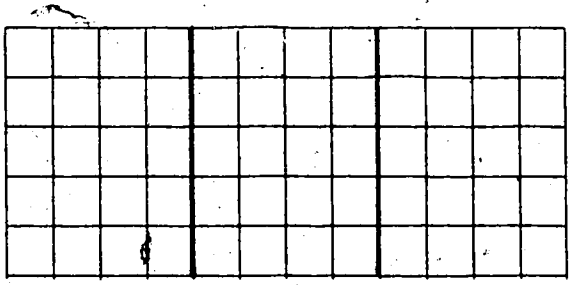
Name: _____

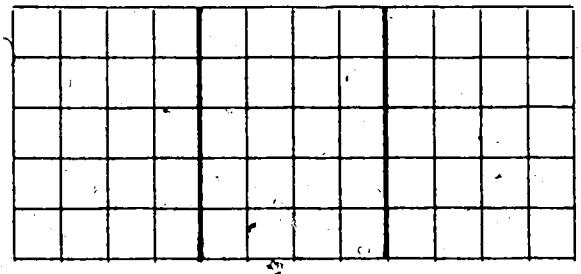
Time in seconds
15 15 15 15 15 15 15 15 15 15 15 15

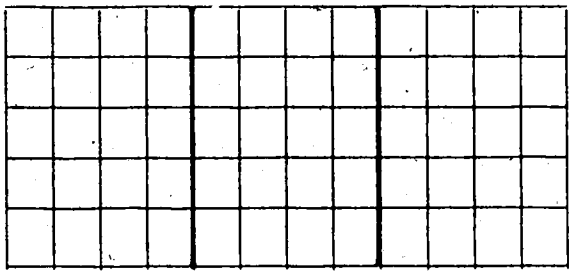


Time in minutes

A - Body stance
B - Tool use
C - Multiple variables
D - Process/Product
E - Psych. Time/Intensity







CCAT and E.P.S.B. Achievement Tests Recording Chart

Student Name: _____

School Name: _____

Date: _____
Day Month Year

CCAT (Grade Six)

Non-verbal I.Q. Score

Verbal I.Q. Score

E.P.S.B. Achievement Tests (Grade Six)

English Decoding

English Comprehension

Mathematics

Teacher Rating Scale

Name of Student: _____

Teacher Observations

Information Obtained: _____ by _____
Month Day Year

Please respond to each question.

School: _____

Degree of Activity

Observation	None	Little	Some	Much
1. Restless or overactive				
2. Excitable, impulsive				
3. Disturbs other children				
4. Short attention span				
5. Constantly fidgeting				
6. Easily distracted				
7. Quick mood changes				

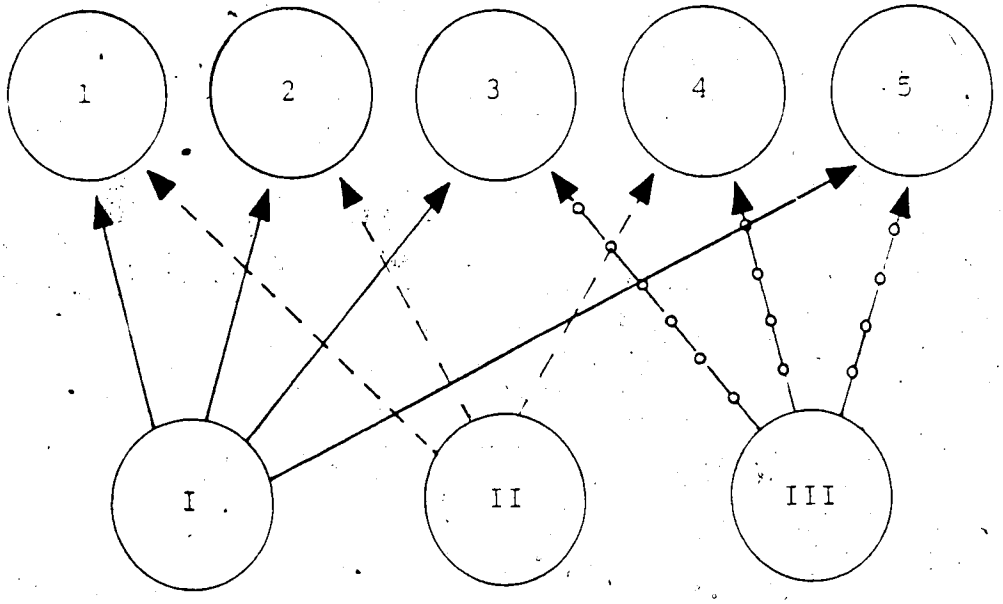
While the observers are in your room please rate this student scale on a scale of 1 to 4 (check one box):

Rate as to how well the student is performing his/her tasks today.

1	2	3	4

Observation Procedure and Schedule Diagram

Students: randomly selected by observers.



Observers: maintained their positions in the classroom.

The sequence of observations were repeated on a fifteen second basis, for a total of six minutes viewing by each observer.

Procedures for randomly selecting Students,

Schools, and Classrooms.

1. Teachers and students will be asked to volunteer for the study.
2. If these teachers and students do not wish to participate they may not.
3. If when the study is underway they wish to drop out, they may.
4. The teachers and students will be made aware of the nature and purpose of the study.
5. The teachers and students will be assured that their personal privacy will not be invaded.
6. The teachers and students will be assured that personal data gathered will be held in strictest confidence.
7. Parents of the students involved will be asked to give their consent.
8. The principals of the schools involved in the study will be asked to give their consent.

Copy of letter to Edmonton Public School Board

Classroom Dynamics of Pupil Actions:
An Observational Study.

This is a study of body position in space where the student is engaged in a task in which product is produced.

Participating schools of the Edmonton Public School Board will have classes chosen at random. The students must meet two criteria:

1. They must have been in the Edmonton Public School system for the past four consecutive school terms.
2. They must be taking both English and Mathematics this term in grade seven.

Objectives

1. Develop criteria for observing body stance as a function of process in learning.
2. Use trained observers to record body stances for brief, timed periods during regular classroom desk work (See Bishop, 1983).
3. To have classroom teachers rate the students using Conner's Abbreviated Teachers Rating Scale.
   Connors, C.K. American Journal of Psychiatry. 1969, 126, 844-888.
4. To have students for observing who are working at assigned tasks in Mathematics or Enlgish and Reading.
5. Make random selections of data gathered on standardized tests to provide a sufficient data base for a comparative analysis of the relations between stance and performance.

Procedure

The selection of schools, classes, and students within classes, will be kept hidden from the researcher. Data gathered using the techniques and instruments outlined in the objectives, will be encoded and submitted for analyses to this researcher. Using statistical procedures a comparison will be made between body stance and observations and performance on standardized tests.

Results of analyses will be assigned to the decoded data to allow this researcher to make appropriate inferences and draw some conclusions.

The participating schools, the Edmonton Public School Board, and other concerned individuals are to be notified of the results of the research.

RESEARCH PROPOSAL

1. Date of Submission

October 3, 1985

2. Organization to be Involved

EPSB (as on attached Cooperative Activities Program Form)

3. Requestor (University Staff Member)

Name J. Bishop Telephone _____

Department Ed. Psych. Position _____

Request made on behalf of R. D. Johnson (Master's student)
(Name of person conducting research)

(Address)

(Phone)

4. Description of Activity or Research

(Include title, objectives, procedure, evaluation, techniques, etc.)

as on attached

For Office Use Only

The Research Committee of the Department of Educational Psychology has reviewed this proposal and finds it acceptable with respect to ethical matters.

Chairman or Designate

Date

Instruction sheet for Observers

1. Set up appointment with school.
2. Meet principal, teacher, and secretary.
3. Leave set of Teacher Rating Scales with teacher.
   Make arrangements to collect later.
4. Select students - make observations.
5. Obtain selected student names from seating plan.
6. Obtain CCAT test results for Verbal and Nonverbal I.Q.'s and the raw scores from E.P.S.B. Achievement Tests for English Decoding, English Comprehension, and Mathematics from student cumulative records for grade six.
7. Return all data to the University of Alberta for storage.

Raw Data of This Study

a	b	c	1	2	3	4	5	6	7	8	9	10	11
01	1	1	48	51	48	40	39	117	103	035	081	040	4
02	2	1	39	37	37	38	41	101	087	023	027	027	4
03	2	1	42	41	40	36	35	101	101	051	080	045	4
04	1	2	58	50	48	45	54	109	098	032	083	030	4
05	1	2	62	53	51	48	60	096	098	024	062	038	2
06	2	2	66	56	50	45	61	109	127	034	084	053	4
07	1	2	64	51	45	43	60	111	104	035	068	060	3
08	2	3	73	65	65	65	70	122	132	036	081	048	4
09	2	3	75	68	71	71	71	124	120	034	093	058	4
10	2	3	75	64	59	59	87	125	124	041	091	055	4
11	2	4	53	44	36	36	50	123	103	032	079	044	3
12	2	4	51	36	38	38	47	106	112	036	084	055	3
13	2	4	42	33	27	27	36	099	106	031	084	050	3
14	1	5	53	47	40	40	46	088	089	019	054	027	2
15	1	5	49	38	34	34	45	101	096	031	052	039	4
16	2	5	48	35	29	29	40	072	107	022	053	039	4
17	2	5	57	44	53	53	55	095	101	022	062	028	2
18	2	5	55	44	36	36	49	121	106	035	074	041	4
19	2	6	68	59	61	61	67	138	121	038	090	040	4
20	1	6	59	52	51	51	54	092	084	028	070	034	2
21	2	6	74	62	60	57	70	102	098	042	057	039	3
22	2	6	53	49	43	43	53	096	087	019	068	028	2
23	1	6	64	57	54	54	63	131	130	036	089	060	4
24	2	6	84	77	78	69	86	103	103	032	081	048	4
25	2	6	67	56	60	60	70	094	111	032	058	039	4
26	1	6	81	75	69	69	81	098	096	032	024	029	4

Legend:

- Column (a) student identification number
- Column (b) student sex identification number
  1 = male, 2 = female
- Column (c) school identification number
- Columns (1-5) observations
- Columns (6-7) CCAT measures
- Columns (8-10) E.P.S.B. Achievement Tests
- Column (11) teacher rating