



Is There A Difference In Artistic Ability
Between Learning-Disabled Students and
"Regular-Class" Students?

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Abstract

Research and practice regarding LD students usually has focussed upon defining and supplementing deficiencies rather than seeking unique talents and capability patterns for learning and expression. This study examined nine dimensions that may constitute artistic or creative talent and compared LDs with "regular-class" students, pair-wise and as groups, for levels and distributions of the dimensions. For 14 LD and 9 "regular-class" elementary-school subjects, both genders, data were taken by direct observation, from a standardized test and assessments by two practicing artists. Assessments by artists were in concord. LDs improved more in "Composition". No other significant class, age or gender-related differences were found.

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CHAPTER ONE

INTRODUCTION TO THE STUDY

This study will examine the question: Is there a difference in artistic ability between Learning-Disabled (LD) students and "regular-class" students?

Rationale For The Study

Only a narrow range of talents or abilities is recognized for development in our educational systems, leaving many largely unrecognized. Aptitudes in areas of language or mathematics have been established as the main basis of successful progress through our school systems. Recent interest in identifying gifted children, in order to design special programmes for them, has prompted increased attention to definitions of "creativity", implicitly suggesting that creativity and intelligence are functionally identical. Educators have failed to find--and seldom have sought--signs of creative talent in learning-disabled children.

The early research in the field seemed to be leading to potentially important implications for educational practice. The more recent literature, however, seems to be largely silent in regard to the topic of artistic ability in learning-disabled children, with findings making only trivial contribution to knowledge in the field.

Examination of research completed shows major flaws in sample selection and test validity in these applications. Generally,

researchers tended to use an available sample of students, usually a group defined as LD rather than a randomized sample from the population. Longitudinal research ought to be completed to examine the persistence of the characteristics found in the studies.

Older, theoretical reports suggest that further studies investigating the nature of creativity ought to consider how artistic potential is being applied by subjects to their environments. These are problems which will continue to haunt us but they cannot be addressed within the limits of the present study.

Overview of the Problem

Referring to LD students as "disabled" implies that they do not meet a specific level of expectancy and that those who are not labelled LD do meet that expectancy. LD students might be lower on verbal abilities, as we often find to be the case, compared with non-LD students, but higher on other features such as spatial ability. If each student's features were plotted as a profile graph, differences between them would be in profile shape rather than in general intellectual level, suggesting difference in functioning style rather than capacity.

An examination of the labels currently used to group children shows that verbal abilities are valued more than other abilities. If, however, one group of children were characterized by having

verbal talents ("V") and the other by spatial talents ("S") the groups might be labelled "Profile V" and "Profile S" and so need have no value loading attached to either group by the label applied to them.

Statement of the Problem

Can LD students be taught more effectively by taking advantage of some elements of artistic abilities more than linguistic abilities? Learning-disabled students often are not valued by teachers who tend to respond to them with impatience and by repeating the same verbal instruction in order to make themselves clearer. Faced with the evidence that the child has ability areas and given strategies for capitalizing on them, both the teacher and the student may achieve greater success.

The following questions are addressed specifically in this research:

1. Do LD elementary-school students have latent artistic potential;
2. Are there common patterns in the thinking processes that LD students use to produce an artistic product;
3. Are there differences in the thinking patterns used by LD students compared with those used by non-LD students; and
4. Is the capacity to produce an artistic product distributed among members of a group of LD students in the same way that it is distributed among members of a group of non-LD

students?

Hypotheses of the Study

This study suggests that "regular" classroom teachers may be using strategies that are not directed toward the needs of LD students. The hypothesis of this study is that LD students demonstrate artistic capabilities that are greater than those of "regular-class" students and that teaching strategies based on exercise of these capabilities will lead to improvement in teaching effectiveness.

The discovery of strategies to assist the emergence of abilities in LD children is of great importance for three reasons:

1. Emergence of an ability, if it is recognized by the child as his or hers, may enhance the child's self-concept;
2. Recognition that LD children have abilities as well as learning disabilities may change teachers' and parents' views of these students, in a positive way;
3. Emergence of a creative ability may enhance the LD student's ability to perceive, express or solve problems and may reduce some of the difficulty or frustration that he or she experiences in participating in school activities.

If the results of this study were to suggest that there is no significant difference in artistic ability between LD and "regular-class" students, participants in the study activities would have benefitted in that they would have confronted the creative issue

and process. Topics to be shown in students' creative works were selected so that, in completing each assignment, students gained insight into their roles and interactions with others in their environments. Through interviews conducted by the experimenter and recordings made while the students worked, orally-expressed information complemented the visual process to which each student was exposed during the exercises. These measures ensured that the students experienced the success that creative artistry makes available.

Definition of Terms

For the purposes of this study, a learning-disabled student was any student who was formally identified as LD at some point, whether currently placed in a self-contained classroom, in a "regular" classroom with resource withdrawal or with special programme, or in a temporary class placement to serve his or her special needs. This study recognized that these placement factors may be a matter of administrative choice from alternatives based upon legislation and are not necessarily responses to well-defined needs of the student.

Artistic ability has been viewed and discussed in this paper as a form of intelligent response to needs in the environment. Creativity has been considered in terms of its relation to artistic ability. Artistic ability is not the same as creative ability. Creative ability often is taken to mean "pressing back

the boundaries to expand human knowledge or capacities" while artistic ability is taken to mean expressive capability in the use of materials and methods usually associated with the production of artistic works. For the purposes of this paper, artistic activity does not need to grow from a consciousness of the effects of various media and methods by the child. The method or medium of expression need not be consciously selected to produce an example of novel product, although occasionally it might.

The expressiveness sought in this paper simply is determined by:

1. The subject's being more or less satisfied that the product related well to the ideas that he or she wanted to express;
2. The artistic assessors detected elements of expression. In other words, the subject's use of expressive modalities may have been naive and innate while the artist assessors' detection of them was educated and conscious.

The notion of "intelligent" activity implies the use of "mind" or mental process in the responses that a person produces. "Intelligent" activity contrasts with reflexive or reactive response in which conscious thought, at the time of the response, is not implied.

"Intelligence" is a term that has become identified with a type of testing done in schools. The result of intelligence

testing typically is thought to be the "IQ" scores that are produced on behalf of individuals, as predictors of their differential school performance potentials.

The assumptions that underlie IQ testing often are violated without thoughtful consideration of the effects upon prediction. For example, the effectiveness of IQ as a predictor depends upon the assumption that the test contains a proportioned sample of verbal, numerical, spatial and other tasks that corresponds to the demands made in the curriculum to be followed by the child. If the curriculum demands performances of different types or in different proportions from that of the test, the predictive effectiveness of IQ is reduced accordingly.

Herr and Cramer (1979) explore and discuss the use of tests of intelligence and other specific abilities as predictors of performance in school activities, in work-related training settings and in later job performance. While tests of intelligence are effective in predicting up to 90% of performance in school settings, they are much less effective in predicting training performance and seldom predict more than 12% of the person's performance in job-related activities. For this reason, the notion of intelligence, as employed in this paper, generally is restricted to its meaning as a predictor of school performance.

Intelligence and "g" are not identical. Jensen (1977) described the "g" factor and its production. While intelligence

is a psychological construct that aids understanding and explains differential performance of individuals at tasks in schools, "g" is a mathematically extracted factor that describes a feature of tasks that people might be asked to do. The factor "g" is that "general" component of intelligent mental activity that would be required by all of the tasks in common.

An analysis to determine the nature of "g" or general ability across all of the tasks, yields an estimate of how much each task depends upon "g" for effective performance of the task, while intelligence tests yield IQ measures that predict performance of individual persons in schools. Of course, "g" analysis and the information that they yield are not applied only to tasks that might be performed in schools.

Neither intelligence nor creativity was central to the issue in this paper. This study was more concerned with artistic methods of expression than the relationship between creativity or intelligence and cognitive processes underlying artistic methods. For this reason, the exploration of the relationships among general intelligence ("g"), creativity and concepts of creative artistry received limited treatment beyond review of some of the relevant literature.

The structure, form and language of this paper were intended to encourage its use by practicing teachers, particularly teaching generalists. The author is proud to be a Canadian researcher and

to employ Canadian spelling in the writing.

CHAPTER TWO

REVIEW OF THE LITERATURE

Literature Relating to Abilities and Creativity

Does artistic ability relate to intelligent activity?

Sternberg (1984) asserted that intelligent activity is something that enables a person to adapt to the environment. Intelligent activity, such as an artist's perception and reproduction of a mountain with shading, emphasizing certain features that encourage a viewer to draw a parallel between the natural patterns in the rock and the construction used in a medieval castle, provides a "good fit" between the individual and the surroundings. It includes selection of desirable or useful features as well as shaping of the environment.

The distinguishing characteristic of capable people in any field is that they recognize and use those talents that they have available. Great people are not necessarily great because they have tremendous talent in some area, but because they fit some talent that they have to their environment remarkably well using these processes. Intelligence tests and ability tests, Sternberg continues, generally recognize adaptive behaviours, but focus upon three different features of intelligent activity:

1. The capacity to perceive and articulate relationships (such as in the Raven Progressive Matrices);
2. The ability to provide speedy responses, so time usually is a pressure in testing intelligent activity; and

3. Achievement level: can a person demonstrate that he or she has achieved a certain level of control of a culturally approved body of information compared with some normative standard.

The normative standard is determined by age level. Examples of this component are the "Information" and "Vocabulary" sections of the Wechsler Scales (Wechsler, 1974) in which performance expectancy is determined by age.

It follows that tests of artistic ability may be based upon different notions of what constitutes intelligent activity. An artist might articulate his or her perception of unexpected similarity between natural formation and human constructions (e.g. the mountain and the castle). An artist may perceive a pattern of change and show progressive features that ordinarily escape us (e.g. time-lapse pictures of changing light that highlight or reveal items in a church sanctuary). The artist may demonstrate fluency or ingenuity in use of items (e.g. a set of pictures showing a rock of a particular shape used as a doorstep, keystone of an arch, or the skull in a mosaic). The artist may produce a concrete form of advertising with letters of the word "bird" extended and distorted to look like an ostrich. The notion of intelligence exercised in these examples is one that depends upon knowledge of culturally-determined detail (the castle), symbolic meanings (the church items), figure-ground separation ability (a

rock in different juxtapositions) and capacities to exaggerate into the grotesque (letters forming an object). Of course, there may be the common feature of set breaking or extending beyond conventional limits in many activities.

If art is an intelligent activity in terms of adaptation to environment, and the environment is highly verbal, adaptive forms of artistic talent would include speedy production and knowledge of conventional forms and facts. Other forms of selection from and shaping of the environment might be unnoticed and undervalued. Further, they may go unmeasured if the measuring instruments used focus upon the three principles of articulating relationships, speedy response and displaying a standardized level of achievement of cultural knowledge. This is true particularly with creative artistry because it necessarily is a display of something not already known to the culture.

Sternberg (1977) stated that, in LD students, for whom verbal/sequential capabilities tend to be the main deficiency, schooling generally may have produced a succession of disappointing experiences from which they quite possibly would generalize that any attempt to display capability may lead to disappointment and embarrassment in the typically verbal environment present in most school settings. Feuerstein (1979), as stated in Sternberg, noted that "culturally deprived individuals are likely to enter all ability testing situations

with reduced motivation because they lack curiosity concerning the outcome" (p. 10).

Feuerstein (cited in Sternberg, 1979) noted that curiosity endows "the tasks to be performed with a specific personal meaning" and we can expect "an avoidance reaction to the kinds of tasks ... associated with failure in the past" (p. 11). The resulting "motivational deficit" accounts for "intellectually deficient behaviour" in testing situations (p. 11).

Educators might suspect that these effects would extend from performances that exercise truly deficient capabilities to performances that exercise normal or above-normal intellectual capabilities in environments that do not value the higher-ability areas. As a result, the measurement of high-talent areas may be tainted by low personal expectations in an environment that constantly produces embarrassment and disappointment by calling upon low talent areas. For this reason, it may be difficult to get an accurate measurement of artistic capability, even when these abilities are high, if the measurement process is associated with the highly verbal environment of the school. This may provide an excellent reason for confirming test scores with performance observation in less formal situations.

J. McV. Hunt (1961) wrote that it is important to maintain the child's interest in novelty. He said that notions of development to a predetermined expectation level, such as a

normative age standard, completely fail to include notions of intelligent activity based on application "of familiar means to new situations" (p. 149). These situations may be new to individuals at widely different points in their developments because they occur at points of need for each person. These are evidence of creative, artistic and intelligent activity because they are adaptive.

While several psychologists had done explorations into the area of "imagination", it was Guilford whose early work sparked great interest in "creativity" from the 1950s to the 1970s (Vernon, 1979). Guilford devised his model of intellect from pure theory. This means that he provided classification of intellectual processes on a logical, rather than empirical basis, produced the individual 120 cells within his model, then appealed to empiricism to develop tests for each of these logically-defined units. His model of intellect did not emerge through any process of natural factor analysis but is produced only if the factor analysis is held to Guilford's model by Procrustian (predetermined) relationships.

P. E. Vernon (1979) discussed Guilford's organization and suggested that the artificial separations of convergent and divergent thinking suggested by Guilford's model may, by their wide public acceptance, provide more difficulty in understanding "talents that are of practical importance, such as mechanical,

artistic, or musical abilities" (p. 60) because these functions may include elements that are artificially separated in Guilford's model.

Katz (cited in Yuille, 1983) used the Torrance Verbal and Figural Creativity tests (see Appendix A for detail on the Torrance Tests) in an attempt to comprehend thinking styles among 100 subjects. Using Q-type factor analysis, he identified four styles of thinking that unambiguously classified 90% of the sample. Two of the groups scored high on imagery (figural) concepts. One group also showed high ability to find remote associations while the second group displayed high ability to isolate information from irrelevant background. The first group were associated by Katz with an "initiator" type who were "ambitious, reflective, and intellectually driven" (p. 49), while the second, "aesthetic" group were associated with personality features tending to be "impatient, skeptical, and rebellious" (p. 49). The first group "might well use their imagery abilities in elaborative ways" (p. 49) and the second group might use imagery ability to "pick apart the world to look for hidden messages" (p. 49).

These findings suggest that the Torrance Figural Tests may reveal imagery abilities that manifest themselves in different kinds of products in everyday life, depending upon other personality features of the person completing the tests. It

became clear that the Torrance Figural Tests may not be measuring artistic ability in every case. It would be necessary to examine other personality features of the subject to see whether that person was using the high imagery abilities reflected on the test to be critical and fault-finding of the world or was using imagery abilities to elaborate upon the world by energetically adding to it. The difference between the two uses of imagery may be detectable by the more critical group's higher preference for simple pictures and higher figure-ground word separation abilities.

The act of elaboration upon the environment may be a subset of creativity. Both of these uses of imagery can add to our perceptions and knowledge of the environment in the way that we organize it in our thinking, but one tends to be destructive in our appreciation of what is seen, while the other tends to increase or enhance the appreciation.

Literature Relating to Learning Disabilities

Shephard, Smith and Vojir (1983) stated that research investigating the diagnostic procedures for identifying LD children show methodological weakness because most are done ex post facto and investigate organic or causal features without appropriate use of controls. Some LD students involved in studies have been identified through some form of diagnosis based upon examination by a pediatrician, teacher and parents, while others

have been labelled LD based upon some intuitive notion of their teachers without confirmation. This confounds the results of experiments. A final factor mentioned is that samples are biased because accessible samples, rather than probability samples, have been used.

O'Donnell (1980) examined the discrepancy between level of achievement and achievement capacity among exceptional children. This is one of the measures often employed to determine whether a child ought to be labelled learning-disabled. O'Donnell found that the degree of magnitude of discrepancy for LD children was not significantly different from that of children diagnosed as being hearing-impaired, visually-impaired or behaviour-disordered. O'Donnell concludes that the "intra-individual discrepancy is a necessary but not sufficient measure for recognition of learning disabilities" (p. 16).

Several studies have examined the visual-spatial-figural preferences of learning-disabled students. Veit, Scruggs and Mastropieri (1986) completed a study in which LD students were assigned to mnemonic and control-condition instruction groups to learn vocabulary, attributes and extinction information concerning dinosaurs. Keyword and pegword techniques were employed with the mnemonic groups, while direct instruction was used in the control group. Students were found to benefit more from mnemonic instruction than they did from direct instruction. In a study

examining the effects of VAKT (visual, auditory, kinesthetic and tactile) sensory instruction upon on-task behaviour and word-reading accuracy of LD children, Thorpe and Borden (1985) found that attention to task increased significantly with multisensory instruction and that visual-auditory instruction with praise "was the most effective overall instruction procedure" (p. 286) for teaching LD students reading words.

Swanson (1987) studied verbal-coding deficits in the recall of pictorial information by non-LD and LD children, with the influence of a lexical system upon those deficits. The findings suggested that "visual coding is not impaired in learning-disabled readers, since their performance was like that of skilled readers" under conditions in which verbal names were not required for pictorial notions (p. 163). For items that were highly codable verbally, it appeared that LD readers were inefficient in utilizing long-term memory resources. This result contrasted with those for the skilled readers who were efficient in coordinating information from long- and short-term memory systems.

It was suggested that the LD subjects "used a retrieval route unrelated to the semantic coding system" (p. 164). The author asserted that the verbal code prevalent in the skilled reader's memory is less effective or prevalent in LD readers' memory processes and that, for both groups, visual coding and verbal coding work independently. Visual information stimulates

activation of what the child verbally knows about a specific item of information in the long-term memory. "Retrieval of visual information occurs for both ability groups under conditions that make verbal coding unlikely" (p. 165).

An article by Howe, Brainerd and Kingma (1985) states that, although LD students generally acquire a mastery of information more slowly than non-LD students do, once it is acquired its storage and retrieval is just as available for their use as it is for non-LD students.

Koorland and Woolking (1982) completed an investigation to discover the effect of reinforcement on preference of modality (visual or auditory) in LD students. They found that modality preference could be affected by reinforcement, suggesting that auditory or visual preferences may be learned rather than inherent.

Recent Reports on the Nature of Creativity

Bailin (1984) discusses the literature about conflicting claims with regard to what constitutes creativity. The question centres around whether a person can be said to have creativity as one of his or her features if potential can be inferred but the person has not yielded creative products. Bailin claims that creativity without product may be a contradictory notion even though creativity, as a feature of the person, might have general effects of making the person more flexible or more competent.

Williams, Stockmyer and Sharon (1984) saw naturally creative people as those who have learned, probably unconsciously, to integrate their left and right hemispheres and brain processes. They stated that the right hemisphere of the brain arranges material into "new Gestalts forming connections and relationships not previously seen" (p. 72). This action, they contended, parallels our conception of the creative process. The authors suggested that at the beginning of the creative process, the left brain analytical skills combine with visual, spatial, perceptual and emotional information from the right brain. The right brain inputs tend to fragment the left brain percepts "which represent composites of accumulated data" (p. 72). When this process is completed, the right hemisphere reorganizes the data into new sets, which then are transferred from the right brain to the left, in pictorial form. The left brain translates these into linguistic form, evaluates the effectiveness of the new constructs in terms of whether they are appropriate for solving the current problem and "selects an appropriate alternative" (p. 72). If successful, creativity has occurred.

Young (1985) wrote that creativity is the integration of left brain processes with right processes in order to bring about something new and valuable. The author asserted that there is no creativity without skill because the results of creativity are not repeatable.

Strickland (1989) wrote that "strategies that individuals use to understand and control events in their lives depend not only on an understanding of contingencies between behavior and subsequent events, but also include the creation of new patterns of contingencies" (p. 7). The author suggests that individuals make use of creative thinking structures as they plan their activities and "regulate their behavior within some reality constraints" (p. 7). Autonomy, information-seeking and processing toward change, as well as the ability to make independent judgements, all are parts of the creative process. Strickland asserts that creative individuals are less likely to readily accept the "accepted" but are more likely to engage in risk-taking behaviours.

Artistic Ability in Children

Somerville and Hartley (1986) focussed upon children's cognitive development as it related to curriculum design in the arts. They noted that intense research in the areas of artistic works of young children has begun only recently. Central to their investigation was the notion of artistic style development in children's art work and examination of changes in this aspect before and after a child engages in formal education. Kennedy, Kennedy and Fox, Kennedy and Heywood (cited in Somerville & Hartley, 1986) stated that "on the basis of the perception of pictures by the blind, (...) at least some knowledge of the conventional system of graphic depiction is innate and that the

system is accessible not just through vision but also through touch" and that "pictorial displays offer a powerful and congenial way for people to convey information and ideas. This appears to be so, partly because we tend to mold our pictorial systems to fit the way in which we understand the world" (p. 242). Somerville and Hartley asked whether the changes in processes or strategies that children use when drawing "reflect or and depend on changes in the child's growing understanding of the world" (p. 243).

Early artwork often is a by-product of motor activities and a fascination with experimentation with lines, dots and jagged patterns. Gradually these scribbles or shapes become more clearly defined into distinguishable patterns (at about 1 or 2 years). Representational drawings are evident at about 3 or 4 years. In this, the authors noted, graphic skills seem to lag behind developments in play, story-creation and song-creation.

Characteristic of children's earliest drawings, is representation of parts of objects by lines or shapes. Researchers suggest that omissions of significant features on characters or objects on the page reflect "cognitive deficits or limitations in information-processing" (p. 255) capacities in the young. Other researchers state that drawings are representational patterns and are not intended to be "copies" of the original form or that failure to show figures accurately reflects deficits in spatial development.

Young children tend to be aware of the placement of parts of objects in relation to other parts, reflecting that the child is aware that each part ought to have its own boundaries. When they depart from segregation of parts in their drawings, children often create "transparent" drawings, such as those in which walls in a house are drawn so that the viewer can see through the wall. This is typical of drawings executed by children around the age of 7 years. This is one point in progress in which children between the ages of 5 years and late adolescence attempt to come to terms with the problem of representing objects in perspective.

Van Sommers (cited in Somerville & Hartley, 1986) completed a detailed analysis of strokes and sequences used by five to six-year-olds to complete drawings of objects drawn from life in order to identify the schema that children used for organizing their drawings. He found a strong similarity in execution among family members of subjects in his study, as well as a great deal of difference in order in which subjects executed major and minor parts of the objects in their drawings, suggesting a flexible production process.

Goodnov (cited in Somerville & Hartley, 1986) reported that drawings of human figures by three to five-year olds were executed in a "top to bottom" (p. 257) order, in which heads, represented by circles were given some face details before legs, but no arms were added. Other researchers, cited in the same article, have

reported departures from this order of execution and have noted that patterns of right-to-left or left-to-right progression tend to change with age. These differences in execution, suggest Somerville and Hartley, "provide a plausible foundation for the development of individual artistic styles in young children" (p. 257).

Galomb (cited in Somerville & Hartley, 1986) suggested that "children are aware of the representational possibilities of graphic activity at a very early age" (p. 252). In the same article, Freeman found that two-year-olds, acting independently, were unable to create complete representational drawings of human figures.

Somerville and Hartley noted that between the ages of five and seven years, children's creative potentials are thought to reach a peak and that drawings at these ages reflect an ability to arrange elements to form a picture, incorporating a limited sense of balance. The sense of balance is even more greatly restricted in artwork that has been influenced by adults while in progress.

Gardner, Gardner and Wolf, and Wolf (cited in Somerville & Hartley, 1986) noted that symbolism developed in successive stages. The first wave "depends upon the child's early capacity to structure his or her experience with the world in terms of events, and is signaled by the child's use of language and symbolic play to represent this structured knowledge" (p. 253).

The next stage involves the child's mapping "patterns or spatial properties of events or displays which the child experiences" (p. 253) into a symbolic system. The third stage, which occurs at about three years of age, involves the child's initial attempts to represent relative sizes of shapes and objects.

Gardner and Lohmen (in O'Hare & Westwood, 1984) suggest that pre-adolescent children do not appear to be fully aware of style in visual art, but tend to focus upon the subject matter in an art product. Carothers and Gardner (cited in O'Hare & Westwood, 1984) asserted that children at age 10 "are able to perceive the characteristics necessary for successful style discrimination in visual art, but younger children (7-year olds) lack the ability to do so" (p. 151).

O'Hare and Westwood (1984) conducted a study of the aesthetic sensitivity of children. The results indicated that six-year-old children were able to make aesthetic discriminations based on such artistic features as quality of line and picture composition. They quote other research showing that the use of language to make similar distinctions develops during ages seven to twelve.

A study examining elementary-aged students' responses to artistic media found that third-grade children preferred media that provided opportunity for manipulation and sensing (e.g. clay). "Clay was perceived as providing more flexibility of expressive ideas than the other media" (p. 109). Fourth-graders

based their selections upon "home reference" (p. 109) involving experience with manipulation of the same material at home, and flexibility of ideas that it provided. Generally, students "enjoyed exploring and manipulating/sensing different media, were sensitive to the qualities of different media, and regarded flexibility of ideas as more important than product outcome" (p. 112). Among the choices available to participants in this study were:

1. Cardboard and wood;
2. Felt tip markers;
3. Clay;
4. Pen and ink;
5. Yarn;
6. Paints;
7. Chalk and pastels;
8. Pencils and crayons;
9. Craypas; and
10. Scissors, glue and paste.

The author asserts that more balance in the art curriculum may be achieved, in part, by providing a diversity of media for students to explore.

Somerville and Hartley (1986) considered whether the art products of young children ought to be considered art and suggested that "if we suggest that artistic activity consists of

the creation of things of beauty then we confront the problem that not all works of art are beautiful and, conversely, not all things of beauty are art. Furthermore, not all works of art are created intentionally by the artist. A piece of driftwood found on the beach may function as art, although not created as such" (p. 262).

Gardner (cited in Somerville & Hartley, 1986) suggested that some qualifications must be made in order to consider the young child as an artist. First, there are limitations to the extent to which the forms and figures in a young child's drawings might be considered to be symbols.

Carothers and Gardner (cited in Somerville & Hartley, 1986) stated that young children would be unable to devise their own means of expressing such dimensions as mood or feeling, in spontaneous drawings. They note further, that one of the considerations in using adult assessors of children's artwork is that adults might tend to infer expressive qualities in the works when no such qualities actually exist. Adult assessors of student work, as reported by Hartley in the same article, consistently were able to recognize individual drawing styles in drawings produced by three five-year-old artists.

Eisner (1982) suggests that the process of expression through artistic means, enhances a child's general ability to perceive, record and express relationships that are found in his or her environment. Eisner notes that another author (Collingwood, 1938)

wrote that:

...expression is a process through which ideas are formed and clarified. The writer, in a sense, does not know what he has to say until it is said. The process of forming ideas is also a process of clarifying one's thoughts.

Eisner discusses the possibility that art is a reciprocal experience: Does the child express what he or she has learned from experience in the environment, or does the child attempt to mirror some aspect of the environment and then, in focus and reflection upon the piece of art work produced, discover new relationships or significant qualities about the environment? This discussion raises questions that are relevant to the current study.

Learning-disabled students, who often may not gain a great deal from traditional verbal teaching strategies, might benefit from the opportunity to record information in pictorial form for study and, possibly, greater insight. Investigation into the relationship between cognitive gain resulting from teacher-produced visual material as compared with student-produced visual material, might be beneficial.

Artistic Ability in Learning-Disabled Children

Argulewicz, Mealor, and Richmond (1979) noted that only recently has it become obvious to educators and parents that learning-disabled children's school experiences involve "affective states" as well as "perceptual/cognitive states" (p. 30). In an

experiment involving elementary-grade students, the subjects were tested with the Torrance Tests of Creative Thinking (see Appendix A for detail), to assess their creativity on the dimensions of fluency, originality, abstract titles, elaboration, and resistance to quick closure. They found that a significant number of LD children scored highly on "richness of imagery" (p. 31) measures. LD children were "highest in fluency and lowest in elaboration" (p. 32). Argulewicz et al. suggested that the low elaboration score might be due to a lack of persistence.

Tarver, Buss and Maggiore (1979) examined the relationship between creativity, as measured by the Torrance test of Creative Thinking, and selective attention in learning-disabled boys. They found that "the relationship changed as a function of age and the type of creativity measured" (p. 58). Originality and uniqueness were related to the attention measures. Fluency and number creativity were not. Stronger relationships among the variables was found at the younger (mean chronological age 8.3 years) and middle (mean chronological age 10.9 years) groups.

In a paper presented in 1980, Jaben discussed findings of her study on which she examined the "impact of creativity training on learning-disabled students' creative thinking abilities and problem-solving skills" (p. 1). Learning-disabled students constituted the experimental group while non-LD students made up the control group. Students were instructed in the Purdue

Creative Training Program and an analysis of verbal flexibility and total verbal creativity was made. The experimental group was revealed to be significantly higher in posttest scores than the control group on all measures.

Andrews and Janzen (1988) completed a study in which 96 LD and non-LD Grade 5 students were given the Kinetic School Drawing (KSD) test, in order for the experimenters to develop a rating system for the KSD. Student work was submitted for blind assessment by independent, trained raters.

Cummings (cited in Andrews & Janzen, 1988) suggests that projective tests, such as the KSD, provide a valid method for evaluating the child's self-concept. Klopfer and Taulbee (cited in Andrews & Janzen, 1988) assert that projectives may "reveal creative capacities, hidden resources and an individual's conscious preoccupations and goals" (p. 27).

The results of the Andrews and Janzen study indicate a number of findings applicable to this thesis:

1. LDs tended to show themselves taking part "in non-academic and undesirable forms of behaviour" (p. 35) while non-LDs showed themselves involved in "academic and desirable forms of behaviour" (p. 35);

2. LD art work was rated as showing "negative affect" (p. 35) compared with that of non-LD students;

3. LD students tended to show portrayals of themselves as non-active or engaged in game playing, while non-LDs showed themselves as active and involved in academic tasks;

4. LDs tended to show themselves involved in disruptive activity more than non-LDs did;

5. Non-LDs showed teachers as teaching while LDs tended to show teachers in neutral roles;

6. Art work from LD students more frequently represented peers hitting or fighting and interacting through throwing objects, than did non-LD art work;

7. More LDs showed themselves facing out and away from central figures, than did non-LDs;

8. The heights "of self, teachers and peer #1 were all significantly smaller" (p. 39) in LD drawings than in non-LD work;

9. Non-LDs may "have more of a tendency to focus on content over figure related representations than LDs" (p. 40) and LDs tended more to produce drawings that appeared "strange or unexpected" (p. 40).

10. LDs tended, more than non-LDs, to include items that seemed out of context in the settings of their drawings.

In their concluding statements, Andrews and Janzen note that interpretation of art work through KSD ought to be supplemented with "other forms of personality measurement, interview and observation data, behavioural indices, developmental

characteristics and report from significant others" (p. 46). They suggest that children's drawings of activity often is consistent with their own written descriptions and that "children may have conscious intent in their drawings" (p. 46). The authors support Hammer (1958) in suggesting that a blend of observation of a child's drawings as well as careful study of how the end product is achieved, provides a more complete assessment of what meaning a child's drawing has to him or to her.

CHAPTER THREE

THE RESEARCH PROCEDURES

Introduction

A combination of ethnographic with the empirical method was chosen because conditions and thinking structures that occur naturally and without intervention were to be examined and described (ethnographic), then these features were to be compared quantitatively with occurrences in a sample population (empirical).

The ethnographic design for part of this study was chosen for several reasons. It is a means of gathering data which relies little upon the language skills of LD students, who often are deficient in this area. It offers the opportunity for students to gain greater insight into themselves through expression of their interpretations of their work. The ethnographic method is a relatively unobtrusive form of information gathering that will tend to leave existing classroom structures and practices undisturbed. I recognize that LD students tend to resist change from routine and that drastic change might considerably affect the outcome of a research study. The ethnographic format offers the option of continuous study over an extended period of time and allows the researcher to gather information about the nature of the students, as well as their work.

Subjects

Fourteen students whose school records indicated that they

had been identified as LD were selected for the investigation. Nine of these students had been placed in "regular" classrooms with Special Learning Centre or Resource Assistance supplement. Five had been placed in a Mixed Exceptionality (LD and Opportunity) class. Eighteen "regular-class" students from another school were selected to participate. Of these, seven were matched for age and gender with individuals in the LD group to facilitate control for these factors in later analysis. The comparison group of non-LD students were not a class group, but an assembly of individuals chosen to complement the LD group. These imposed structures and conditions constitute an empirical component in the study, permitting comparisons on the basis of controlled factors. Such controls cannot be expected to occur in ethnographic studies.

Both schools shared the same rural southwestern Ontario community. Most subjects in LD group rode busses to and from school each day. During the period of the investigative sessions, parents were requested and agreed to provide transportation home for the participants. All regular-class subjects walked home after the sessions.

Subjects in the LD group were familiar with the investigator, since the investigator had taught in the school for three years prior to the investigation. Two subjects had been taught for two years by the investigator in a self-contained Mixed

Exceptionality classroom. One subject had been taught by the investigator in a self-contained LD classroom for one year and in a self-contained Mixed Exceptionality classroom for one year. All of the other participants were exposed to the investigator through such occasions as recess duty and school assemblies or through casual meeting in school hallways. The investigator had not met the members of the regular-class group, although there may have been some contact through the investigator's involvement in community activities or school-related events described in the community newspaper.

Preliminary Arrangements

A letter requesting permission to conduct educational research toward completion of the thesis requirement for a Master's of Education degree, was sent to the Committee of the Kent County Board of Education. When the written permission had been secured, letters were written to the principals of the schools involved, requesting their approval and agreement with the arrangements for their schools. Copies of these letters are provided in Appendix B. A meeting with the two principals was held in September, during which all details were discussed. Access to Ontario School Record files was granted for selection of subjects and selection followed immediately. Letters and consent forms, addressed to parents or guardians of selected subjects, were left with the school offices for pre-arranged distribution to

the subjects. Most were returned within a week. Telephone contact was made with the parents or guardians of subjects who did not return forms to determine whether non-return was tardy response or intention not to participate.

Specific Arrangements

Sessions were conducted one afternoon each week (LD group on Wednesdays and regular-class group on Thursdays) consecutively for nine weeks, beginning in October and ending in December. Sessions ran from 4:00 to 5:15. During the last 15 minutes, subjects were required to clean and store all art materials and clean the work surfaces.

Sessions for the LD group took place in the Special Learning Centre classroom where large tables were available and there were few obstacles to free movement throughout the room. There was a great deal of natural light and close proximity to the school office, providing a pleasant, quiet setting for the activities. Regular-class group sessions were conducted in the rotary Art classroom at the request of the school Principal. This room provided a relatively quiet setting with good exposure to natural light and a fair amount of working space with desks grouped in pairs. Many subjects were familiar with the rules established by the school Art teacher with regard to the proper use and care of art supplies and, although these were not requested by the investigator, subjects often adhered to these practices during

preparation and clean-up of work areas. Current art projects from Grades 5 to 8, some belonging to subjects in the "regular" group, were displayed in this classroom by the classroom teacher.

Each session began with a statement of the topic, expressed verbally and printed on the chalkboard. In response to requests for elaboration or interpretation of the topic, subjects were directed to show what they thought was meant by the topic as stated. The subjects were informed that the investigator would be writing notes during the sessions, that these notes would not be shown to parents, friends or anyone else in the school and that notes made in this class would not affect marks in any school studies. Subjects were told that choice of material or materials in combination, as well as arrangement of paper on the work surface (vertical or horizontal placement) was theirs. This was an attempt to avoid a tendency to arrange paper horizontally simply because desks tops are shaped in a way that encourages horizontal placement of paper.

Subjects were advised to choose a place in the room where they believed that they could work comfortably and that no critical comments of any kind were permitted during the sessions. These were to include comments about others in or out of the room and about art work of other participants.

A standard set of art materials was available in the classroom, with sufficient materials for each subject to have a

full selection if desired. Included were:

1. 11" x 17" white cartridge paper suitable for drawing or painting;
2. Three sizes of paint brushes and large cans for water;
3. Six trays of tempera paint tablets including red, yellow, blue, black, white, green and brown;
4. Primary-size and regular-size drawing pencils;
5. Artist's gum erasers;
6. Construction paper in 11" x 17" size, in the colours of the paints;
7. Scissors and stick glue;
8. Grey play dough;
9. Magazines suitable for cutting or tearing.

A camera was considered as one mode of producing artistic products but was rejected because the novelty of the device might encourage subjects to choose it over other media. In order for a novice to use a camera effectively some instruction concerning its proper use might be necessary. This interaction might affect the subject's end product and might affect the results further in that observation and record-keeping time would be used for instruction. The following materials were made available to all participants when they were requested by LD subjects:

1. Six packages of felt-tipped markers including primary, secondary colours as well as fluorescent colours;

2. Six fine-tipped pens suitable for drawing pen and ink sketches;

3. Six packages of play dough including the primary and secondary colours as well and black and white.

Subjects were instructed to choose and use as much of any of the art materials that they believed would help them show the topic in the best way possible. Emphasis was upon independent work so that original creations would be completed.

Topics included:

1. Show you with your family;
2. Show a winner;
3. Show wealthy people;
4. Show a frightening scene;
5. Show your favourite place to be;
6. Show a still life (arranged by the investigator);
7. Show an adventure;
8. Show a design.

These topics were chosen because they represent abstract, culturally-defined ideas and each affords the opportunity for clear expression and insight into the subject's perception of himself or herself in relation to his or her home, school, or community environment.

After two sessions, some LD subjects stated that they wished to have lessons taught to them and that they found the current

format of "free drawing" frustrating. In response to this, brief (eight-minute) mini-lessons were devised. In an effort to avoid affecting technique of subjects, these lessons emphasized novel uses of material, such as paper tearing used in combination with painting to produce layering. Art projects appeared not to be influenced by these lessons. The ideas presented in these mini-lessons were not applied to assigned tasks, although some subjects in both groups tried them during free time when the assigned artwork was completed before the end of the session.

During the fourth session, subjects in both groups tended to wait impatiently during the mini-lesson and actively request the topic as soon as they entered the classroom. For this reason, the mini-lesson format was abandoned in favour of the original format of immediate presentation of topic and selection of material.

Interviews by the investigator began with the request: "Tell me about your work." Interviews were recorded in writing and supported by tape recordings.

Art products of both groups were marked with a code that identified the subject and the group. Art products of both groups then were merged in random order to form a single file of work for later evaluation.

Subject projects were examined and graded by the artists on the following dimensions:

1. Choice of medium;
2. Shape;
3. Balance;
4. Perspective;
5. Rhythm;
6. Unity of theme or idea;
7. Contrast;
8. Composition;
9. Scale.

Dimensions one to six were chosen by the investigator. When the charts were presented to the first artist assessor, he was instructed to include additional headings that he believed would assist in careful assessment of subject work. As a result, the final three were added to the assessment data headings. The grade record forms presented to the second artist assessor included the three additional dimensions. No distinction was made between original and added dimensions. No additional dimensions were suggested by the second assessor. Both artists chose to eliminate a proposed "choice of colour" dimension because many of the pieces of work were completed in pencil. Copies of the assessment forms used are provided in Appendix B.

Choice of Medium: This dimension is intended to assess the extent to which the medium, or artistic materials used by the subject, was appropriate for conveying the realism, mood or message

expressed in the finished work. Assessment of "choice of medium" would include a measure of expressed originality.

Shape: To what extent did the artist effectively use contour to express realism, mood or theme? Assessment of "shape" would include a measure of the subject's ability to express elaboration.

Balance: To what extent does the finished work show placement of objects or characters so that it is pleasing to the eye? Is there evidence to suggest a deliberate lack of balance intended to cause arousal in the viewer? Assessment of "balance" would include a measure of the subject's ability to express originality.

Perspective: To what extent are objects or characters shown in a setting that displays acknowledgment of perspective and vanishing point? Assessment of "perspective" would include a measure of the subject's ability to perceive and articulate relationships.

Rhythm: To what extent did the artist employ repetition of line, texture, colour or shape to guide the viewer's eye around the surface of the work, to create unity, or to lead the viewer to a focal point in the work?

Unity of Theme or Idea: To what extent did the subject use line, texture, colour or shape to make clear that characters or objects in the product are related through a single theme or idea?

Assessment of "unity of theme or idea" would include a measure of the subject's ability to express originality.

Contrast: To what extent did the artist apply contrast in texture, colour, line, or form, effectively? Assessment of "contrast" would include a measure of the subject's ability to express elaboration.

Composition: To what extent does the art product appear to have been thoughtfully arranged? Is there evidence of deliberate use of line, texture, shape or colour to create realism or a desired mood or to communicate a message? Assessment of "composition" would include a measure of the subject's capacity to perceive and articulate relationships, display a culturally approved body of knowledge (employ symbolism), elaboration and resistance to quick closure.

Scale: To what extent does the artist show accuracy of proportion in objects or characters in the work? Is there evidence that proportion has been distorted deliberately in order to create arousal in the viewer? Assessment of "scale" would include a measure of the subject's capacity to perceive and articulate relationships and to express originality.

The merged file of art products was submitted to two practicing artists (see Appendix B for detail) who were unfamiliar with the subjects in the study. Acting independently, the artists were asked to assign grades on the assessment dimensions. For each of the products of each subject, grades were assigned for each dimension. These were converted from letter to number

grades, then were averaged to form a composite score for that dimension as assigned by that artist. Since some subjects missed one or more sessions, the composite score for a subject on a dimension represents the average for the sessions attended. The process of converting and averaging was repeated for each of the dimensions for each subject, for each artist.

Grades were translated as follows:

1. A = 85;
2. B = 75;
3. C = 65;
4. D = 55;
5. E = 45.

A mean value of the subject's assessed performance on each dimension was computed as the average of the assessments by the artists. These values also are shown in Table 1 as the third column for each dimension. The grand means and standard deviation values for each subject were computed separately for each artist and for the artists combined.

 Insert Table 1

Scores, representing the assessed performances of the subjects on the different measurement dimensions, are recorded in Table 1. Regular-class subject names are coded as lower-case

letters and LD subjects as upper-case letters. During the data collection sessions, subjects from each of two schools met as a group in a classroom in their own school. Schools (groups) are coded to distinguish them. These groups coincide with classifications as LD or non-LD. The number of observations reflects the attendance of the subjects at the sessions and, consequently, the number of artistic products on which that subject's scores are based. Gender is coded as $f=0$, $m=1$.

During one of the sessions, the Esthetic Judgment subtest of the Comprehensive Abilities Battery (IPAT, 1975) was administered. Obtained scores are shown in Table 1. Additional information regarding the CAB is provided in Appendix A.

Subject data in Table 1 is separated into four groups. Subjects coded with upper and lower case forms of the same letter are pairs of LD and non-LD subjects matched in gender and age (approximately). These are the upper two groups in the Table. The third group consists of LD subjects for whom there is no match and the fourth group consists of non-LD subjects who are unmatched. The Table shows means and standard deviation values for LD and non-LD subjects in total. No significant differences were found by a test of differences in means.

CHAPTER FOUR

RESULTS OF THE STUDY

Introduction

The data for this study are from a standardized test, expert assessment, and from direct observation of the subjects. The data from test performance is mainly quantitative and can be submitted to numerical analysis procedures. In a narrower sense, the test data also is qualitative because it provides information about a particular feature or trait of the subjects. Data from expert assessment also can be submitted to numerical analysis and can provide information about factors or traits that are qualities of the subjects. The observation data, however, is qualitative not quantitative. It permits us to know something about the process of artistic performance and, through the interview records, may provide information about the aims, emotions and attitudes of the subjects during the production period.

A finding that one of these features of mind-state relates to features of the product is valuable because it may inform us about expressiveness, the relationship between knowing or feeling and communicating.

This study is intended to reveal something about expressive capacities that LD children can exercise as alternates to the verbal modes in which they may have less effectiveness. The observation data may confirm inferences and hypotheses made from the completed art products, using knowledge available only at the

time the products were developed.

Qualifying the Artists as Assessors

Data taken as assessments by experts is, of course, not standardized. The employment of expert opinion is based in the belief that this judgement represents the community of thought in the field. Employment of more than one expert is intended to ensure that the community thought in the field is distinguished from the personal thought of one individual by forming a composite that more strongly reflects the community thought. It is important to establish that a community of thought is being represented in a panel judgement.

To determine whether there was a significant relationship between assessment judgements made by one artist and the other as they worked independently, the scores that they assigned were submitted to analysis.

A correlation coefficient would indicate whether the assessments were similar but, since the purpose of the study is to evaluate relative talents of people rather than their products, another statistic is more appropriate. The coefficient of concordance is directly related to the subjects of judgement because it reflects the extent to which the assessors agreed in ranking the subjects from best to poorest rather than the way they concurred in judgement about the work. The statistic (Kendall's W) produced by this analysis, when corrected for cases for which

tie grades are assigned, is analogous to the correlation coefficient in other respects. Since the analysis recognizes only the ranking of the subjects, the presence of one or more assessors who would tend to assign uniformly high scores is not a bias to the outcome.

Each assessment judgment provides a separate opportunity for the assessor to be concordant with or discordant with other assessors and so the degrees of freedom for determining significance is based upon the number of assessments rather than the number of subjects who produced them. This is in accordance with procedures recommended by Kukuk and Baty (1979).

Insert Tables 2-3 & Figure 1

Table 2 displays the results of the analysis, including the coefficients of concordance. Significance at the level of probability $p=.01$ indicates that, although assessments were made in complete separation and independence, the judgments reflect a substantial community of thought that is representative of the artistic community at large. The assessments made by the artists in this study, then, are meaningful statements about the artistic

abilities of the subjects.

Figure 1 graphically displays the degree to which the artists were in agreement in their assessments. Although the degree of concordance was greater on some dimensions than on others, the level is substantial on every one of the factors.

The dimensions chosen by the investigator as the important components of artistic expression were accepted with only minor modification by the artists who acted as assessors. The assessors were able to interpret the meanings of the dimensions without discussion and showed no hesitation in assigning scores for the subjects on the basis of these factors. We can assume that a community of understanding existed for the assessors and the investigator concerning the validity of these dimensions as elements of artistic expression.

Taken together, the scores indicate the levels of artistic expressiveness of the subjects. Comparison of scores provides a comparison of the artistic expressive capacities of individuals or groups in the analysis.

Analysis of Variance

The dimensions in the study are factors of artistic expressiveness. Data for LD and non-LD subjects were submitted to an analysis of variance routine to reveal whether any significant differences of level existed between groups or among the factors of artistic expression. Significant difference was found among

the artistic dimensions (columns) at $p \leq .0001$. Figure 2 displays the relative levels of group scores on the dimensions and shows that the "Choice of Medium" factor is at a substantially higher level than the others. This suggests that the participating subjects expressed their ideas or themes more effectively in their choice of an appropriate medium than they did in the use of other factors. No other significant findings emerged from the analysis of variance.

The LD and non-LD groups were compared on each of the factors of artistic expressiveness by comparing the means. No differences were found to be at a significant level.

 Insert Figure 2

Paired Data Analysis

Since the plan for this study included analysis of data in pair-wise combinations, the data for paired subjects were formed into a separate file and data descriptive analysis was performed on the file. The findings are presented in Table 4.

 Insert Table 4

The subject data shown in Table 4 are for students matched for age and gender. The cases are arranged in order of increasing

age and in groups of non-LD (lower-case letter codes) and LD subjects. Matching of subjects provided control for gender and age effects. Further analysis compared LD and non-LD groups through their group means on each of the artistic dimensions. Significant difference was not found for any comparison. It is interesting to note that scores were unrelated to ages of the subjects. These findings are graphically presented in Figures 3 through 11.

 Insert Figures 3-17

Mean scores for the two groups were compared for assessments, by each of the artists separately and for combined assessments, to determine whether one or both of the assessors had expressed higher valuations of the art products of one group over the other. No differences were found at any acceptable level of significance.

Again, it is interesting to note that assessment scores are not related to age, as can be seen graphically in Figures 12-14. The assessment scores for the two groups on each of the artistic dimensions and the mean assessed score for the group are shown graphically in Figure 15. Although one assessor tended to assign lower scores on the "Choice of Medium" (first) dimension and higher scores on all other dimensions, the general tendency for the assessors to be in accord is visible.

Mean scores were computed for each gender in each of the LD and non-LD groups. A comparison revealed no significant difference between means on either factor. The dramatic similarity of means is visible in Figure 16.

No significant correlation between scores obtained on the CAB Esthetic Judgment subtest and scores assigned by the assessors of the art works was found for either the LD or the non-LD group. Figure 17 graphically displays these data for individuals in both groups. The figure also displays the relative ineffectiveness of the younger subjects on the test compared with the older subjects. A point, or at least a narrow range of age, past which the test may become a useful instrument, may be visibly established with the knowledge that the earliest age of effective performance on the test appears to be that of the middle person in each group, about 156-157 months at the test date.

The Comprehensive Ability Battery is intended for use with persons of secondary-school age and, in any case, Guilford (1965) points out that formal testing, as a way of acquiring facts about people, is likely to be effective only at an age at which the subject's maturity level permits handling information expression in the formal ways required (p. 309). On the other hand, the tasks required for the Esthetic Judgment subtest in particular are so elementary that even the least level of sophistication and skill would seem to permit its use. It may be that some feature

of the mental process of responding in a formal way, producing a response that has been tested by the subject against procedural rules, is inhibiting to younger subjects.

A Wilcoxon Pairs Test was performed to reveal significant differences between subjects on the artistic dimensions with control for age and gender. The results are displayed in Table 5. No differences were found in this analysis.

Insert Table 5

Analysis of Artistic Intellect and Learning

When examining the later art works for assessment, each assessor spontaneously remarked that some of the works were so advanced in quality that the work might have been executed by more advanced subjects. A method of testing for improvement was devised by simulating a pretest/posttest design.

The final two sessions (products) were considered to be summative examples and all of the earlier sessions were taken to be formative in nature. For those subjects who had attended one or both of the final sessions, a mean score was computed for the formative marks and another for the summative marks on each of the factors and the mean of all factors. The difference between formative and summative means was computed. Difference values for these subjects are recorded in Table 6.

Mean scores were computed for the LD and the non-LD groups on each factor dimension and these were compared for significant differences. A difference between LD and non-LD groups was noted on the Composition factor ($p=.005$), indicating that the LD subjects improved their performance level more than the non-LD subjects did in expression of ideas through composition of their art works. No other significant differences were found in the analysis.

Insert Table 6 & Figure 18

Figure 18 was constructed to display a comparison of the proportionate contribution of each factor of artistic expression to the artistic intellect of LD and non-LD subjects. The graph reveals no notable differences in the composition.

Qualitative Data Detailed Observation #1: "j" The subject was a "regular" class female, 115 months of age.

This subject chose water tempera paint to complete every art product because she believed that she drew best with it. Objects or figures in her works were large and often displayed bold

segments. For example, shirts or dresses were painted in primary colours, unembellished with patterns. Each article of clothing, limb or object was painted a separate colour. For example, skin tone contrasted with shirt colour, which was one solid colour and which differed from pant colour. Articles of clothing or outlines of figures or shapes often were outlined with black or another colour. Figures rarely touched. Figures were disproportionately large in comparison with other objects in the pictures.

Characters faced away from one another.

The "show your favourite place to be" drawing included "transparency" in which the West Edmonton Mall exterior was shown with a huge sign labelling it and a view of the interior from the side, indicating where fountains and slides were placed in the mall. Subject "j" reported that she knew where to place objects on the page because "that was where they were in the mall".

Evidence of use of symbolism was present. Wealth was represented by a large, black car, ownership of a poodle and money falling out of the pockets of the characters on the page. A "winner" was represented by a successful beauty contest contestant wearing a large necklace, a long, red gown and carrying red roses. The subject reported that she could tell that this person was a winner "because she was the most beautiful because she had long, long black hair and a crown."

Another character, facing away from the winner, was present.

No features were completed on its face. It showed no arms or feet and had a small patch of hair painted on the top of its head. This character was dressed in a solid black gown and had an outline of a rectangular shape extending from its left sleeve.

Examination of subject "j"'s school reports revealed a mean Art score of "C+". Teacher observations included indications of good effort. No remark suggested significant creative potential.

Detailed Observation #2: "J"

This female subject was placed in a "regular" classroom with Special Learning Centre assistance. She was 116 months of age.

This subject always took art materials to a corner of the classroom and worked on the floor. Frequent attempts to take the investigator by the arm, to show and discuss her artwork, were made.

This subject chose tempera paint exclusively. She stated that she did not know why this was her choice. All works were sketched with pencil before paint was applied. Characters or objects often were painted with one colour applied for the top half and arms, a second colour used to paint legs or pants. Feet, arms and heads were painted with other distinguishing colours.

Elaborations such as ear-rings, buttons, ribbons or barrettes were used to identify specific individuals known to the artist. For example, the "show a winner" picture included a crowd of figures at a track and field racetrack. The subject distinguished

herself from the rest of the crowd through use of red to represent her red hair as well as freckles on her face.

Character arrangement indicated acknowledgment of perspective. Crowd figures were smaller, placed toward the top of the paper, with figures in the forefront of the crowd showing completed features, figures in the middle showing only eyes and those in the background showing no features. The "show a winner" picture showed two runners, the winner larger and closer to the viewer than the loser. The winner had passed through an arch marked "Finish".

Evidence of use of symbolism was present. Above the loser's head was a "bubble" in which were printed the words "I hate you". The winner had a ribbon and medal drawn around his neck, painted yellow. When asked why one character hated the other, the subject stated that it was because he had lost the race. When asked what will happen next, the subject responded that "the crowd will clap for him" (indicating the character with the medal) "and he (indicating character with bubble) will cry and smash down the sign".

Examination of subject "J"'s school reports revealed a mean Art score of "C". Teacher observations included indication of fine motor difficulty and necessity for individual assistance to complete assignments. No remark suggested significant creative potential.

Detailed Observation #3: "n"

This was a "regular" class male, 145 months of age.

This subject tended to choose pencil and cartridge paper as media during sessions. Detail and elaboration was added with markers or fine dots of tempera paint. Figures or characters tended to be small. Completed drawings used little surface area of the paper available.

Interviews with this subject indicated that he composed his pictures with the viewer in mind: characters were placed in the art in order that the viewer be able to understand relationships among objects in the picture. The "show your favourite place to be" picture included a pool scene. The subject decided that a third character, drawn with part of the body extending above the water in the picture, was needed in order that the viewer be able to distinguish the water line from the lines indicating sides of the pool. Figures showed complete features and limbs. Swimming trunks were elaborated with a design.

Use of symbolism was evident in this subject's works. Movement in the water was represented with lines extending from one swimmer. Music from a ghetto blaster was represented by musical symbols curling from the side of the machine. Heat was represented by the presence of two partially-consumed drinks with bent straws. Movement around the pool was shown through wet (blue) footprints surrounding its exterior. Friendship between

the two characters was represented by the fact that they "are looking at each other and smiling and they wouldn't be swimming together if they weren't friends. They would drown each other."

Figures rarely overlapped or touched. Characters, objects and figures consistently were the same size, indicating little use of perspective. Characters always were engaged in separate, distinct activities although they often were shown in the same setting. For example, two characters were drawn marooned on an island and were eating, although they were facing in opposite directions and 'ot interacting.

This subject's order of progression in picture composition was typical of the "regular" class subjects in the middle age group. Each piece of art work began with a rough outline of a central object or character which was used as a reference to guide placement of other figures or objects on the page. For example, the palm tree was drawn first on the island. This provided a guide to where the island was placed, then the water, characters, food, clouds and birds in the sky. Most often, the reference object was placed slightly to the left of the centre of the page.

Association among characters was shown symbolically. For example, the "show you with your family" picture included three figures in the bottom left corner of the page, each playing a musical instrument.

Examination of subject "n"'s school reports indicated a mean

Art score of "B+". Teacher comments included "good effort" and reported that Art seemed to be a "special area of interest or talent" for this subject.

Detailed Observation #4: "N"

This male LD subject was placed in a self-contained "Mixed Exceptionality" classroom. He was 142 months of age.

This subject always chose to work in an isolated corner in the classroom. Infrequent verbal interaction with friends involved interjections to discussions concerning events of the day. Play dough was the preferred medium because the subject believed that he worked best with it. The "still life" product, made of grey play dough, was produced with little reference to the arrangement available to him. Interviews with "N" confirmed that a cursory observation of the arrangement from that point, was sufficient to know what to produce. The model arrangement consisted of full-size ears of corn, squash and gourds. The final product was a number of objects recognizable in shape as similar to those in the model arrangement, but lacking scale as well as textural detail. A great deal of manipulation of the material occurred before the objects were shaped into the completed product.

Subject "N"'s works showed little indication of symbolic expression, although interviews produced surprisingly astute symbolic thinking. His "show a winner" painting showed a

character in the lower right corner of the page, enclosed in a box-like square of brown paint with a small opening at shoulder level. The character's head faced that opening and its arm and right hand was extended toward the opening. Slightly to the left of the centre of the page, was a larger, darker figure, facing forward. Both figures included arms and legs, facial features and expressions that did not indicate emotion. When interviewed, "N" indicated that the character in the box was the winner because he had seen the other character take something from the teacher's desk and he had told the teacher about it. "If you are a winner you are not afraid to tell the truth."

Box shapes surrounding figures, objects, or entire completed pictures were characteristic of this subject's work. In reference to the "show a winner" picture, "N" reported that the box was painted to indicate the winner. In other works, boxes were used to enclose pictures that occupied only small portions of the surface available on the page. Box shapes surrounded play dough products "to protect them."

Subject "N" showed preference for black and shades of brown in elaborations in his original art products. Fairly accurate skin tones were produced by mixing colours. Products focussing upon comic strip characters featured vivid colours imitating those found in comic strips. Characters never touched and always were separated by large, blank spaces of paper. No horizon or other

reference cue was included in any product. No indication of scale or perspective was shown. Objects and figures often lacked hair, fingers, ears, shoes or feet. Background colouring or detail was absent in all works.

Examination of subject "N"'s school reports indicated a mean Art score of "C". Teacher comments suggested that assignments often were incomplete, although the subject's art works "seemed imaginative". This subject had been integrated into "regular class" settings for Art classes since placement in LD or Mixed Exceptionality classes.

Detailed Observation #5: "u"

The subject was a "regular" class female, age 167 months.

This subject's art work was typical of that of the older female LD and "regular" class subjects in the sample in the inclusion of bold colours, especially primary colours, and that typically, female subjects in both groups followed an order of progression from right to left or left to right, on the page. Her most frequent choice of medium was tempera water paints because she believed that the bright colours that she could produce with paints were not available to her through use of other media.

This subject's products showed indication of use of perspective. Her "show a frightening scene" picture was composed of a wash of reddish-orange paint on which silhouettes of trees

and gravestone shapes, cut from black construction paper, were glued. Trees in the foreground were larger than trees in the background, although there was no consistency in use of perspective in the gravestone shapes.

A sense of unity and rhythm often was indicated through repetition of line or shape. The "show an adventure" product showed a blue wash on which was painted small, boat-shaped objects with figure silhouettes seated inside, varying in size but identical in form. Surrounding but not touching these figures, were wave-like horizontal lines painted in black. Figures or objects rarely overlapped or touched. The "show you with your family" picture included a line of four figures, three of which faced forward and one whose body faced forward and whose head turned to the right. They were arranged in order from tallest to shortest, from right to left. Meticulous attention was paid to the detail of eyes, hair, fingernails, jewelry and shoes although the background was left blank.

During the interview, the subject stated that the figure with its head facing away from the others was that of her father. Later, she mentioned that he was not living with the family. It may be that the figure's representation of being turned away was an indication of use of symbolism to express withdrawal from the family unit.

This subject's art products reflected a sense of balance

through arrangement of objects. This often was achieved through application of colours of equal intensity on the page or through arrangement of solid shapes so that larger shapes on one portion of the page were complemented by a group or a couple of smaller shapes on another portion.

The subject often stepped back to observe her work and made reference to "balance" during interviews. Eagerness to show art products completed in regularly-scheduled art classes at school and pride reflected in the way that she discussed her art work suggested that she believed that art was a talent area for her.

Examination of subject "u"'s school reports indicated a mean Art score of "A". Teacher comments suggested that this subject produced "highly creative and imaginative artwork".

Detailed Observation #6: "U"

This female subject was placed in a "regular" classroom with Special Learning Centre assistance. She was 167 months of age.

Subject "U" chose pencil and felt-tipped markers as preferred media because she believed that she could not produce good quality work with paints. This subject's art products showed awareness of and attention to detail in figures or objects drawn. The "show a still life" piece, sketched in pencil and coloured with felt tipped marker, shows attention to the layering and lack of uniformity in the shapes of kernels on corn. Colouring technique followed the contours of the objects. For example, the squash was

coloured from the stem, outward. Colour was applied to leaves on the corn in jagged lines, expressing texture. Shadow, following the contours of the objects then tapering and fading, was added with pencil. Pictures involving figures included addition of folds and wrinkles in clothing, texture was suggested through lines in hair and in buttons or suspenders drawn onto shirts.

This subject often seemed to experience difficulty with beginning her work. Interviews conducted with her suggested that the difficulty stemmed from indecision concerning the order in which the objects or ideas she wished to include should be drawn. She knew how they ought to be arranged and why that arrangement was necessary to convey the idea or message.

Most of her drawing proceeded from the left side of the page to the right side although, during interviews, she reported that she started with the objects that she felt she could draw the best. Detail and elaboration was added once the contours of objects were established.

The "show a still life" piece originally had been drawn on the reverse side of the page on which the finished piece was presented. The first drawing showed less command of perspective and scale. Included were the table on which the objects were set and drawings of each of the objects. The corn was tipped upward rather than shown lying on the table top.

The subject had asked the investigator whether all of the

cobs of corn needed to be in the picture. The direction was "show what you see in this still life."

The second drawing was started upon return to her centre and showed remarkable command of scale and perspective, but did not include the table or the stem on the squash. This was the only request for elaboration upon any session topic, from subjects in the LD group.

Balance was achieved through use of space and complementary intensities of colour. Her "show a design" piece included a sweep of blue emerging from the upper left corner of the page, a sweep of yellow from the lower right corner of the page and, in the open space between, spirals of black on white. The blue section contained vertices of navy patterns, repeated. The yellow, rows of circles of uniform shape, in grey pencil. Unity was achieved through repetition of form, use of space and colour.

Examination of subject "U"'s school reports indicated a mean Art score of "A". Teacher comments suggested that this subject "seemed to enjoy Art classes" and "always put forth good effort". This subject had been integrated into "regular class" settings for Art classes with placement in Mixed Exceptionality or Opportunity classes.

General Observations Concerning the LD Group:

Subjects in the LD group tended to be very task-oriented. Immediate presentation of the topic was requested from subjects in

all age ranges. Once the topic was presented, subjects selected materials quickly, moved to work areas and proceeded. Conversation among the older males in the group included discussion of events of the day. On no occasion was task completion interrupted by conversation among subjects. No comments criticizing art work of group members was heard by the investigator. However, one older male and one older female in the LD group frequently voiced positive comments about the works of younger members.

Art products of younger subjects (to 10 years) showed use of more surface area on the page. Greater detail in background or elaboration on major objects, was evident. Information derived from interviews indicated that many elaborative inclusions were drawn to fill space, to show ownership, association, or to indicate a specific feature (wealth, for example) of a character. Most young subjects began by drawing a horizontal base line. Figures were drawn beginning with the feet, progressing upward, or beginning with the head, progressing downward. Painted pictures were not drawn first with pencil. Pictures produced using markers, first were drawn with pencil. Words were printed on the page to make manifest emotions expressed or places indicated in art works.

Subjects in the age range of 11 to 15 years seemed to follow a progression from left to right or from right to left, as they completed initial sketches. Elaborative detail was added after

contours of shapes were established.

Colour was applied to define boundaries of articles of clothing. Occasionally, colour was used to define boundaries among objects that overlapped. Colours applied with this purpose in mind often differed from natural colours of the object, in order that there be sharp contrast where boundaries meet. For example, many of the pictures showing "still life" included intense hues of violet or orange along the contours of the corn, defining the shapes of each cob clearly.

Older subjects in the LD group tended to print or write a title at the top of the page before beginning to draw and many incorporated that title into the finished work by changing it into a sign.

Most subjects in the LD group completed relatively small drawings of the "still life" arrangement, using, on average, one eighth of the surface area of the page.

The LD subjects generally appeared eager to be interviewed whether the conversation was taped, taped and supplemented by written notes, or was entirely written. During interviews, most tended to speak negatively of their art products. Negative (hurtful) features often were attributed to characters or objects that appeared in the works. Typical of the nature of conversation is that reported below in excerpts of an interview with "J", with regard to her "Show A Winner" piece.

Q: Where does this story happen?

R: This is the racetrack.

Q: What is this person doing?

R: He is winning the race. Everybody's clapping.

Q: How does this person (indicating other runner in the race) feel?

R: He hates him because he won the race.

Q: What will happen next?

R: He (indicating other runner in the race) will tear down the sign and smash it.

Negative self-evaluative comments criticized the quality of technique. Subjects often expressed the need to fix some words, add more colour, elaborate upon an object or feature in the work or to discard the entire work and begin again.

Attendance by LD subjects was consistently high. Absence at the beginning sessions was necessitated in two cases by lack of transportation.

General Observations Concerning the "Regular-Class" Group:

Younger subjects (9-11 years) generally proceeded directly with drawing upon presentation of the session topic, without expressing a need for elaboration from the investigator. Subjects who were 12 or 13 years of age typically requested elaboration. The consistent investigator response was: "Show what you think (session topic) is".

Subject behaviours exhibited after the investigator's reply included, clicking the tongue, shaking the head and stomping or dragging feet to the work area, slamming art materials onto the desks and mumbling. The investigator ignored these behaviours and, once the subject was seated at the work area, little time usually elapsed before drawing began.

Attendance among females remained consistently good, but attendance among male participants ranging in age from 11-15 years, waned due to personal choice, conflicting athletic events, detentions or suspensions from school. In an attempt to secure greater likelihood of consistent attendance by the remaining subjects, those who attended the fourth sessions of both groups were advised that pizza would be given to all who showed regular attendance during the next four sessions. Most participants attended the fourth session. There was greater attendance and punctuality during remaining meetings.

Subjects in the "regular" group were influenced in terms of choice of medium, by techniques currently taught in art lessons at school. These included techniques taught by the rotary teacher in whose classroom the investigative sessions took place as well as techniques taught to primary and junior subjects by homeroom teachers. Further, choice of technique was influenced by suggestions or directions from other subjects. Interestingly, comments were made from older to younger or from younger to older

subjects, but seldom to subjects of about the same age. One male participant directed critical comments toward other subjects of all ages during the infrequent occasions of his attendance.

Regular-group subjects generally expressed eagerness to discuss their art products in interviews with the investigator. Comments generally began with identification of each object or figure in the composition and followed with elaboration during which the subject would describe further details that would be added to the work. Subjects generally expressed satisfaction with the quality of technique applied in terms of success in conveying the message or mood intended. Typical of the nature of an interview with a regular-group participant, is this excerpt from an exchange between the investigator and "n", a male subject, 145 months of age:

Q: Tell me about your work.

R: Well, this is a pool and these are three guys swimming in it. ...

Q: That's very interesting. Tell me more.

R: Well, I drew the water first, so I could tell where to draw the diving board. Then I drew this guy (pointing), then another person in the water. I drew a line for the buoys so you can tell where the deep end is and drew this guy to show where the shallow end is.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

Statement of the Findings

In essence, this study has revealed that, in a comparison of LD subjects and non-LD subjects:

1. The intellect of both is composed of about the same proportions of the elemental factors of artistic ability;
2. The performance of LD subjects is about equal to that of non-LD subjects in the elements and the totality of artistic expressiveness;
3. LD subjects benefitted more than non-LD subjects from unstructured practice sessions, in their capacities to express ideas through composition of their art works;
4. Both groups are artistically more effective in expressing ideas through the choice of appropriate media than they are in using other artistic factors;
5. For both groups, within the age range of the subjects in the study, the level of elements of artistic expressiveness is relatively independent of age, although formal testing seems to be useful in measuring levels only beyond about 156-157 months of age;
6. Practicing artists display a very significant component of judgment in common with other artists on all factors or dimensions of artistic expressiveness.

Discussion of the Findings

All study subjects might have felt encouraged to try to be artistically expressive because they knew that they had been selected as participants in an activity related to art. This might have resulted in a "Hawthorne" effect. The resulting effects would have been motivation toward maximal performance from both groups, a desirable condition for a study such as this, intended to detect ultimate potential rather than typical performance.

The fact that the experimenter was known to one group and not the other might have introduced a bias. Members of one group might have been more strongly motivated to display their highest potentials. This was a real possibility.

Only one standardized test was used to measure artistic potential, in this study. More might have been used if tests were to have been the criterion of measurement of artistic ability. This would have yielded findings based in psychological theory as many other experimenters had chosen to do. This study was intended to use the limited available time with the subjects to permit them to demonstrate artistic expressiveness in their own terms and to evaluate it in terms of artist's opinions rather than psychological constructs. The hope was that these results might relate more to the understanding of Art instructors and other teachers who are educational generalists.

Many teachers who work with LD pupils or students and sensitively seek to identify their capabilities, begin to believe that artistic expressiveness is unusually high in these students. This impression understandably could result from the presence of this ability at average levels in students with rather clear deficits in other forms of expressive abilities. On the other hand, there may be those who are less energetic in seeking abilities in LD students and who overlook outstanding artistic expressiveness by knowing the students mainly in terms of their deficits.

This study found that the capacity to produce an artistic product was distributed among members of the LD group in the same way that it was distributed among members of the non-LD group and found no significant between-group differences in level of artistic ability. Learning-disabled subjects tended to show improvement in their ability to arrange line, texture, shape or colour to create a desired mood or communicate a message. This was a product of exposure to the opportunity to create art works independent of direction, over time.

Learning-disabled students showed latent artistic ability or potential no greater than that of non-LD students. Both LD and non-LD students are exposed to art instruction during the course of elementary-school Art programmes. It may be that LD students do not benefit from direct instruction to the extent that non-LD

students do and that the gain experienced by non-LD students as a result of direct instruction and practice results in what appears to be equal quality of output. In other words, LD students may actually excel in artistic potential but this potential may not be tapped due to the style of teaching offered in school classrooms. What is missed by LD students may be gained by non-LD students and the result may be an equalizing effect in terms of expression of ability as seen in art products produced by these two groups of students.

Interviews conducted during sessions revealed common thinking patterns among LD subjects. Learning-disabled participants tended to report that they visualized the completed composition before they started to show it with the artistic materials available to them. LD students were able to describe the arrangement, textures, shapes and colours of objects in proposed art products. Typically, they experienced difficulty in deciding the order of progression for actually putting the piece of art into reality. Detail often was not included in original plans.

One significant difference in thinking patterns between LD and "regular-class" subjects was found. Non-LD subjects tended to plan only the central feature of art work. They could not supply verbal descriptions of secondary details in proposed work.

Schooling typically views development of artistic capability as a frill, elective or option rather than as a major component of

communicative development. A major mission of schooling ought to be the discovery and development of each student's salient capabilities. For some students, focus upon remedial development in areas that are perceived to be important, may be at the expense of time and opportunity for development in other areas that are salient potentials and, perhaps, ultimately of greater utility to those particular students.

The findings of this study would guide teachers and curriculum designers to make no distinctions among students in school activities intended to improve graphic expressiveness. Time and effort spent in discovery and development in these capacities ought to be viewed as productive realization of potentials for all individuals and of prime importance for some. For LD students, it may be the major vocational or personal enablement.

Further, when given more freedom to determine how to express their ideas, both groups achieved very effective expression through choice of medium and LD subjects advanced significantly in compositional quality. Neither of these advances is likely to have occurred had they been encouraged or permitted to use only one available medium at each session. While this may challenge some curriculum approaches, the findings of this study make clear the value of available variety in media as well as some freedom to define ideas in terms of personal meaning in the development of

expressive capability. The current practice in "Whole Language" curriculum approaches includes the establishment of paint centres, a less-preferred medium for subjects in this study. Indications would suggest a much different, more diverse inclusion.

It also was noted from observation, that subjects tended to accept ideas for media and expression from art that was on display in the room. In so doing, subjects fail to use media and method devised from their own thoughts, denying themselves the benefits that grow from experimental manipulation in personal expression. The practice of displaying art works as examples, may be counterproductive in the development of personal expression. This is an area of study that would benefit from systematic exploration.

Many art lessons are highly structured in that the teacher provides a sample finished product, displayed at the front of the classroom or in a book. Each step in production is predetermined and prescribed. Observations in this study indicate that subjects had little patience with instructions and demonstration of technique, rather they wanted to begin manipulating the materials. Observations indicated that unstructured exploration of media potential yield better art work; assessments confirmed it.

The findings of this study suggest that opportunity to practice artistic expression as an unstructured activity may be of particular benefit to LD students. It remains for other

investigation to confirm whether similar strategies and activities would be of particular benefit in other areas of development and with different groups.

The finding that elements of artistic expressiveness are independent of age has interesting implications as challenge to a curriculum based on age (grade) advance along with other subjects. It may be that specific investigation in this area might develop an entirely different basis for progressive development in an art curriculum.

The confirmation that artists dependably reflect a community of thought in their judgments of art products is interesting and valuable. It is a challenge to those who have thought that valuation of art works is based on undefinable, nebulous emotionality. The valuation of art works has terms that may not be widely or fully comprehended beyond the community that uses them, but the terms have demonstrated meaning in this study and the concepts form a substantial basis of consistent judgments.

Testing, as a way of determining the child's potential for further advance and present achievement level, has spread from the higher grades downward through educational systems into the lowest grades. Test results have been used for program placement, sometimes as the most heavily weighted factor. The findings of this study show that concern justly may be raised in this area.

This study has indicated that children can demonstrate

substantial capability in an important form of communication and not be able to confirm that fact through an extremely simple test format if they are below an age that permits dealing with formal processes. That test information ought to be confirmed and supplemented by other forms of knowledge about the child, is a truism in education, but these findings dramatically demonstrate why practice must reflect this caveat.

Some Potentials for Application by Teachers

Some specific, practical applications may be derived from the literature available in the related research as well as from the results of this study. Many current studies have found that dramatic gain in retention of data facts and generalization of ideas or concepts resulted from association of facts with pictorial mnemonic devices. Recent literature has suggested that students may benefit from creating pictorial representations of ideas because the process of forming the representation and, examination of it afterward, assists assimilation of ideas or concepts. Educators might heed these reports and afford opportunities for students to produce graphic images to support written or oral information covered in classes. These might be produced in forms of murals, comic strips, mobiles, sequential pictorial logues, overheads, picture books, pottery products, batik, prints, photographs or video tapes, edited for impact of message or idea.

This study reported that LD subjects tended to benefit from the opportunity to select and arrange materials in a setting independent of directive influence by the instructor. These students as well as non-LD students might benefit from opportunities afforded by such things as backdrop design and construction for school musicals or plays, selection and arrangement of objects in display cases within the school and, if possible, within local community businesses. Coverage of such events in local newspapers or interaction with individuals within the community while projects are in progress, would assist these students in recognizing the quality of their work as it is assessed by independent individuals. Community members would identify these students with the art displays.

BIBLIOGRAPHY

- Andrews, J. A. C., & Janzen, H. (1988). Objectifying the kinetic school drawing (KSD): A comparison of LD vs. non-LD Grade 5 students. Canadian Journal of School Psychology, 3, 27-51.
- Argulewicz, E. N., Mealor, D. J., & Richmond, B. O. (1979). Creative abilities of learning disabled children. Journal of Learning Disabilities, 12, 30-33.
- Bailin, S. (1984). Can there be creativity without creation? Interchange, 15, 13-22.
- Eisner, E. W. (1982). The contribution of painting to children's cognitive development. Journal of Education, 164, 227-237.
- Guilford, J. P. (1965). Fundamental statistics in psychology and education (4th ed.). New York: McGraw-Hill.
- Hakstian, A. R., & Cattell, R. B. (1976). The Comprehensive Ability Battery. Champaign, Illinois, Institute for Personality and Ability Testing.
- Herr, E. L., & Cramer, S. H. (1979). Career guidance through the life span. Boston: Little, Brown and Company.
- Howe, M. L., Brainerd, C. J., & Kingma, J. (1985). Storage-retrieval processes of normal and learning-disabled children: a stages-of-learning analysis of picture-word effects. Child Development, 56, 1120-1133.
- Hunt, J. McV. (1961). Intelligence and Experience. New York: The Ronald Press Company.

- Jaben, T. R. (1980, April). The impact of creativity training on learning disabled students' creative thinking abilities and problem-solving skills. Paper presented at the Annual International Convention of the Council for Exceptional Children, Philadelphia, PA.
- Jensen, A. R. (1977). The nature of intelligence and its relation to learning. The Theodore A. Fink Memorial Lecture delivered at the University of Melbourne, Melbourne, Australia. (Also published in Melbourne Studies in Education, 1978).
- Klein, P. S. (1980). The overlooked or misused talents of learning disabled children. The Creative Child and Adult Quarterly, 5, 30-34.
- Koorland, M. A., & Wolking, W. D. (1982). Effect of reinforcement on modality of stimulus control in learning disabled students. Learning Disability Quarterly, 5, 264-273.
- Kukuk, C. R., & Baty, C. F. (1979). The misuse of multiple regression with composite scales obtained from factor scores. Educational and Psychological Measurement, 227-280.
- Lansing, K. M. (1986). Art and the child: are they compatible? Studies In Art Education: A Journal of Issues and Research, 28, 11-16.

- Mastropieri, M. A., Scruggs, T. E., & Levin, J. R. (1986).
Direct vs mnemonic instruction: relative benefits for
exceptional learners. The Journal of Special Education, 20,
299-308.
- May, W. T. (1987). Student responses to media: Implications for
elementary art curriculum. Studies in Art Education: A
Journal of Issues and Research, 28, 105-117.
- Ministry of Education, Ontario. (1985). Visual arts: Curriculum
ideas for teachers, primary and junior divisions. Toronto:
Queen's Printer.
- Mitchell, J. V., Jr. (Ed.) (1983). Tests In Print III An index to
tests, test reviews, and the literature on specific tests.
Lincoln: The University of Nebraska Press.
- O'Donnell, L. E. (1980). Intra-individual discrepancy in
diagnosing specific learning disabilities. Learning
Disability Quarterly, 3, 10-18.
- O'Hare, D., & Westwood, H. (1984). Features of style
classification: A multivariate experimental analysis of
children's responses to drawings. Developmental Psychology,
20, 150-158.
- Shephard, K. A., Smith, M. L., & Vojir, C. P. (1983).
Characteristics of pupils identified as learning disabled.
American Educational Research Journal, 20, 309-331.

- Somerville, S. C., & Hartley, J. L. (1986). Art. In R. F. Dillon & R. J. Sternberg (Eds.), Cognition and instruction (pp. 241-298). San Diego: Academic Press, Inc.
- Sternberg, R. J. (1977). Intelligence, information processing, and analogical reasoning: The componential analysis of human abilities. Hillsdale: Lawrence Erlbaum Associates.
- Sternberg, R. J. (1984). Criteria for intellectual skills training. Educational Researcher, 22, 6-13.
- Sternberg, R. J. (1984, July). What should intelligence tests test? Implications of a triarchic theory of intelligence for intelligence testing. Paper presented at the Annual Meeting of the American Psychological Association, Vancouver, B. C.
- Strickland, B. R. (1989). Internal-external control expectancies: From contingency to creativity. American Psychologist, 44, 1-12.
- Swanson, H. L. (1987). Verbal-coding deficits in the recall of pictorial information by learning disabled readers: The influence of a lexical system. American Educational Research Journal, 24, 143-170.
- Tarver, S. G., Buss, B. R., & Maggiore, R. P. (1979). The relationship between creativity and selective attention in LD boys. Learning Disability Quarterly, 2, 53-59.

- Thorpe, H. W., & Borden, K. S. (1985). The effect of multisensory instruction upon the on-task behaviours and word reading accuracy of learning disabled children. Journal of Learning Disabilities, 18, 279-286.
- Veit, D. T., Scruggs, T. E., & Mastropieri, M. A. (1986). Extended mnemonic instruction with learning disabled students. Journal of Educational Psychology, 78, 300-308.
- Vernon, P. E. (1979). Intelligence, heredity and environment. San Francisco: W. H. Freeman and Company.
- Wechsler, D. (1974). Manual for the Wechsler Intelligence Scale For Children-Revised. New York: The Psychological Corporation.
- Williams, R. H., Stockmyer, J. W., & Sharon, A. (1984). The left and right of creativity: a cognitive (hemispheric cooperation) based program for teaching creative thinking. The Creative Child and Adult Quarterly, 9, 69-81.
- Young, J. G. (1985). What is creativity? The Journal of Creative Behavior, 19, 77-87.
- Yuille, J. C. (Ed.) (1983). Imagery, memory and cognition, essays in honor of Allan Paivio. Hillsdale: Lawrence Erlbaum Associates.
- Zendel, I. H., & Pihl, R. O. (1983). Visual and auditory matching in learning disabled and normal children. Journal of Learning Disabilities, 16, 158-160.

APPENDIX A

The following provides information about test instruments and developmental materials cited in the text, only to the extent that the additional information aids in understanding the applications cited. For more technical or detailed information, the reader should consult primary sources.

The artists who acted as assessors of the artistic dimensions were chosen on the basis of the following facts being true for each of them separately:

1. Known and identified as an artist by members of the local community in response to a request to list outstanding artists in the area;
2. Has produced saleable works of art;
3. Has acted as teacher of artistic skills and processes and/or adjudicator of artistic products in public events or displays;
4. Showed particular interest in participating in research relating to artistic talents.

The presence of several locally-resident persons potentially well qualified to act as assessors was a pleasant discovery. The three who were contacted first, agreed to participate. Just as the data became available, one of the artists was forced to withdraw from participation due to an auto accident. Because the remaining two were felt to be very well able to perform effective

assessments, it was decided to carry the study forward on the basis of their judgments. The results seem to confirm the wisdom of this decision.

The Comprehensive Ability Battery (CAB), (Hakstian & Cattell, 1975) was developed from experimental tests that were intended to cover the defined spectrum of distinct cognitive abilities. Fourteen of the subtests are machine-scorable and one of these, the Esthetic Judgment subtest, provides a measure of a person's judgment for artistically pleasing form and arrangement. The subtest was based on responses from working practitioners in fields such as fine art, architecture, interior and industrial design, furniture and jewelry design. Essentially, the student's responses are compared with judgments made by artistic practitioners, expressed as preference for one of the pictorial designs presented in each of 26 test items.

Time required for this subtest is six minutes. The uncomplicated directions require the student to express preference for one design from two or three offered in each test item. Responses are made by choosing the letter that represents the desired response.

The Purdue Creative Training Program is a set of 28 audio tapes and activities used to develop divergent thinking abilities in the fields of figural and verbal fluency, elaboration, originality and flexibility (Jaben, 1980).

The Raven Progressive Matrices are non-verbal, non-cultural expressions of patterned change that progress from one example to another within a question item. The person who takes the test is asked to perceive the pattern of change and predict what the change would yield in one position or another on a matrix diagram that has two or more dimensions on each of the vertical and horizontal axes. An extended matrix pattern is available by using three dimensions in Cartesian space. A further complexity is added in a more advanced version that uses colour matrices (Mitchell, 1983).

The Torrance Tests of Creative Thinking (Verbal and Figural) have been available for more than 25 years (Personal Press, 1962) with periodic revisions. They are recommended for groups of 15-35 students and require about 60 minutes (verbal) or 45 minutes (figural) including organizational and instruction time to administer. The test is divided into several tasks, each of which requires the student to start from an object (e.g. a toy elephant) or an idea (e.g. a divided box) then to elaborate by generating improvements, possible effects or uses, etc. Creative fluency is graded on both absolute number of responses and categories (new types) of responses. Administrators are to avoid establishment of a "testing" atmosphere in favour of a "game-like" "problem-solving" feeling during the whole process.

The Kinetic Family Drawing Test and the Kinetic School Drawing Test are parts of the Kinetic Drawing System (Knoff & Prout, 1985). The tests are projective instruments that require 20-40 minutes of individual administration time (total) during which the child draws a picture of everyone in the family, then self, teacher and "two more students from school". Following each drawing, the examiner asks the child questions designed to identify the people in the drawing and their relationship to each other. Quantitative as well as qualitative evaluations of responses and features of the drawings enable the administrator to better understand the child's view of himself or herself in relation to others as well as emotional experiences that the child may be otherwise unwilling to or incapable of expressing.

APPENDIX B

List of Forms

<u>Item</u>	<u>Description</u>	<u>Page</u>
1.	Letter requesting permission - Superintendent	91
2.	Letter requesting permission - Principals	93
3.	Letter requesting consent - Parents/guardians	94
4.	Consent Form	95
5.	Letter to artist assessors	96
6.	Assessor's report form	98

Letter requesting permission - Superintendent

P.O. Box ,
 , Ontario.
 NOP 2CO
 1988

Mr. , Superintendent of Program,
 The Board of Education For The County of ,
 P.O. Box ,
 , Ontario.

Dear Mr. :

This is a request for permission to conduct educational research at Public School and Public School during the period of September to December, 1988, as part of the thesis requirement for a Master of Education degree, earned through Brock University. The research proposal has been approved by my faculty advisor, Prof. Michael Kompf and by the University. A copy of relevant portions of my research proposal are enclosed for your information.

By the time the research is conducted, I will have fulfilled all course requirements for the degree and will require only completion of the thesis. The research that I propose to do will provide important, practical information of assistance to teachers who work with the development of visual creativity and particularly in relation to Learning-Disabled students.

Students who participate in the study will experience an opportunity for systematic development of creative visual expression. A copy of the findings, of course, will be filed with your office and I propose to make myself available to explain the results and techniques as part of in-service professional development activities.

The schedule of research activities will require one-hour meetings with the students at each of two schools over the period mentioned above. Students will be asked to produce artistic expressions of work, using a medium that they choose, on topics that I will specify. Students will be asked to describe the processes involved in completing the assignment. The interviews will be tape recorded and the students video recorded, if possible, while at work. My supplemental notes will provide further information. Student works will be identified by code and student identities will be protected. I will support all costs of materials required.

Letter requesting permission - Superintendent

Student work will be submitted for blind assessment by three local artists. Assessment results will be submitted to analysis. Standardized testing will involve use of the Aesthetic Judgement Subtest (six minutes) of the Comprehensive Abilities Battery, published by the Institute For Personality And Ability Testing, and developed by a Canadian (Dr. Ralph Hakstian, U.B.C.) in co-operation with a recognized authority in the United States, (Dr. Raymond Cattell).

If approved by you, I will contact the principals of
Public school and Public
School with a request for their approval.

Thank you for considering this request.

Yours truly,

L. Maureen Cookson

L. Maureen Cookson
encl. 1
c.c.

Letter requesting permission - Principals

, Ontario.
NOP 200
1988

Mr. , Principal,
School,
P. O. Box
Street,
Ontario.

Dear Mr. Beatty:

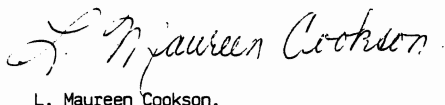
This is a request for permission to conduct educational research at Public School during the period of September to December, 1988, as part of the thesis requirement for a Master of Education degree, earned through Brock University. The research proposal has been approved by my faculty advisor and by the University. I have secured approval from the Board Executive Committee, pending permission from you.

The schedule of research activities will require one-hour and fifteen minute (4:00-5:15) meetings once each week in a quiet area of the school, over the period mentioned above. Students will be asked to produce artistic expressions of work, using a medium of their choice, on topics that I will specify. Artistic works will be submitted for blind analysis. Students will be asked to describe the processes involved in completing each work of art. The interviews will be tape recorded. My supplemental notes will provide further information and artistic talent will be measured using a standardized test as part of the study.

Fully-informed consent will be secured from the parents or guardians of each student before any research activity commences. Correspondence with parents will advise them that their son or daughter may require transportation home from school on meeting occasions.

Thank you for considering this request.

Yours truly,



L. Maureen Cookson.

Letter requesting consent - Parents/guardians

, Ontario.

1988

Dear Parent or Guardian:

This is a request for consent for your child, _____ to participate in an investigative study of the development of artistic talent. The study is part of a Master of Education thesis through Brock University. The study has been approved by the thesis committee of the University and by the Board of Education.

Your child will be one of a group selected to meet at the school on Thursdays from 4:00 to 5:15. Sessions will begin in September and end by the first week in December. At the beginning of each session, a topic will be named and each student will produce a piece of art using materials supplied by the study. All art products will be labelled with a code so that only the investigator will know the names of the students who completed the art work. Art work will be kept for critique. Artistic talent will be measured using a standardized test as part of the study.

Please complete the enclosed consent form and return it to the school before Friday, September 23, 1988. I will confirm receipt of the form by telephone and advise you of the beginning date of art sessions.

Thank you.

Yours truly,

L. Maureen Cookson
encl. 1

Consent Form

Consent Form

_____ I give consent for my child, _____, to
participate in the investigative study of the development of artistic
talent. I understand that my child will leave the school at 5:15 on
meeting occasions.

_____ I do not give consent for my child to participate in the study.

Signature of Parent or Guardian

Date

Letter to artist assessors

, Ontario.

NOP 200

1988

M . _____,

Dear M . _____:

Thank you for agreeing to act as assessor of student art work on my behalf, as I complete the thesis portion of a Masters degree in Education.

As I mentioned to you on the telephone, two evening meetings at

School in _____, have been arranged. The gymnasium has been reserved from 7:00 until 10:00 on:

Tuesday, November 8, 1988; and

Tuesday, December 6, 1988.

You and two other local artists will meet with me on those evenings.

I will give to you five sheets of paper, one for each session during which students met and produced art work and ask you to assess student work on the dimensions listed. You will find a sample sheet enclosed. Please note that there is provision for the addition of dimensions that you feel ought to be added and assessed.

I recommend that assessment be in terms of letter grades, with "A" rating highest and "E" lowest.

Please do not use + or - (ie. A+ or B-). Numerical values may be used. If this is your preference, please use 100 as the highest rating and 40 as the lowest.

Along the top of the page you will see letters beginning with "g". These are the codes that have been assigned to identify student work. They ought to have no bearing on the assessment.

You will be asked to make your evaluations completely independent of the other artists and not in any way confer with them. This is important to the research.

Letter to artist assessors

Please do not hesitate to contact me if you have questions or concerns about your role as assessor.

I can be reached at school (8:00 - 4:00) at ; or at home in the evenings or on the weekends at .

I look forward to working with you and hope that you find this work as exciting as I have.

Yours truly,

L. Maureen Cookson

Assessor:

Topic: Show _____

ART ASSESSMENT

Dimension
To Be
Assessed

Student Code

Assessor's report form

Choice of Medium																
Choice of Colour																
Shape																
Balance																
Perspective																
Rhythm																
Unity of Theme Or Idea																
Contrast																
Composition																
Scale																

*****PLEASE USE THE FULL SPECTRUM OF A TO E WHEN GRADING STUDENT WORK*****

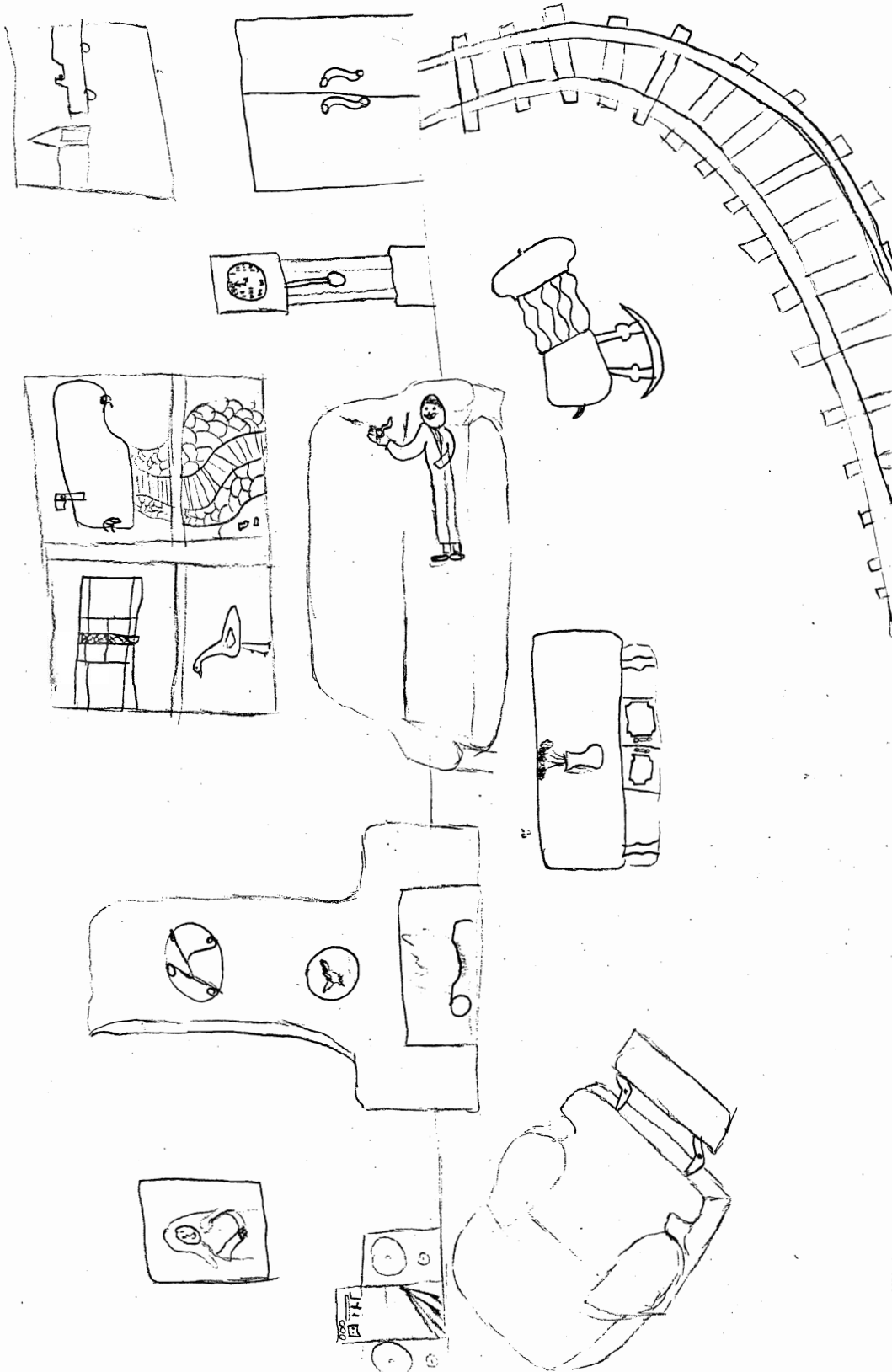
Appendix C

List of Art Samples

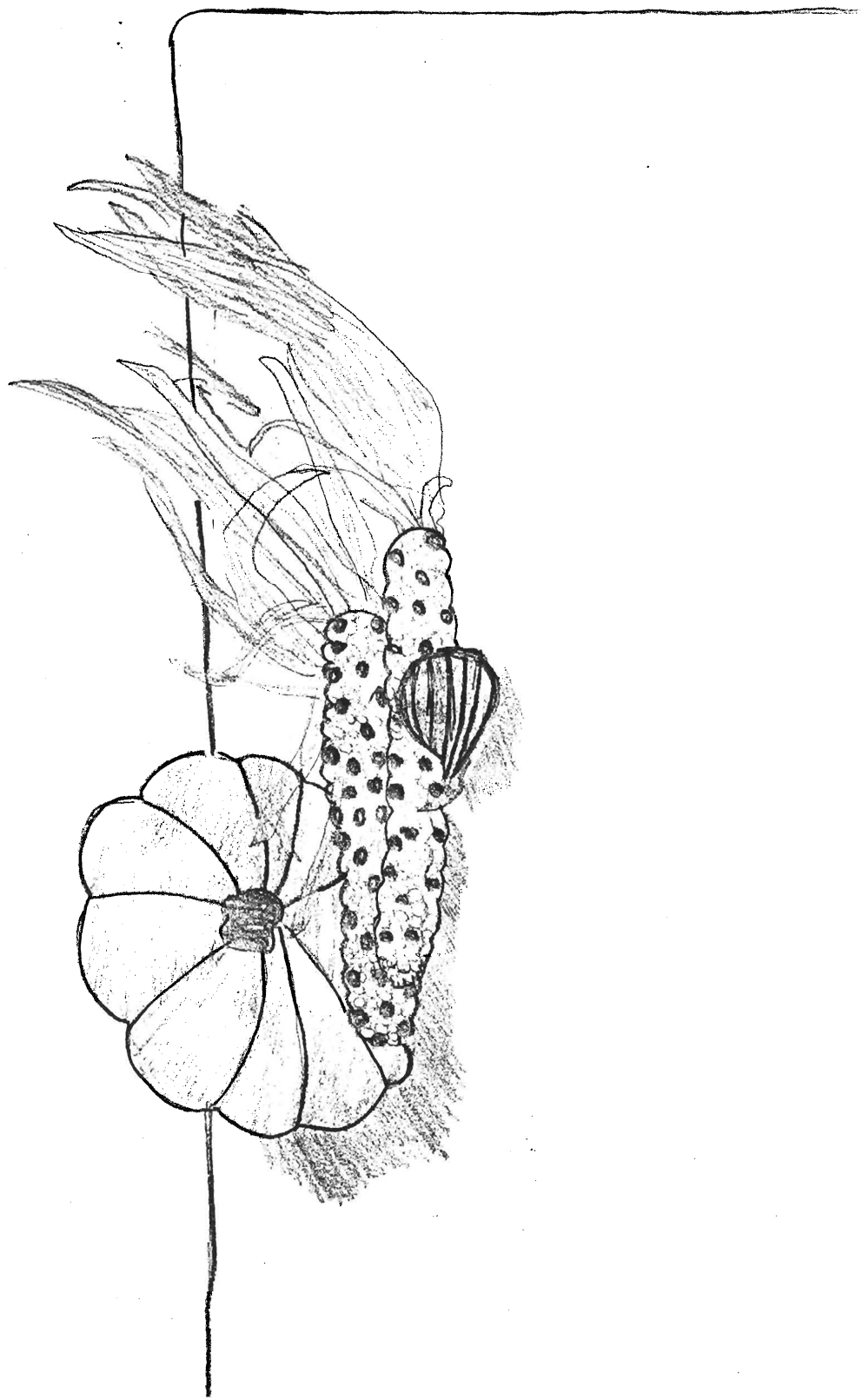
<u>Item</u>	<u>Subject</u>	<u>Description</u>	<u>Page</u>
1.	"t"	"Show wealthy people"	92
2.	"S"	"Still life"	93
3.	"r"	"Show wealthy people"	94
4.	"K"	"Show a winner"	95
5.	"T"	"Show your favourite place to be"	96
6.	"V"	"Show you with your family"	97
7.	"R"	"Show an adventure" (man in barrel going over falls, barrel caught on tree)	98

"t" "Show wealthy people"

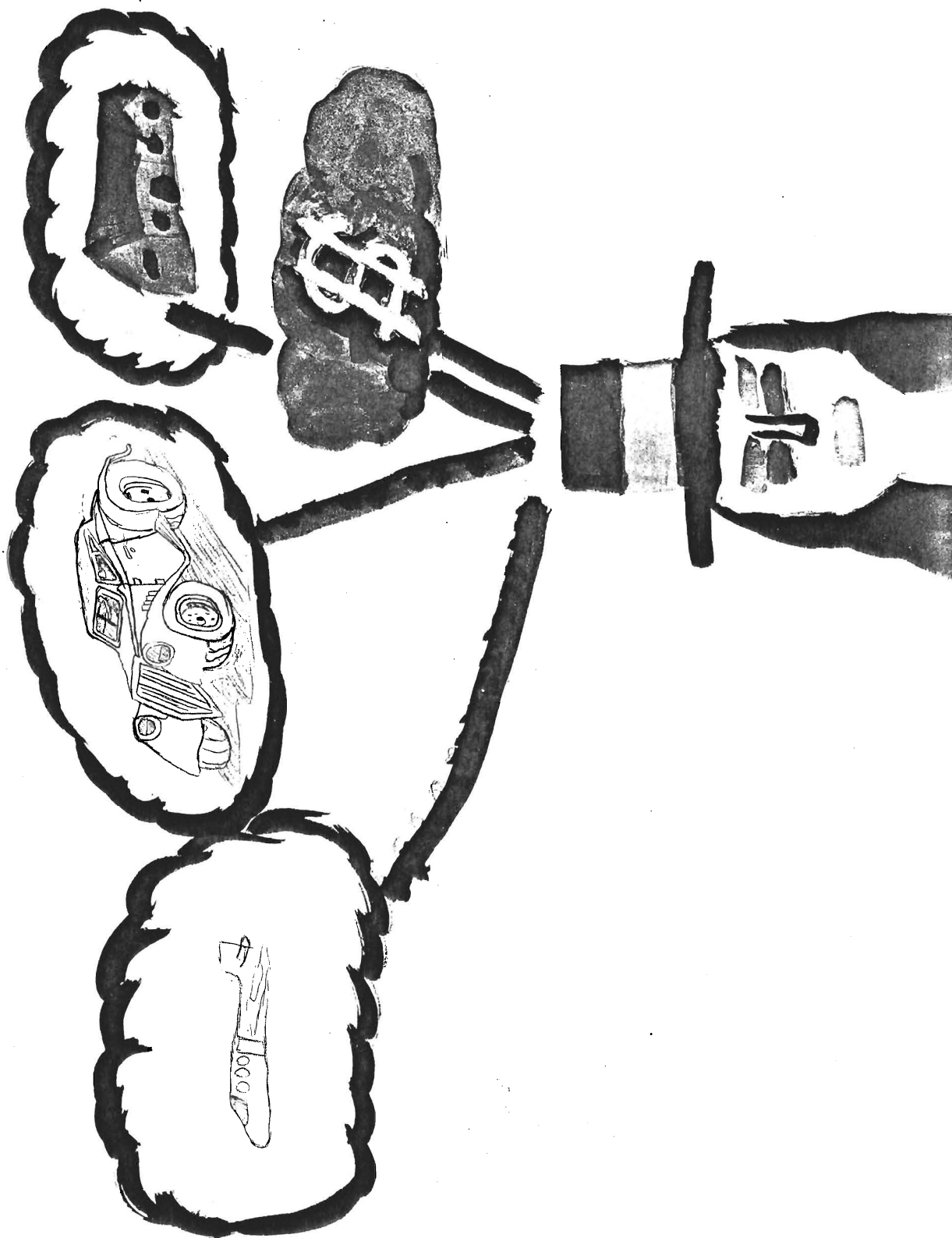
100.



"S" "Still life"

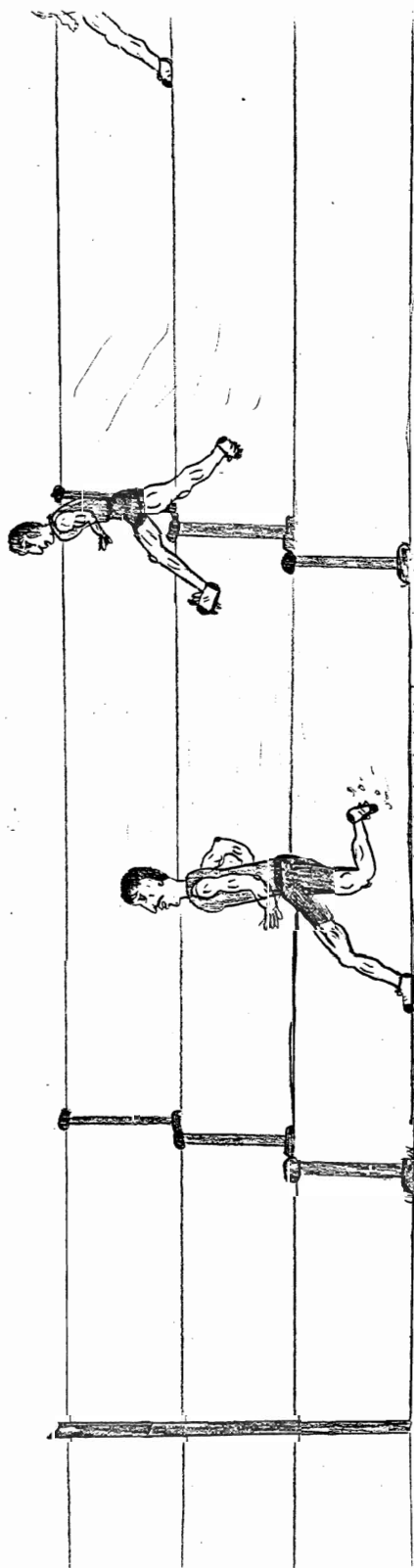


"r" "Show wealthy people"



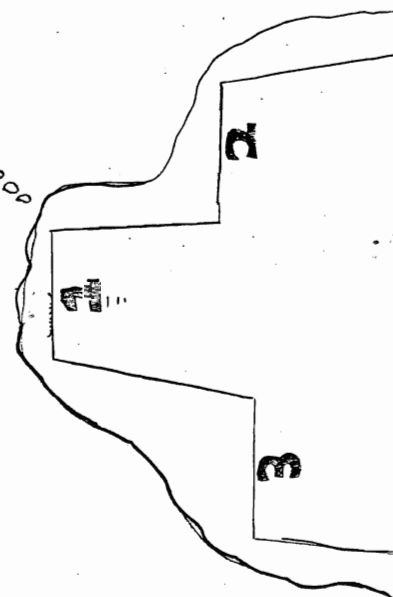
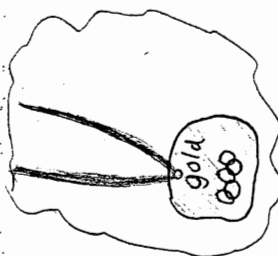
"K"

"Show a winner"

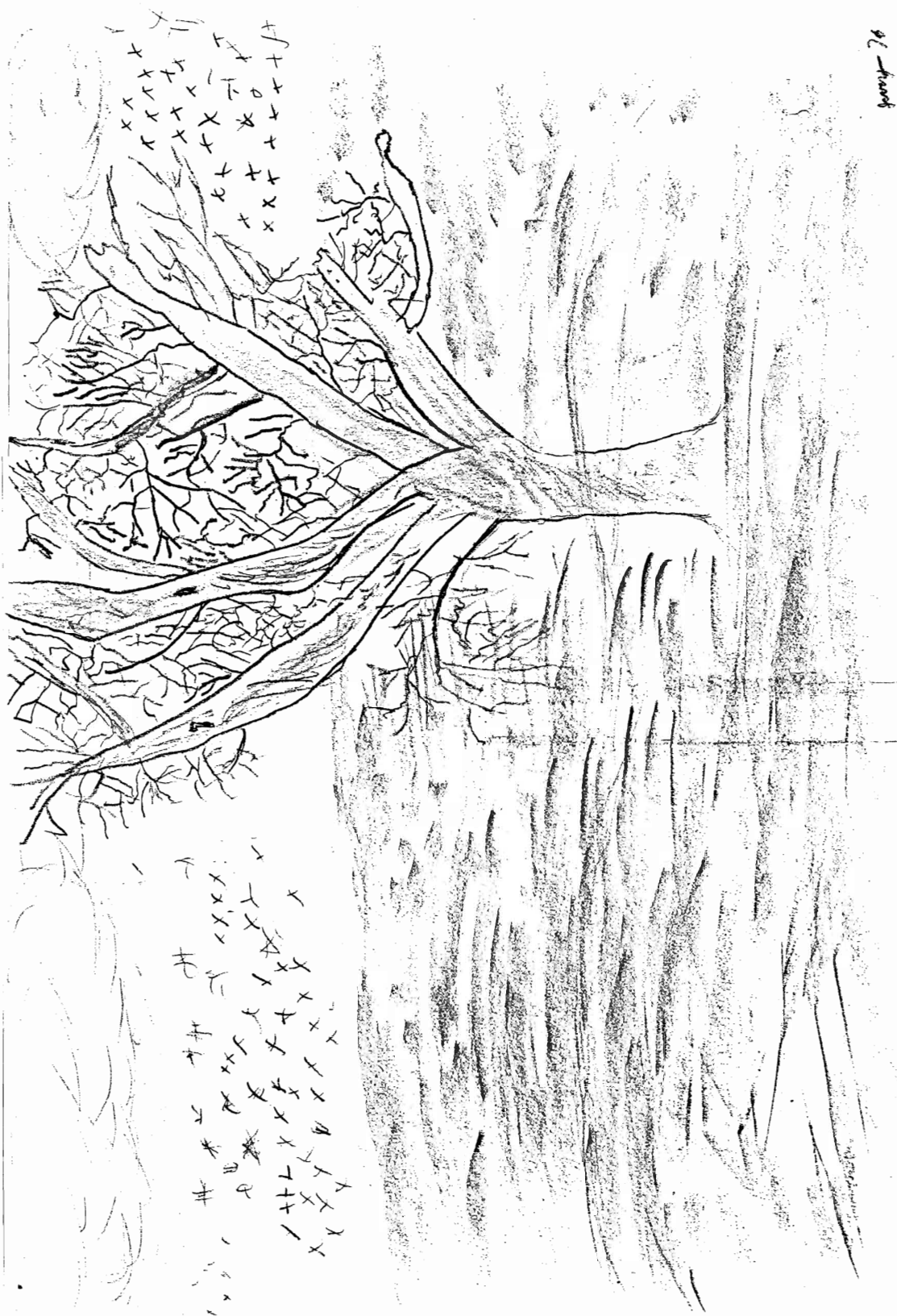


110 meter hurdles

- 1 (gold)
Darrell
Vaon
- 2 (silver)
Brian
Edwards
(Briozn)
- 3
Ian
Duckwith



"T" "Show your favourite place to be"



"v" "Show you with your family"

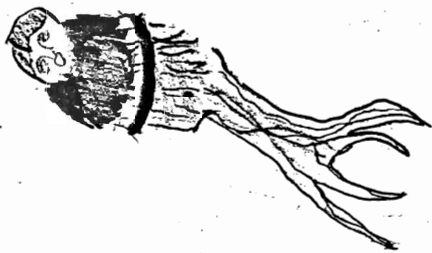
105.



"R"

"Show an adventure"
(See Page 99)

106.



LD and "Regular" Total Data, Table 1 part 1

Id. code	School	Gender	Age(mo)	Test	Obsv.	Ar1med	Ar2med	Av.med	Ar1sha	Ar2sha	Av.sha	Ar1bal	Ar2bal	Av.bal
g	1.00	0.00	137.00	4.00	7.00	83.57	79.29	81.43	75.00	79.29	77.15	69.29	73.57	71.43
j	1.00	0.00	115.00	5.00	7.00	80.71	75.00	77.85	66.43	69.29	67.86	66.43	65.00	65.72
k	1.00	1.00	166.00	15.00	5.00	83.00	85.00	84.00	77.00	85.00	81.00	75.00	81.00	78.00
n	1.00	1.00	145.00	5.00	7.00	83.57	75.00	79.29	59.29	73.57	66.43	62.14	72.14	67.14
r	1.00	1.00	180.00	12.00	3.00	85.00	71.67	78.34	68.33	75.00	71.66	58.33	71.67	65.00
t	1.00	1.00	157.00	10.00	7.00	85.00	73.33	79.16	65.00	71.67	68.34	65.00	73.33	69.16
u	1.00	0.00	167.00	12.00	6.00	85.00	83.57	84.29	71.67	76.43	74.05	73.33	76.43	74.88
G	0.00	0.00	135.00	6.00	5.00	85.00	77.50	81.25	57.00	80.00	68.50	63.00	75.00	69.00
J	0.00	0.00	116.00	11.00	7.00	83.57	76.43	80.00	60.71	70.71	65.71	62.14	69.29	65.72
K	0.00	1.00	171.00	11.00	4.00	85.00	80.00	82.50	67.50	80.00	73.75	65.00	75.00	70.00
N	0.00	1.00	142.00	8.00	6.00	81.67	77.50	79.59	65.00	72.50	68.75	61.67	75.00	68.34
R	0.00	1.00	180.00	13.00	8.00	85.00	73.75	79.38	66.25	77.50	71.88	67.50	77.50	72.50
T	0.00	1.00	156.00	14.00	8.00	85.00	76.25	80.63	63.75	72.50	68.13	62.50	70.00	66.25
U	0.00	0.00	167.00	13.00	8.00	85.00	83.57	84.29	66.25	83.57	74.91	67.50	83.57	75.54
H	0.00	0.00	117.00	9.00	3.00	85.00	70.00	77.50	61.67	70.00	65.84	61.67	70.00	65.84
L	0.00	1.00	164.00	9.00	5.00	83.00	65.00	74.00	59.00	67.50	63.25	63.00	67.50	65.25
M	0.00	1.00	151.00	8.00	2.00	85.00	75.00	80.00	60.00	85.00	72.50	60.00	75.00	67.50
P	0.00	1.00	108.00	11.00	3.00	78.33	77.50	77.91	71.67	77.50	74.59	65.00	72.50	68.75
S	0.00	1.00	170.00	10.00	6.00	85.00	80.00	82.50	78.33	81.67	80.00	70.00	83.33	76.66
V	0.00	0.00	100.00	10.00	7.00	83.57	76.67	80.12	57.86	75.00	66.43	60.71	73.33	67.02
W	0.00	0.00	163.00	6.00	4.00	85.00	79.00	82.00	60.00	69.00	64.50	65.00	69.00	67.00
q	1.00	0.00	153.00	12.00	3.00	85.00	78.33	81.66	71.67	75.00	73.34	65.00	78.33	71.66
x	1.00	1.00	138.00	10.00	5.00	85.00	78.33	81.66	59.00	71.67	65.34	61.00	70.00	65.50
Sigm.Obs					126.00									
Mean						83.96	76.86	80.41	65.58	75.62	70.60	64.79	73.80	69.30
St. Dev.						1.72	4.47	2.44	6.29	5.21	4.94	4.17	4.76	3.91
Reg.Cl.														
Mean								80.87			71.69			69.84
St. Dev.								2.34			5.22			4.54
N = 9														
LD.Cl														
Mean								80.12			69.91			68.96
St. Dev.								2.54			4.81			3.59
N = 14														
Sig.dif.								not			not			not

Id. code	Ar1per	Ar2per	Av.per	Ar1rhy	Ar2rhy	Av.rhy	Ar1uni	Ar2uni	Av.uni	Ar1con	Ar2con	Av.con
g	66.43	72.14	69.29	67.86	73.57	70.72	70.71	75.00	72.85	65.00	76.43	70.72
j	60.71	65.00	62.86	66.43	69.29	67.86	67.86	72.14	70.00	62.14	73.57	67.85
k	67.00	81.00	74.00	69.00	81.00	75.00	69.00	85.00	77.00	67.00	83.00	75.00
n	56.43	69.29	62.86	67.71	73.57	70.64	59.29	77.86	68.58	56.43	75.00	65.72
r	61.67	71.67	66.67	58.33	71.67	65.00	58.33	71.67	65.00	58.33	71.67	65.00
t	66.43	68.33	67.38	65.00	73.33	68.16	65.00	75.00	70.00	56.43	70.00	63.22
u	68.33	73.57	70.95	65.00	77.86	71.43	68.33	77.86	73.10	68.33	80.71	74.52
G	59.00	77.50	68.25	59.00	82.50	70.75	63.00	82.50	72.75	65.00	82.50	73.75
J	62.14	67.86	65.00	59.29	73.57	66.43	60.71	72.14	66.43	63.57	73.57	68.57
K	65.00	77.50	71.25	62.50	77.50	70.00	67.50	72.50	70.00	60.00	77.50	68.75
N	63.33	67.50	65.41	61.67	72.50	67.09	61.67	77.50	69.59	63.33	75.00	69.16
R	63.75	76.25	70.00	65.00	73.75	69.38	62.50	76.25	69.38	58.75	75.00	66.88
T	63.75	72.50	68.13	62.50	73.75	68.13	63.75	73.75	68.75	57.50	68.75	63.13
U	63.75	83.57	73.66	65.00	83.57	74.29	65.00	85.00	75.00	65.00	83.57	74.29
H	61.67	65.00	63.34	65.00	70.50	67.75	58.33	70.00	64.16	55.00	70.00	62.50
L	59.00	65.00	62.00	57.00	67.50	62.25	61.00	75.00	68.00	57.00	65.00	61.00
M	60.00	75.00	67.50	65.00	85.00	75.00	60.00	75.00	67.50	60.00	85.00	72.50
P	65.00	70.00	67.50	61.67	80.00	70.84	65.00	77.50	71.25	55.00	80.00	67.50
S	73.33	83.33	78.33	68.33	80.00	74.16	71.67	81.67	76.67	68.33	83.33	75.83
V	60.71	68.33	64.52	60.71	75.00	67.86	59.29	78.33	68.81	59.29	73.33	66.31
W	62.50	69.00	65.75	60.00	77.00	68.50	60.00	75.00	67.50	55.00	73.00	64.00
q	58.33	78.33	68.33	65.00	75.00	70.00	68.33	78.33	73.33	61.67	78.33	70.00
x	55.00	70.00	62.50	61.00	75.00	68.00	57.00	78.33	67.66	47.00	73.33	60.17
Sigm.Obs												
Mean	62.75	72.51	67.63	63.39	75.76	69.57	63.62	76.67	70.14	60.22	75.98	68.10
St. Dev.	4.09	5.65	4.12	3.41	4.57	3.14	4.32	4.05	3.41	5.15	5.36	4.68
Reg.Cl.												
Mean			67.81			69.76			70.84			68.02
St. Dev.			4.35			2.78			3.61			5.02
N = 9												
LD.Cl												
Mean			67.83			69.44			69.70			68.15
St. Dev.			4.39			3.46			3.33			4.64
N = 14												
Sig.dif.			not			not			not			not

LD and "Regular" Total Data, Table 1 part 2

Id. code	Ar1com	Ar2com	Av.com	Ar1sca	Ar2sca	Av.sca	Ar1mean	Ar1.sd	Ar2mean	Ar2.sd	Av.mean	Av..sd
g	70.71	73.57	72.14	69.29	70.71	70.00	70.87	5.55	74.84	2.99	72.86	3.94
j	66.43	67.86	67.15	63.57	63.57	63.57	66.75	5.75	68.97	4.03	67.86	4.37
k	69.00	83.00	76.00	71.00	79.00	75.00	71.89	5.40	82.56	2.19	77.22	3.08
n	60.71	76.43	68.57	60.71	67.86	64.29	62.92	8.44	73.41	3.23	68.17	4.81
r	61.67	68.33	65.00	68.33	68.33	68.33	64.26	8.78	71.30	2.00	67.78	4.57
t	65.00	68.33	66.66	65.00	68.33	66.66	66.43	7.56	71.29	2.49	68.86	4.35
u	65.00	76.43	70.72	63.33	75.00	69.16	69.81	6.53	77.54	3.01	73.68	4.42
G	59.00	82.50	70.75	57.00	72.50	64.75	63.00	8.72	79.17	3.75	71.08	4.65
J	63.57	75.00	69.29	59.29	70.71	65.00	63.89	3.07	72.14	2.77	68.02	4.66
K	60.00	80.00	70.00	65.00	72.50	68.75	66.39	7.51	76.94	3.01	71.67	4.33
N	63.33	75.00	69.16	61.67	67.50	64.59	64.82	6.43	73.33	3.75	69.07	4.43
R	65.00	80.00	72.50	63.75	71.25	67.50	66.39	7.41	75.69	2.59	71.04	3.72
T	63.75	71.25	67.50	65.00	70.00	67.50	65.28	7.70	72.08	2.34	68.68	4.79
U	63.75	85.00	74.38	62.50	82.14	72.32	67.08	6.88	83.73	0.86	75.41	3.45
H	61.67	75.00	68.34	51.67	70.00	60.84	62.41	9.39	70.06	2.50	66.23	4.86
L	59.00	70.00	64.50	59.00	67.50	63.25	61.89	8.13	67.78	3.17	64.83	4.01
M	55.00	75.00	65.00	55.00	75.00	65.00	62.22	9.05	78.33	5.00	70.28	5.07
P	61.67	82.50	72.09	71.67	72.50	72.09	66.11	8.87	76.67	4.15	71.39	3.38
S	70.00	83.33	76.66	71.67	81.67	76.67	72.96	5.45	82.04	1.39	77.50	2.46
V	59.29	80.00	69.65	56.43	73.33	64.88	61.98	8.22	74.81	3.38	68.40	4.70
W	60.00	71.00	65.50	60.00	67.00	63.50	63.06	8.64	72.11	4.14	67.58	5.65
q	68.33	78.33	73.33	65.00	75.00	70.00	67.59	7.60	77.22	1.67	72.41	3.92
x	59.00	75.00	67.00	57.00	68.33	62.67	60.11	10.25	73.33	3.63	66.72	6.19
Sigm.Obs												
Mean	63.08	76.21	69.65	62.73	71.73	67.23	65.57		75.02		70.29	
St. Dev.	4.00	5.22	3.47	5.44	4.67	4.07	3.39		4.28		3.38	
Reg.Cl.												
Mean			69.62			67.74					70.29	
St. Dev.			3.64			3.90						
N = 9												
LD.Cl												
Mean			69.67			66.90					70.08	
St. Dev.			3.50			4.29						
N = 14											70.29	
Sig.dif.			not			not						

LD and "Regular" Total Data, Table 1 part 3

Coefficients of Concordance Data, Table 2

	MEDIUM	SHAPE	BALAN.	PERSP.	RHYTHM	UNITY	CONTR.	COMPO.	SCALE	AVERAGE
Artist 1	83.960	65.580	64.790	62.750	63.390	63.620	60.220	63.080	62.734	65.569
Artist 2	76.860	75.620	73.800	72.510	75.740	76.670	75.980	76.210	71.230	74.958
Coeff. of Concordance (Corrected for ties)	0.530	0.717	0.739	0.668	0.580	0.647	0.832	0.545	0.614	0.660
df=22,104	Values	.,532	sig. @.01							

ANOVA Analysis Data, Table 3

	Medium	Shape	Balan.	Persp.	Rhythm	Unity	Contr.	Compo.	Scale	
Non-LD	80.64	72.36	70.19	67.72	69.97	70.93	68.86	69.46	68.15	M = 70.9222
	2.65	5.36	4.87	4.11	3.12	3.82	4.67	3.77	3.86	sd = 5.3346
										N = 42
LD	81.09	70.23	69.62	68.67	69.44	70.28	69.21	70.51	67.20	M = 70.6959
	1.77	3.34	3.47	3.30	2.64	2.80	3.86	2.29	2.78	sd = 4.7314
										N = 46
Mean	80.87	71.30	69.91	68.20	69.71	70.61	69.04	69.99	67.67	
sd	2.18	4.43	4.07	3.61	2.79	3.24	4.12	3.05	3.27	

	df	Var.est.	F ratio	Sig.
Rows	1.00	1.61	0.13	0.7242
Columns	8.00	216.81	16.86	0.0001
Interaction	8.00	3.65	0.28	0.9693

LD and "Regular" Matched Pairs Data, Table 4: part 1

Id. code	School	Gender	Age(mo)	Test	Obsv.	Ar1med	Ar2med	Av.med	Ar1sha	Ar2sha	Av.sha	Ar1bal	Ar2bal	Av.bal
j	1.00	0.00	115.00	5.00	7.00	80.71	75.00	77.85	66.43	69.29	67.86	66.43	65.00	65.72
g	1.00	0.00	137.00	4.00	7.00	83.57	79.29	81.43	75.00	79.29	77.15	69.29	73.57	71.43
n	1.00	1.00	145.00	5.00	7.00	83.57	75.00	79.29	59.29	73.57	66.43	62.14	72.14	67.14
t	1.00	1.00	157.00	10.00	7.00	85.00	73.33	79.16	65.00	71.67	68.34	65.00	73.33	69.16
k	1.00	1.00	166.00	15.00	5.00	83.00	85.00	84.00	77.00	85.00	81.00	75.00	81.00	78.00
u	1.00	0.00	167.00	12.00	6.00	85.00	83.57	84.29	71.67	76.43	74.05	73.33	76.43	74.88
r	1.00	1.00	180.00	12.00	3.00	85.00	71.67	78.34	68.33	75.00	71.66	58.33	71.67	65.00
J	0.00	0.00	116.00	11.00	7.00	83.57	76.43	80.00	60.71	70.71	65.71	62.14	69.29	65.72
G	0.00	0.00	135.00	6.00	5.00	85.00	77.50	81.25	57.00	80.00	68.50	63.00	75.00	69.00
N	0.00	1.00	142.00	8.00	6.00	81.67	77.50	79.59	65.00	72.50	68.75	61.67	75.00	68.34
T	0.00	1.00	156.00	14.00	8.00	85.00	76.25	80.63	63.75	72.50	68.13	62.50	70.00	66.25
K	0.00	1.00	171.00	11.00	4.00	85.00	80.00	82.50	67.50	80.00	73.75	65.00	75.00	70.00
U	0.00	0.00	167.00	13.00	8.00	85.00	83.57	84.29	66.25	83.57	74.91	67.50	83.57	75.54
R	0.00	1.00	180.00	13.00	8.00	85.00	73.75	79.38	66.25	77.50	71.88	67.50	77.50	72.50
Sigm.Obs					88.00									
Mean						84.01	77.70	80.86	66.37	76.22	71.29	65.63	74.18	69.90
St. Dev.						1.41	4.11	2.18	5.56	4.85	4.43	4.63	4.72	4.07
Reg.Cl.														
Mean						83.69	77.55	80.62	68.96	75.75	72.36	67.07	73.31	70.19
St. Dev.						1.56	5.17	2.65	6.12	5.20	5.36	5.95	4.87	4.86
N = 7														
LD.Cl														
Mean						84.32	77.86	81.09	63.78	76.68	70.23	64.19	75.05	69.62
St. Dev.						1.28	3.14	1.77	3.72	4.84	3.34	2.50	4.78	3.47
N = 7														
Sig.dif.								not			not			not

Id. code	Ar1per	Ar2per	Av.per	Ar1rhy	Ar2rhy	Av.rhy	Ar1uni	Ar2uni	Av.uni	Ar1con	Ar2con	Av.con
j	60.71	65.00	62.86	66.43	69.29	67.86	67.86	72.14	70.00	62.14	73.57	67.85
g	66.43	72.14	69.29	67.86	73.57	70.72	70.71	75.00	72.85	65.00	76.43	70.72
n	56.43	69.29	62.86	67.71	73.57	70.64	59.29	77.86	68.58	56.43	75.00	65.72
t	66.43	68.33	67.38	65.00	73.33	69.16	65.00	75.00	70.00	56.43	70.00	63.22
k	67.00	81.00	74.00	69.00	81.00	75.00	69.00	85.00	77.00	67.00	83.00	75.00
u	68.33	73.57	70.95	65.00	77.86	71.43	68.33	77.86	73.10	68.33	80.71	74.52
r	61.67	71.67	66.67	58.33	71.67	65.00	58.33	71.67	65.00	58.33	71.67	65.00
J	62.14	67.86	65.00	59.29	73.57	66.43	60.71	72.14	66.43	63.57	73.57	68.57
G	59.00	77.50	68.25	59.00	82.50	70.75	63.00	82.50	72.75	65.00	82.50	73.75
N	63.33	67.50	65.41	61.67	72.50	67.09	61.67	77.50	69.59	63.33	75.00	69.16
T	63.75	72.50	68.13	62.50	73.75	68.13	63.75	73.75	68.75	57.50	68.75	63.13
K	65.00	77.50	71.25	62.50	77.50	70.00	67.50	72.50	70.00	60.00	77.50	68.75
U	63.75	83.57	73.66	65.00	83.57	74.29	65.00	85.00	75.00	65.00	83.57	74.29
R	63.75	76.25	70.00	65.00	73.75	69.38	62.50	76.25	69.38	58.75	75.00	66.88
Sigm.Obs												
Mean	63.41	73.12	68.26	63.88	75.53	69.70	64.47	76.73	70.60	61.92	76.16	69.04
St. Dev.	3.26	5.45	3.54	3.43	4.28	2.79	3.81	4.59	3.24	3.99	4.76	4.12
Reg.Cl.												
Mean	63.86	71.57	67.71	65.62	74.33	69.97	65.50	76.36	70.93	61.95	75.77	68.86
St. Dev.	4.34	5.04	4.10	3.54	3.91	3.12	4.89	4.52	3.82	4.99	4.70	4.67
N = 7												
LD.Cl												
Mean	62.96	74.67	68.81	62.14	76.73	69.44	63.45	77.09	70.27	61.88	76.56	69.22
St. Dev.	1.94	5.78	3.10	2.41	4.59	2.64	2.26	4.99	2.80	3.08	5.17	3.86
N = 7												
Sig.dif.			not			not			not			not

Id. code	Ar1com	Ar2com	Av.com	Ar1sca	Ar2sca	Av.sca	Ar1mean	Ar1.sd	Ar2mean	Ar2.sd	Av.mean	Av..sd
j	66.43	67.86	67.15	63.57	63.57	63.57	66.75	5.75	68.97	4.03	67.86	4.37
g	70.71	73.57	72.14	69.29	70.71	70.00	70.87	5.55	74.84	2.99	72.86	3.94
n	60.71	76.43	68.57	60.71	67.86	64.29	62.92	8.44	73.41	3.23	68.17	4.81
t	65.00	68.33	66.66	65.00	68.33	66.66	66.43	7.56	71.29	2.49	68.86	4.35
k	69.00	83.00	76.00	71.00	79.00	75.00	71.89	5.40	82.56	2.19	77.22	3.08
u	65.00	76.43	70.72	63.33	75.00	69.16	69.81	6.53	77.54	3.01	73.68	4.42
r	61.67	68.33	65.00	68.33	68.33	68.33	64.26	8.78	71.30	2.00	67.78	4.57
J	63.57	75.00	69.29	59.29	70.71	65.00	63.89	3.07	72.14	2.77	68.02	4.66
G	59.00	82.50	70.75	57.00	72.50	64.75	63.00	8.72	79.17	3.75	71.08	4.65
N	63.33	75.00	69.16	61.67	67.50	64.59	64.82	6.43	73.33	3.75	69.07	4.43
T	63.75	71.25	67.50	65.00	70.00	67.50	65.28	7.70	72.08	2.34	68.68	4.79
K	60.00	80.00	70.00	65.00	72.50	68.75	66.39	7.51	76.94	3.01	71.67	4.33
U	63.75	85.00	74.38	62.50	82.14	72.32	67.08	6.88	83.73	0.86	75.41	3.45
R	65.00	80.00	72.50	63.75	71.25	67.50	66.39	7.41	75.69	2.59	71.04	3.72
Sigm.Obs												
Mean	64.07	75.91	69.99	63.96	71.39	67.67	66.41	6.84	75.21	2.79	70.81	4.26
St. Dev.	3.24	5.68	3.05	3.81	4.80	3.27	2.78	1.55	4.35	0.82	3.03	0.52
Reg.Cl.												
Mean	65.50	73.42	69.46	65.89	70.40	68.15	67.56	6.86	74.27	2.85	70.92	4.22
St. Dev.	3.61	5.67	3.77	3.72	5.11	3.86	3.40	1.41	4.59	0.69	3.70	0.57
N = 7												
LD.Cl												
Mean	62.63	78.39	70.51	62.03	72.37	67.20	65.26	6.82	76.16	2.72	70.71	4.29
St. Dev.	2.22	4.83	2.29	2.99	4.63	2.78	1.48	1.80	4.24	0.99	2.49	0.51
N = 7												
Sig.dif.			not			not						

Wilcoxon Pairs Test, Table 5

Wilcoxon Pairs Test

	Pairs diff.	Pairs equal	Sigma pos.	Sigma neg.	Z value	Sig(1-tail)
Medium	6.00	1.00	6.00	15.00	0.9435	0.1812
Shape	7.00	0.00	19.00	9.00	0.8452	0.2039
Balance	7.00	0.00	16.00	12.00	0.3381	0.3676
Perspective	7.00	0.00	8.00	26.00	1.0142	0.1557
Rhythm	7.00	0.00	17.00	11.00	0.5071	0.3092
Unity	7.00	0.00	16.00	12.00	0.3381	0.3676
Contrast	7.00	0.00	10.00	18.00	0.6761	0.2531
Composition	7.00	0.00	9.00	19.00	0.8452	0.2039
Scale	7.00	0.00	15.50	12.50	0.2535	0.3978
Test	7.00	0.00	5.50	22.50	1.4368	0.0734

None significant

Id. code	School	Gender	Age(mo)	Test	Obsv.	Ar1med	Ar2med	Av.med	Ar1sha	Ar2sha	Av.sha	Ar1bal	Ar2bal	Av.bal
g	1.00	0.00	137.00	4.00	7.00	20.02	-6.05	6.98	0.00	-6.05	-3.03	0.94	-5.04	-2.05
j	1.00	0.00	115.00	5.00	7.00	6.05	-6.99	-0.47	12.04	8.00	10.02	19.03	6.99	13.01
k	1.00	1.00	166.00	15.00	5.00	3.33	0.00	1.67	5.02	0.00	2.51	8.34	6.65	7.50
n	1.00	1.00	145.00	5.00	7.00	1.68	-11.67	-5.00	6.63	1.68	4.16	3.36	-8.31	-2.48
t	1.00	1.00	157.00	10.00	7.00	0.00	14.03	7.02	0.00	3.95	1.98	0.00	-10.00	-5.00
u	1.00	0.00	167.00	12.00	6.00	0.00	2.02	1.01	4.98	-2.02	1.48	2.52	-9.01	-3.25
G	0.00	0.00	135.00	6.00	5.00	0.00	10.00	5.00	-2.48	6.67	2.10	2.48	0.00	1.24
J	0.00	0.00	116.00	11.00	7.00	2.02	2.02	2.02	13.04	-0.94	6.05	11.03	0.94	5.98
K	0.00	1.00	171.00	11.00	4.00	0.00	-6.67	-3.34	-3.33	6.67	1.67	0.00	13.33	6.67
N	0.00	1.00	142.00	8.00	6.00	4.98	4.98	4.98	7.50	4.98	6.24	12.48	0.00	6.24
R	0.00	1.00	180.00	13.00	8.00	0.00	-5.00	-2.50	5.00	-10.00	-2.50	3.33	-16.67	-6.67
T	0.00	1.00	156.00	14.00	8.00	0.00	5.00	2.50	8.33	10.00	9.16	3.33	6.67	5.00
U	0.00	0.00	167.00	13.00	8.00	-6.67	2.02	-2.33	11.67	-4.98	3.35	16.67	2.02	9.35
L	0.00	1.00	164.00	9.00	5.00	2.47	0.00	1.24	7.50	10.00	8.75	15.00	10.00	12.50
P	0.00	1.00	108.00	11.00	3.00	10.02	-4.98	2.52	-10.02	-4.98	-7.50	-15.00	-4.98	-9.99
S	0.00	1.00	170.00	10.00	6.00	0.00	-7.50	-3.75	10.02	-2.52	3.75	7.50	2.52	5.01
V	0.00	0.00	100.00	10.00	7.00	2.02	-2.02	0.00	2.96	0.00	1.48	6.05	2.02	4.04
W	0.00	0.00	163.00	6.00	4.00	0.00	-14.99	-7.50	10.02	-14.99	-2.49	10.02	1.69	5.86
Sigm.Obs					110.00									
Mean					6.11	2.55	-1.43	0.56	4.94	0.30	2.62	5.95	-0.07	2.94
St. Dev.						5.52	7.37	4.08	6.14	6.93	4.57	7.82	7.71	6.53
Reg.Cl.														
Mean						5.18	-1.44	1.87	4.78	0.93	2.85	5.70	-3.12	1.29
St. Dev.						7.62	9.06	4.60	4.51	4.86	4.25	7.15	7.88	7.23
N = 6														
LD.Cl														
Mean						1.24	-1.43	-0.10	5.02	-0.01	2.51	6.07	1.46	3.77
St. Dev.						3.88	6.83	3.82	6.99	7.95	4.90	8.44	7.49	6.32
N = 12														
Sig.dif.								not			not			not

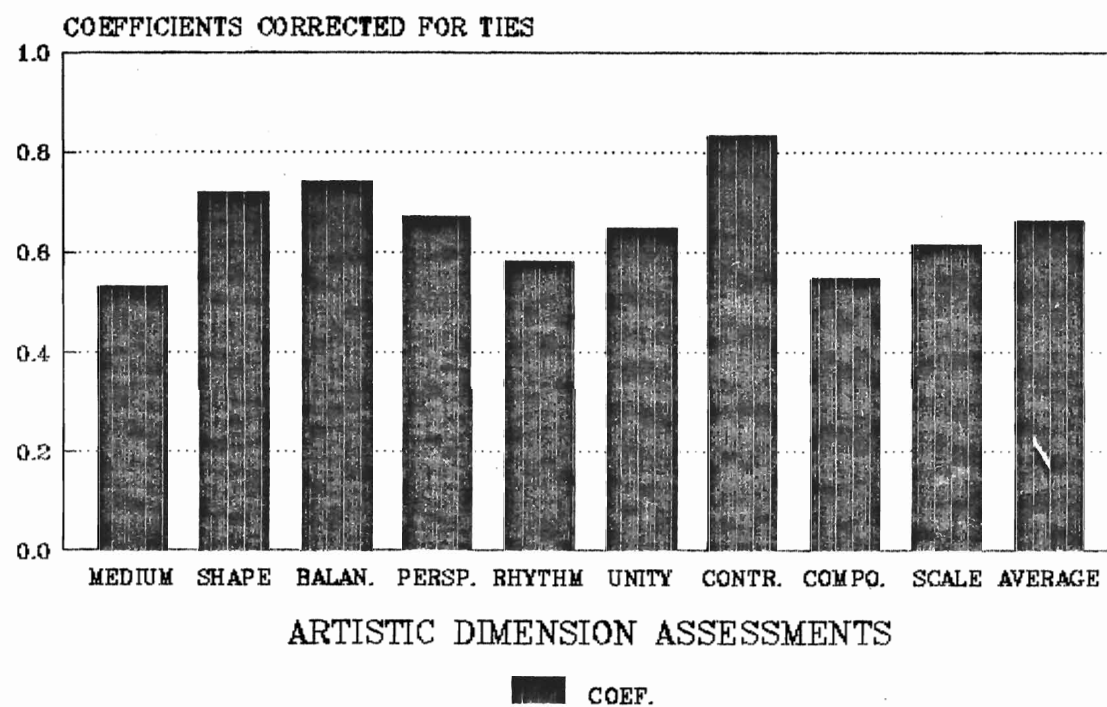
Simulated Pre- Post-Test Data, Table 6 part 2

Id. code	Ar1per	Ar2per	Av.per	Ar1rhy	Ar2rhy	Av.rhy	Ar1uni	Ar2uni	Av.uni	Ar1con	Ar2con	Av.con
g	-2.02	-9.95	-5.98	-4.03	-4.98	-4.51	-0.94	-6.99	-3.97	13.99	-2.02	5.99
j	6.05	6.99	6.52	19.03	8.00	13.52	17.01	4.03	10.52	11.03	-4.98	3.02
k	5.02	-1.69	1.67	1.69	-1.69	0.00	18.32	0.00	9.16	13.36	3.33	8.34
n	9.99	-5.04	2.48	5.04	-9.99	-2.48	-5.04	-3.36	-4.20	-1.67	0.00	-0.84
t	-1.68	-3.95	-2.82	0.00	2.02	1.01	0.00	0.00	0.00	21.65	5.96	13.81
u	2.52	-11.97	-4.73	-7.50	-4.03	-5.77	-4.98	-11.03	-8.00	10.02	-0.94	4.54
G	7.50	10.00	8.75	7.50	3.33	5.42	2.48	3.33	2.91	0.00	3.33	1.67
J	4.03	2.96	3.50	0.94	2.02	1.48	6.05	-2.97	1.54	16.00	2.02	9.01
K	-13.33	10.00	-1.67	3.33	-3.33	0.00	10.00	3.33	6.67	-6.67	10.00	1.67
N	25.02	-4.98	10.02	-2.52	-4.98	-3.75	4.98	-4.98	0.00	17.52	10.02	13.77
R	1.67	-15.00	-6.67	-6.67	-11.67	-9.17	3.33	-15.00	-5.84	8.33	-13.33	-2.50
T	8.33	10.00	9.16	10.00	1.67	5.84	8.33	8.33	8.33	16.67	15.00	15.84
U	21.67	2.02	11.85	0.00	2.02	1.01	13.33	0.00	6.67	20.00	2.02	11.01
L	20.03	0.00	10.02	9.98	10.00	9.99	5.02	13.33	9.18	22.50	0.00	11.25
P	-15.00	0.00	-7.50	-10.02	0.00	-5.01	0.00	4.98	2.49	15.00	0.00	7.50
S	2.52	2.52	2.52	10.02	0.00	5.01	4.98	4.98	4.98	10.02	2.52	6.27
V	6.05	8.06	7.06	-8.00	0.00	-4.00	0.94	-3.95	-1.51	0.94	2.02	1.48
W	-4.98	1.69	-1.65	0.00	-11.67	-5.84	0.00	-16.68	-8.34	10.02	-13.36	-1.67
Sigm.Obs												
Mean	4.63	0.09	2.36	1.60	-1.29	0.15	4.66	-1.26	1.70	11.04	1.20	6.12
St. Dev.	10.57	7.56	6.39	7.67	6.00	5.98	6.70	7.82	6.09	8.27	7.12	5.61
Reg.Cl.												
Mean	3.31	-4.27	-0.48	2.37	-1.78	0.30	4.06	-2.89	0.59	11.40	0.23	5.81
St. Dev.	4.67	6.72	4.82	9.26	6.21	6.97	10.74	5.44	7.62	7.60	3.90	4.98
N = 6												
LD.Cl												
Mean	5.29	2.27	3.78	1.21	-1.05	0.08	4.95	-0.44	2.26	10.86	1.69	6.27
St. Dev.	12.71	7.23	6.77	7.17	6.16	5.76	4.07	8.89	5.47	8.90	8.41	6.10
N = 12												
Sig.dif.			not			not			not			not

Id. code	Ar1com	Ar2com	Av.com	Ar1sca	Ar2sca	Av.sca	Ar1mean	Ar1.sd	Ar2mean	Ar2.sd	Av.mean	Av..sd
g	6.05	-4.98	0.53	8.00	-8.00	0.00	4.67	8.09	-6.01	2.22	-0.67	4.56
j	4.98	2.96	3.97	9.01	2.02	5.52	11.58	5.62	3.00	5.56	7.29	4.78
k	9.97	-5.02	2.48	6.65	1.69	4.17	7.97	5.25	0.36	3.31	4.17	3.33
n	5.04	-13.35	-4.15	-6.63	-3.36	-5.00	2.04	5.51	-5.93	5.21	-1.94	3.29
t	0.00	-3.95	-1.98	0.00	-3.95	-1.98	2.22	7.31	0.46	7.04	1.34	5.81
u	0.00	-9.01	-4.51	2.52	-13.99	-5.74	1.12	5.17	-6.66	5.57	-2.77	4.16
G	7.50	3.33	5.42	-2.48	3.33	0.43	2.50	4.14	4.81	3.38	3.66	2.67
J	23.00	0.00	11.50	8.00	-0.94	3.53	9.35	7.18	0.57	1.92	4.96	3.50
K	-6.67	6.67	0.00	0.00	3.33	1.67	-1.85	6.69	4.81	6.48	1.48	2.89
N	10.02	-10.02	0.00	12.48	-4.98	3.75	10.27	7.96	-1.11	6.51	4.58	5.38
R	6.67	-13.33	-3.33	1.67	-8.33	-3.33	2.59	4.34	-12.04	3.71	-4.72	4.22
T	15.00	5.00	10.00	13.33	13.33	13.33	9.26	5.34	8.33	4.25	8.80	4.11
U	15.00	0.00	7.50	16.67	4.03	10.35	12.04	9.38	1.02	2.55	6.53	4.79
L	7.50	6.67	7.09	7.50	-3.33	2.09	10.83	6.85	5.19	6.03	8.01	3.92
P	-10.02	4.98	-2.52	-10.02	4.98	-2.52	-5.01	10.91	0.00	4.31	-2.50	5.73
S	7.50	2.52	5.01	-10.02	4.98	-2.52	4.73	6.56	1.11	3.98	2.92	3.60
V	8.00	5.96	6.98	4.98	2.02	3.50	2.66	4.70	1.57	3.71	2.11	3.70
W	0.00	-1.69	-0.85	10.02	-3.32	3.35	3.90	6.02	-8.15	7.62	-2.12	4.71
Sigm.Obs												
Mean	6.09	-1.29	2.40	3.98	-0.58	1.70	5.05		-0.48		2.28	
St. Dev.	7.75	6.76	4.97	7.75	6.30	4.99	4.84	1.78	5.32	1.70	4.07	0.91
Reg.Cl.												
Mean	4.34	-5.56	-0.61	3.26	-4.27	-0.50	4.93		-2.46		1.23	
St. Dev.	3.83	5.45	3.50	5.93	6.07	4.65		1.23		1.75		0.95
N = 6												
LD.Cl												
Mean	6.96	0.84	3.90	4.34	1.26	2.80	5.11		0.51		2.81	
St. Dev.	9.15	6.50	5.02	8.74	5.78	4.97	5.34	2.03	5.70	1.74	4.23	0.93
N = 12												
Sig.dif.			0.005			not						

Figure 1

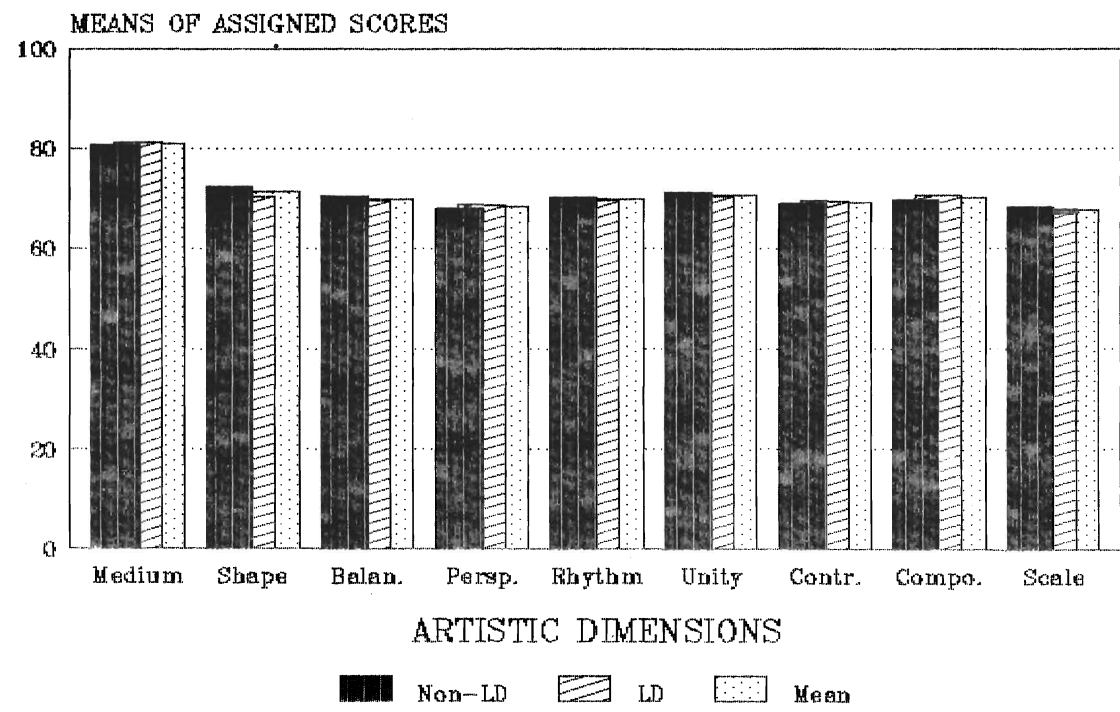
COEFFICIENTS OF CONCORDANCE COMPARING ARTISTS' ASSESSMENTS



VAL > .532 sig @ .01, df=22,104 (ALL)

Figure 2

REGULAR-LD & MEANS ARTISTIC DIMENSIONS COMPARED



Columns differ sig. (.0001) in ANOVA

Figure 3

Figure 3

REGULAR-LD MATCHED PAIRS CHOICE OF MEDIUM

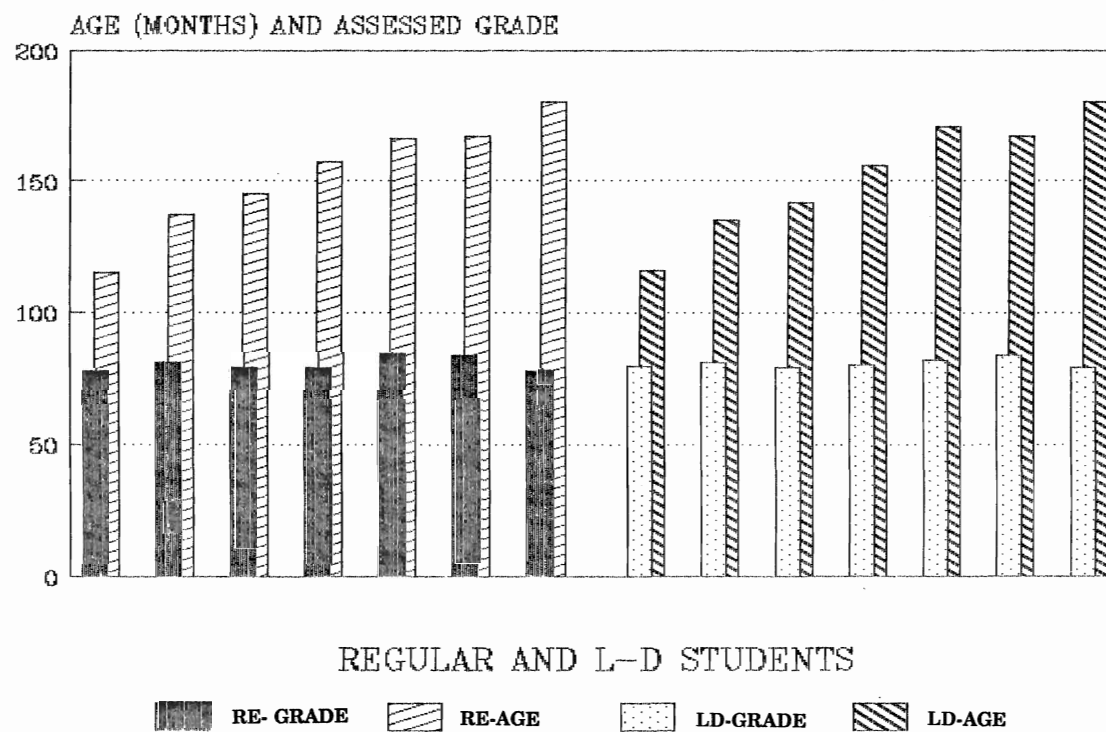


Figure 4

REGULAR-LD MATCHED PAIRS SHAPE

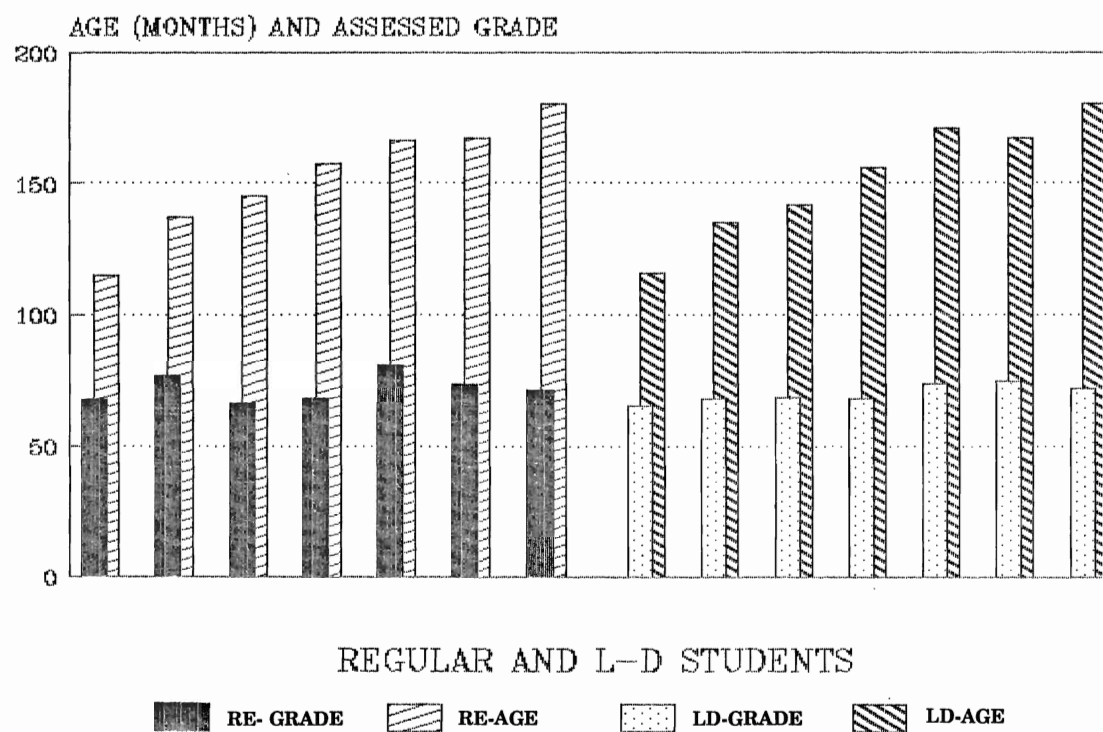


Figure 5

REGULAR-LD MATCHED PAIRS

BALANCE

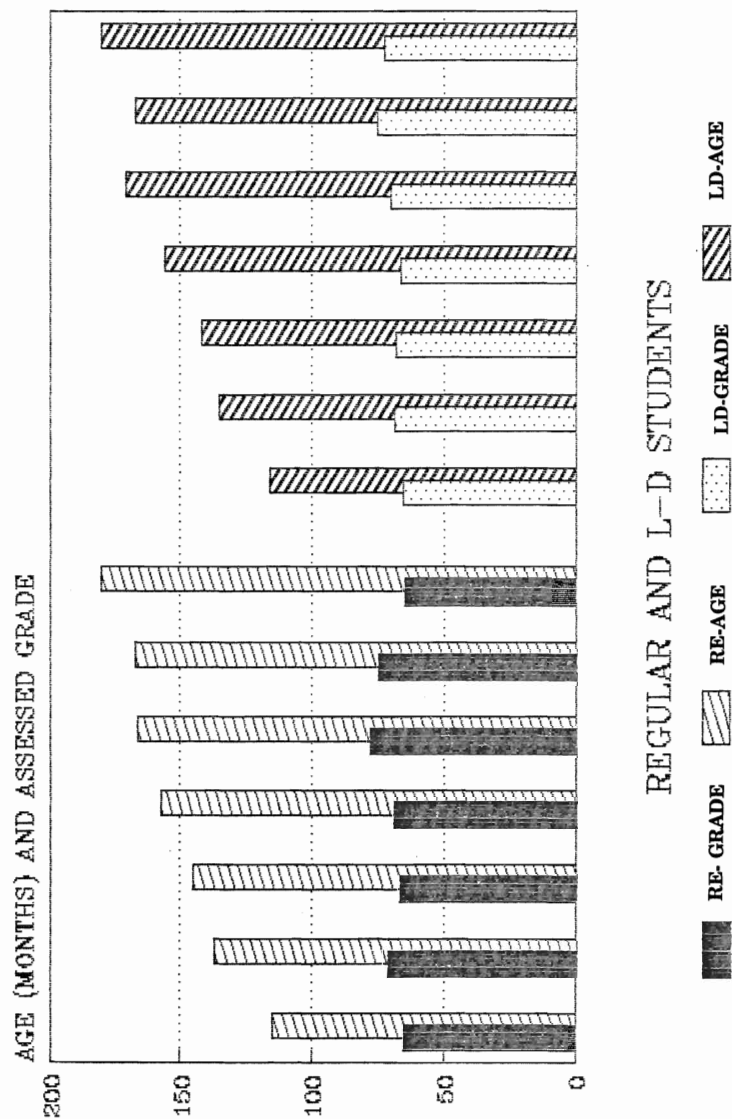


Figure 6

REGULAR-LD MATCHED PAIRS PERSPECTIVE

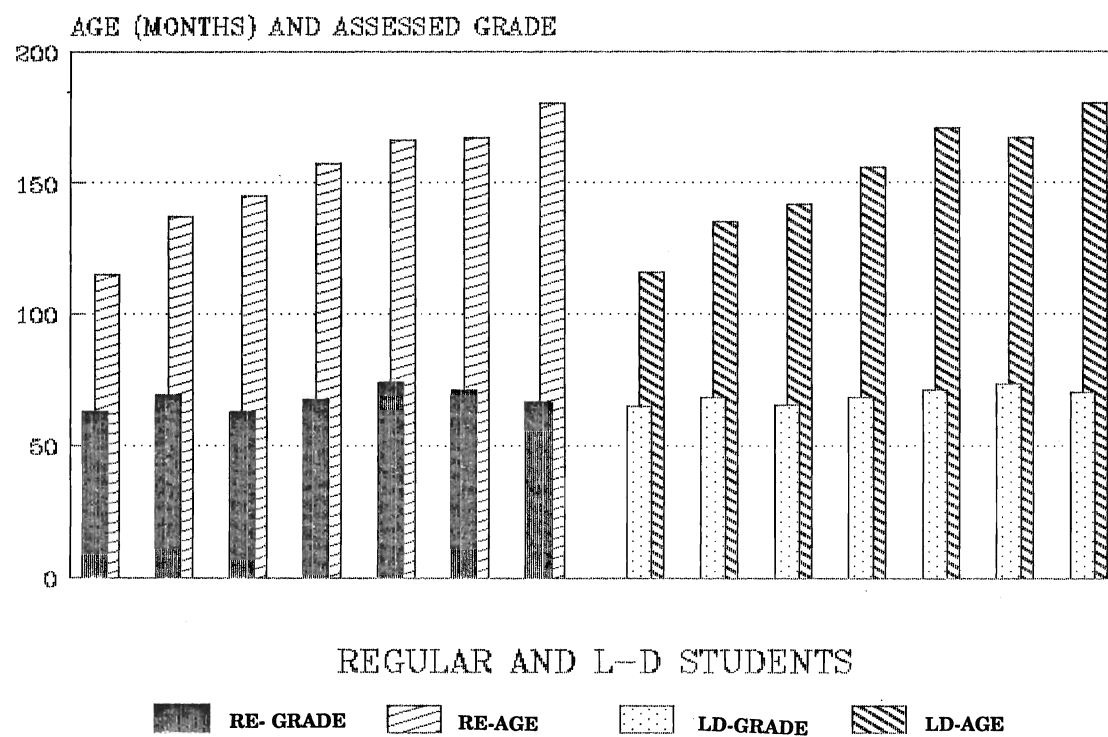


Figure 7

REGULAR-LD MATCHED PAIRS RHYTHM

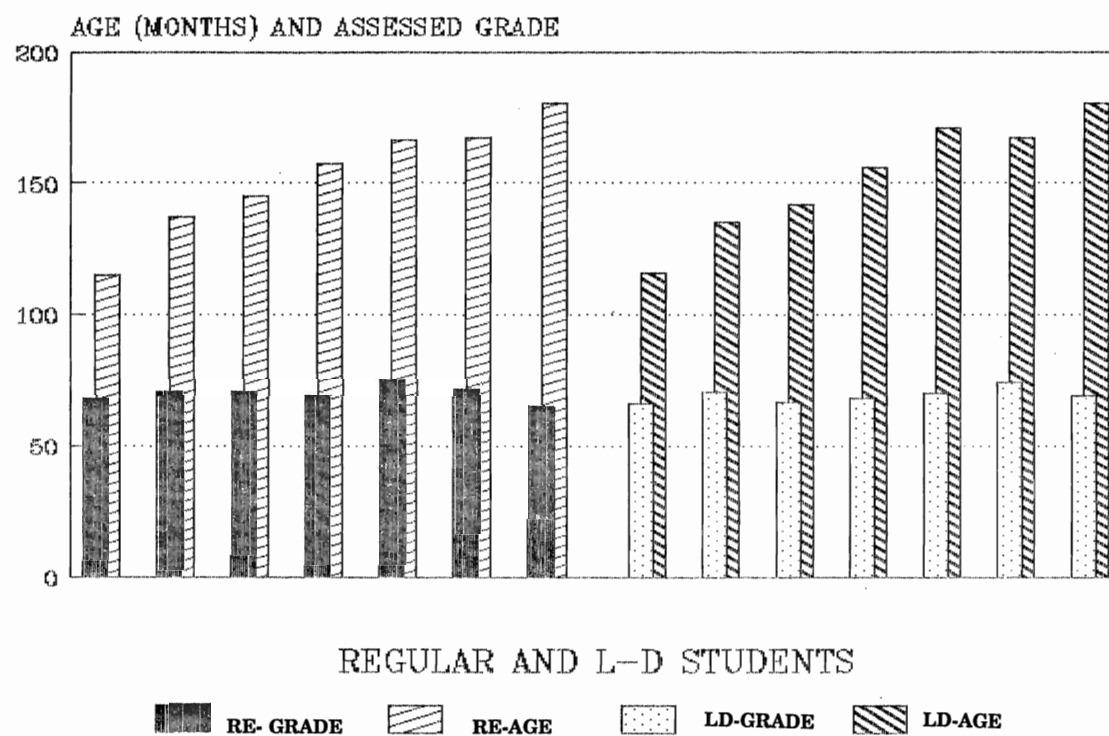


Figure 8

REGULAR-LD MATCHED PAIRS UNITY

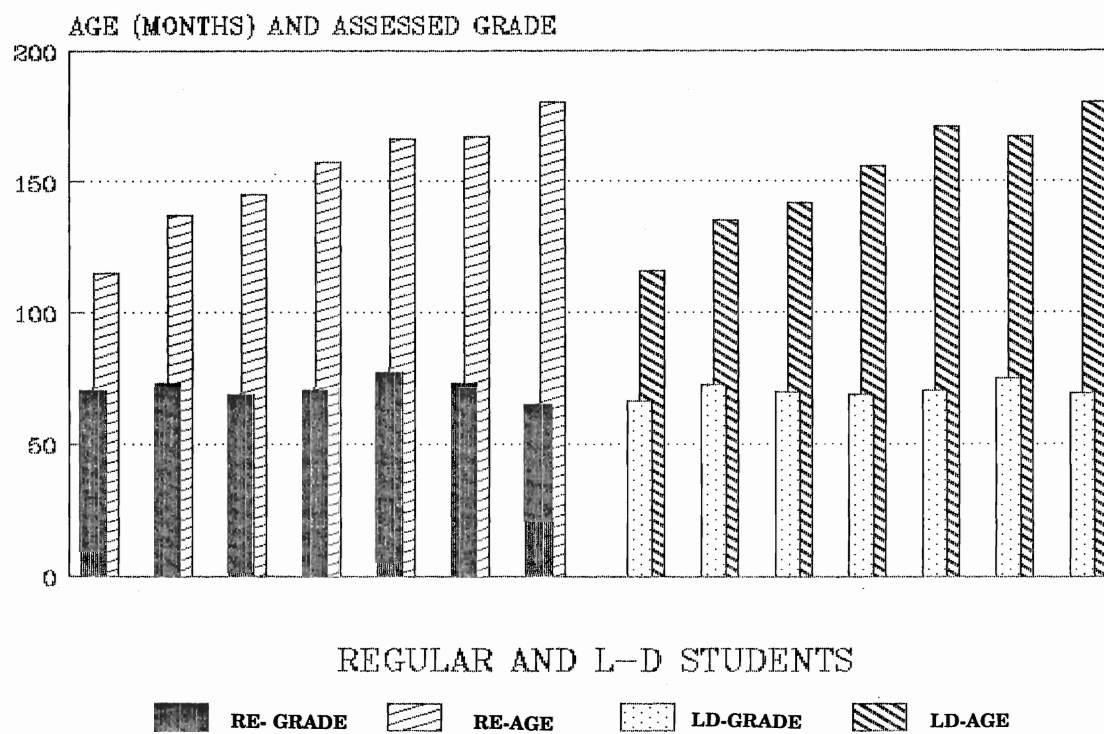


Figure 9

REGULAR-LD MATCHED PAIRS CONTRAST

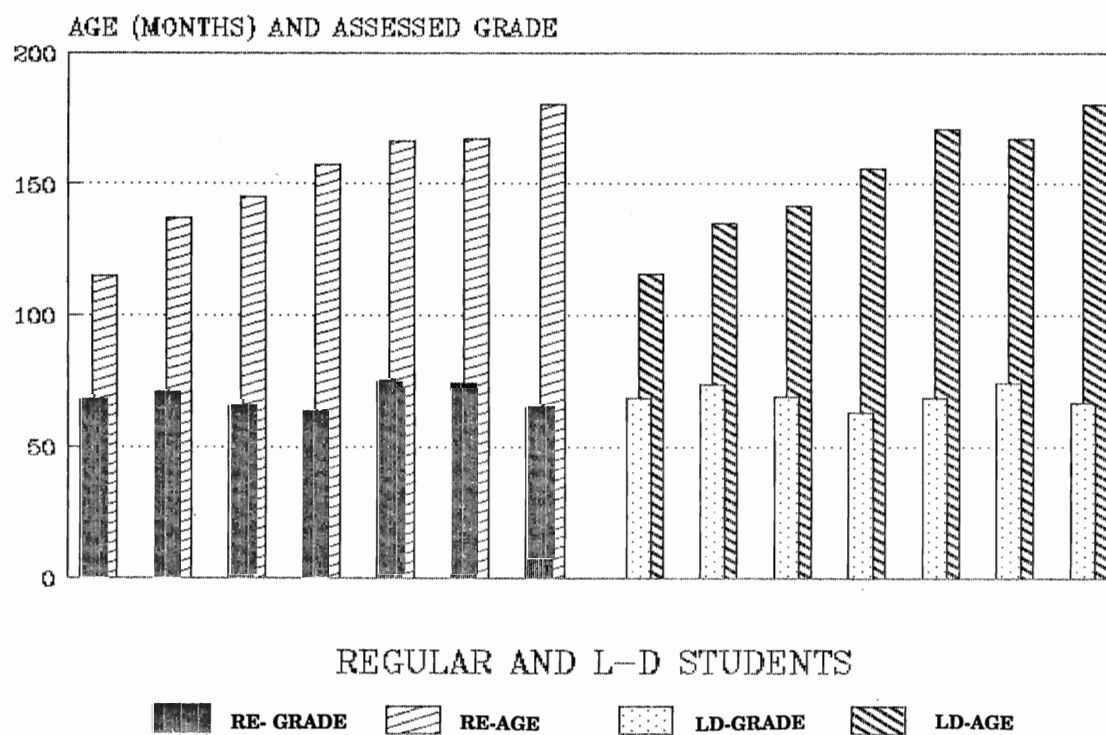


Figure 10

REGULAR-LD MATCHED PAIRS COMPOSITION

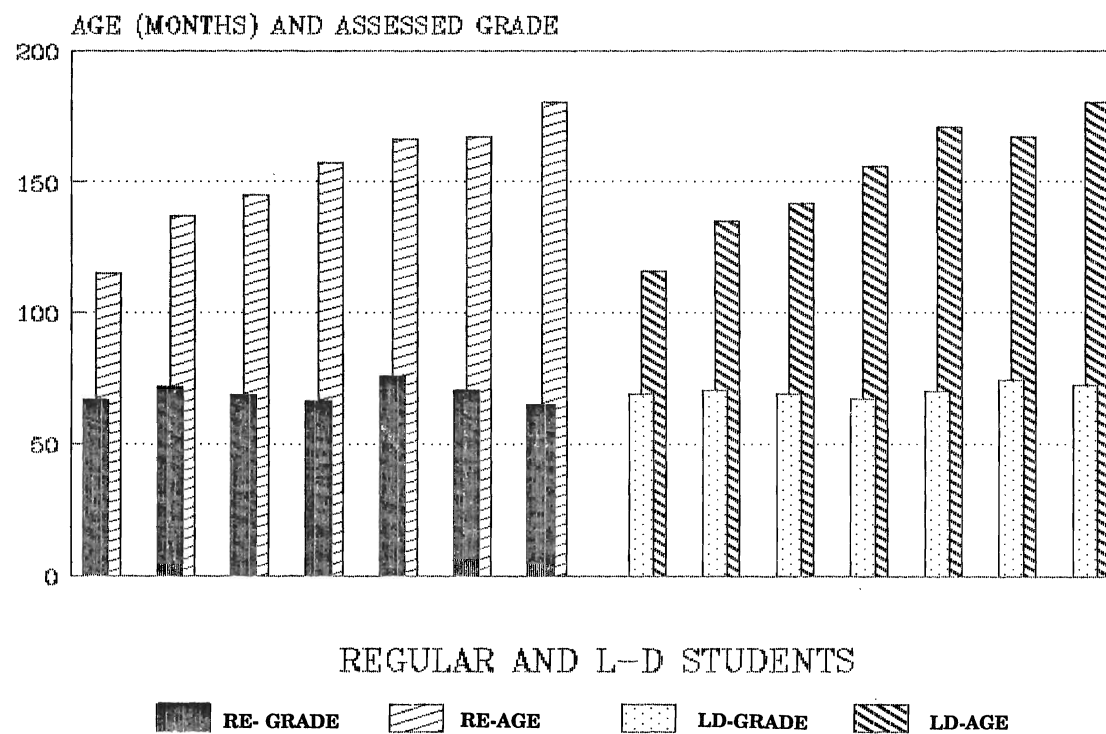


Figure 11

REGULAR-LD MATCHED PAIRS SCALE

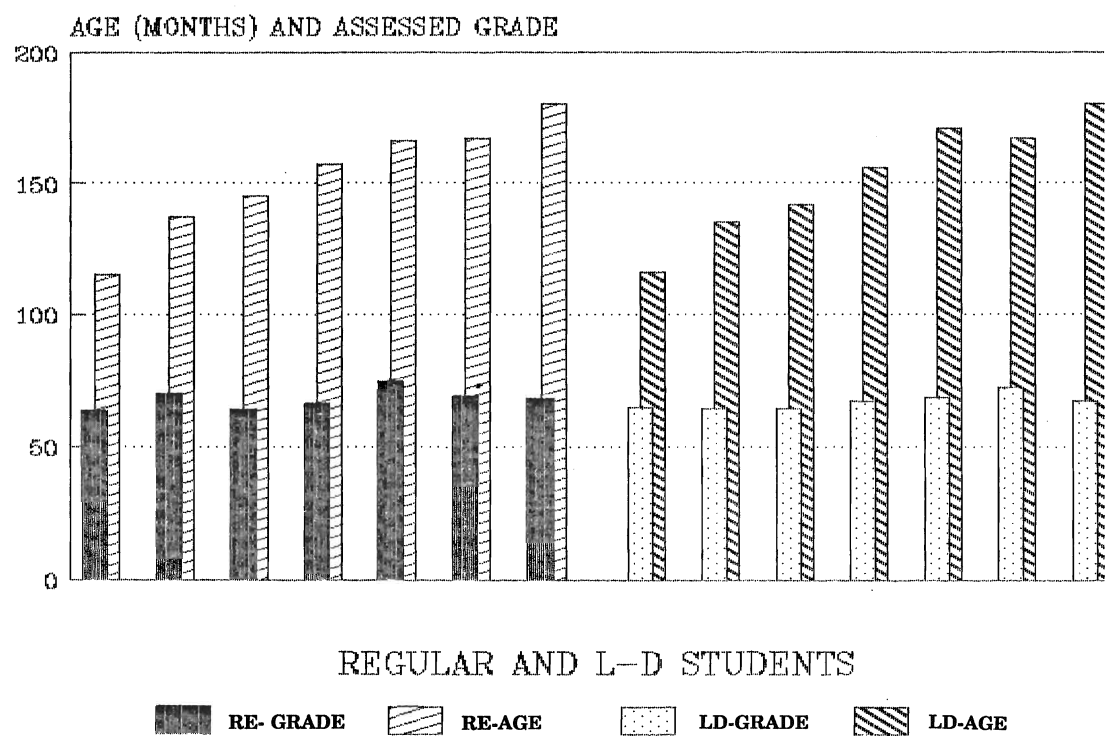


Figure 12

REGULAR-LD MATCHED PAIRS ARTIST 1 OVERALL

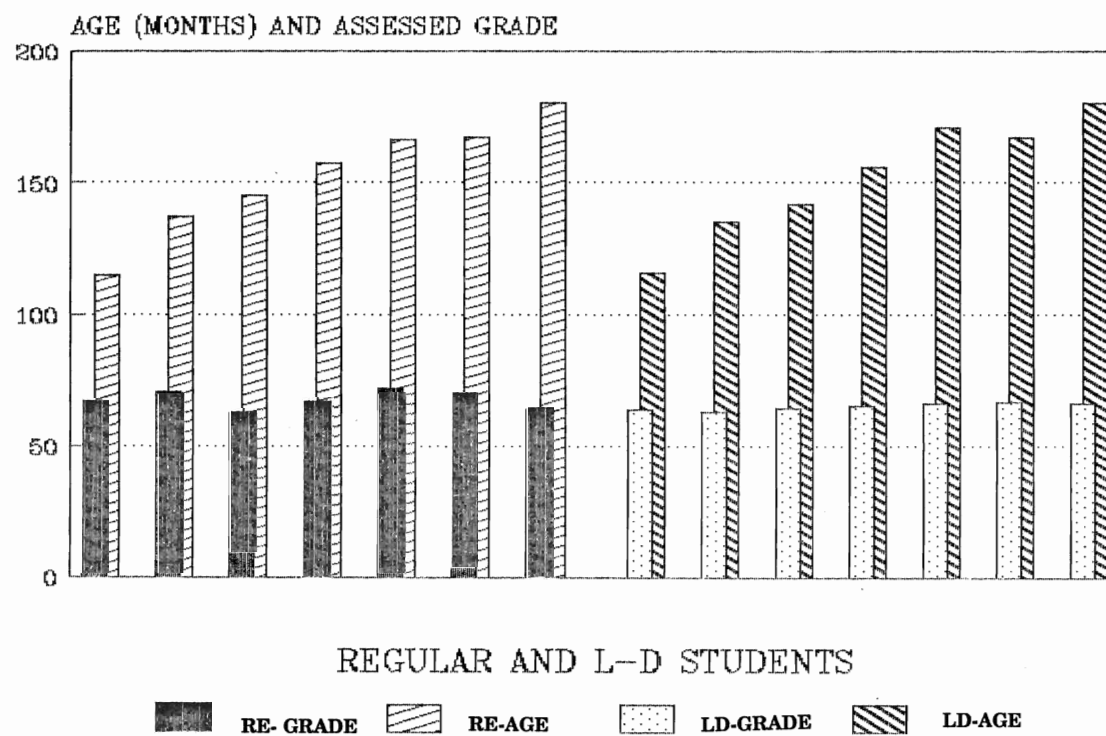


Figure 13

REGULAR-LD MATCHED PAIRS ARTIST 2 OVERALL

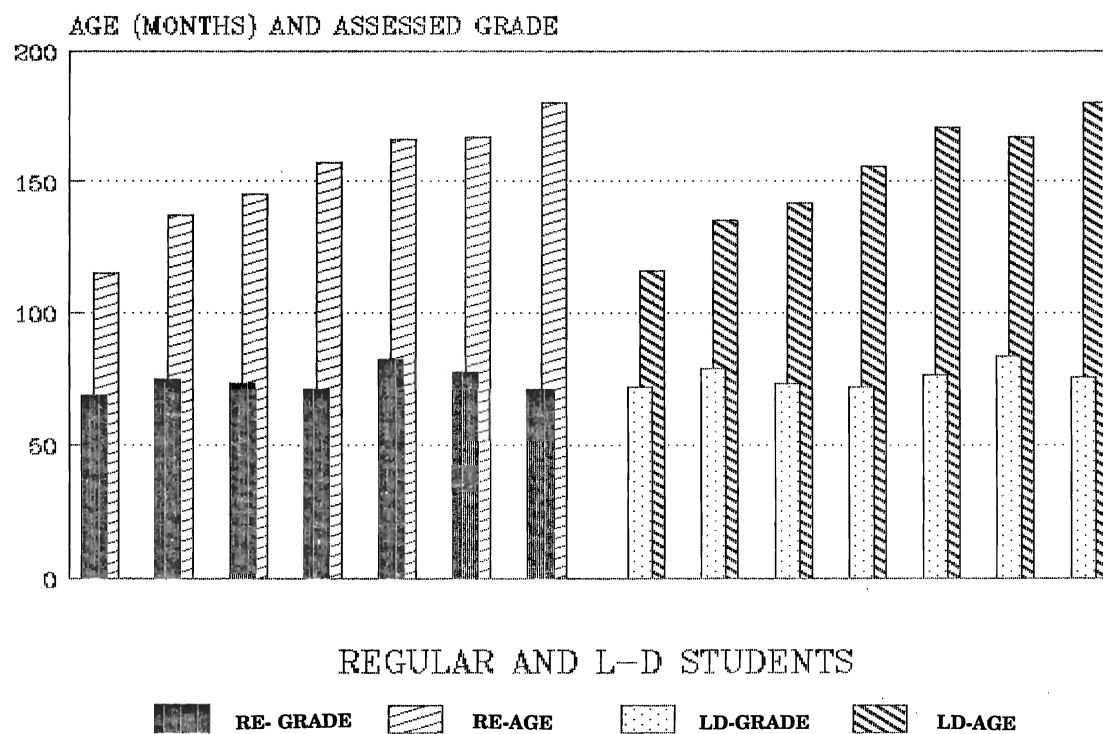


Figure 14

REGULAR-LD MATCHED PAIRS OVERALL MEANS

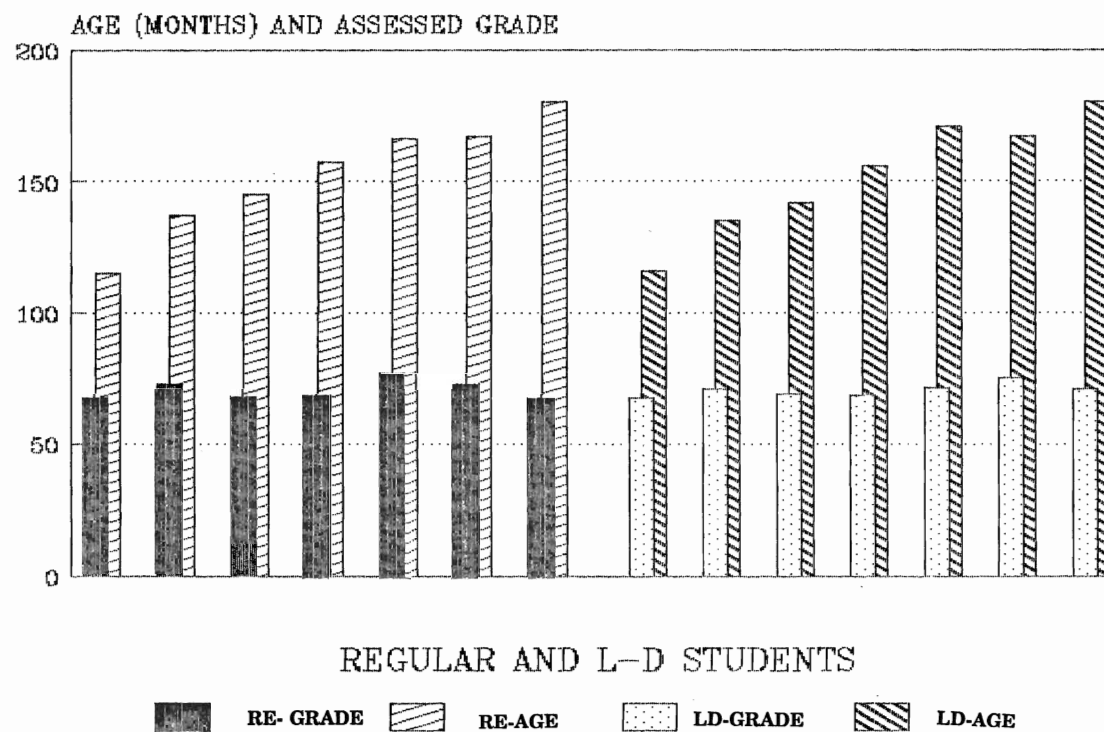


Figure 16

REGULAR-LD MATCHED PAIRS GENDER SCORE COMPARISON

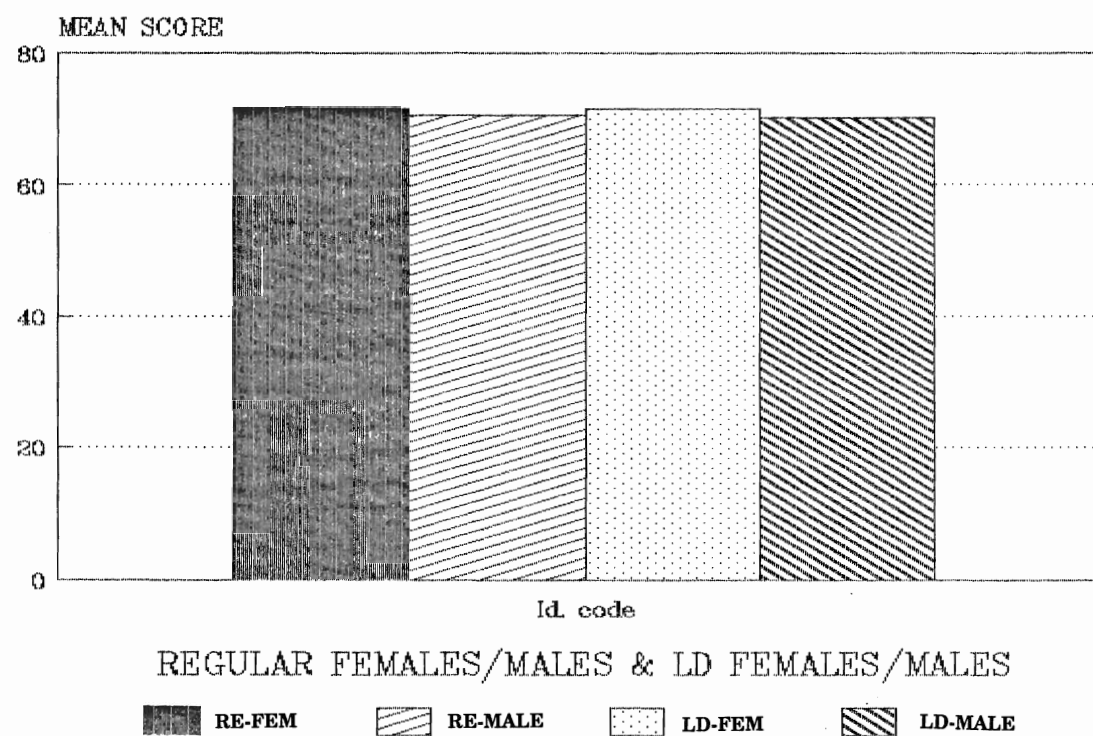
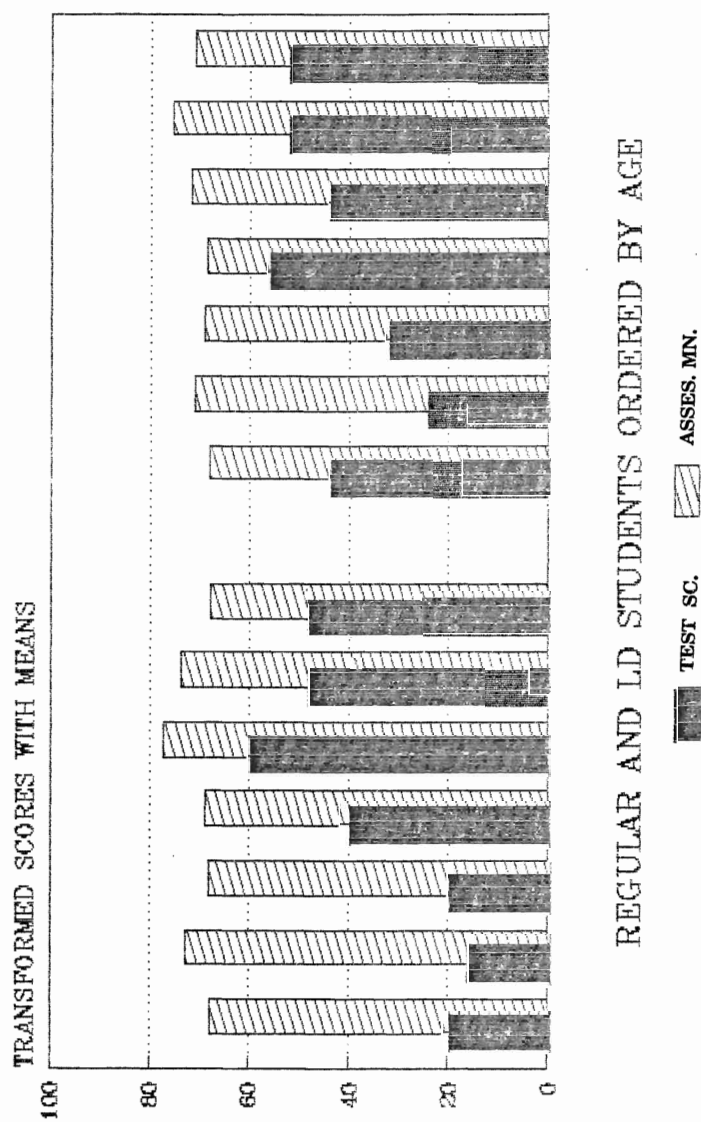


Figure 17

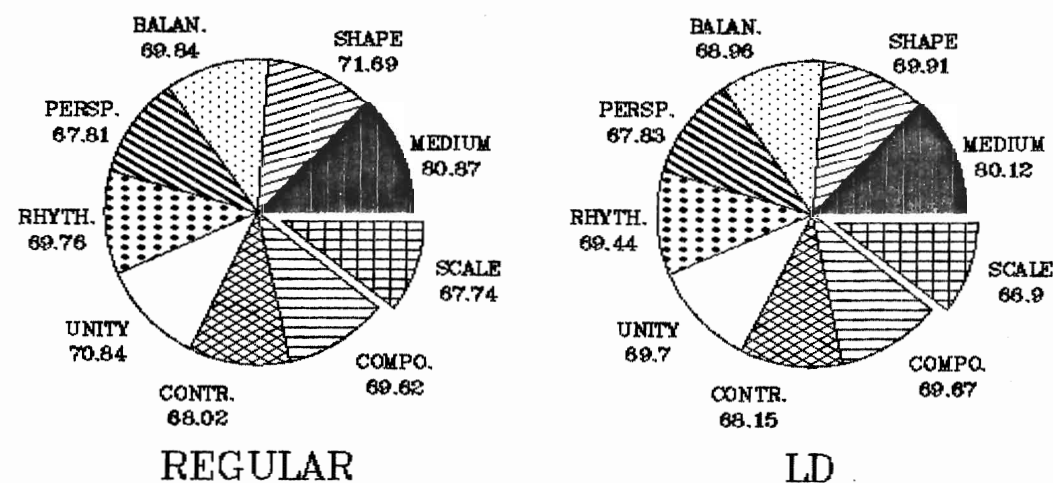
REGULAR-LD MATCHED PAIRS TEST SCORES & OVERALL ASSES. MEANS



(TEST SCORES MULTIPLIED BY 4)

Figure 18

REGULAR-CLASS & LD-CLASS PROPORTIONS IN ARTISTIC INTELLECT



(Means used for comparison)