TWO METHODS OF CONTOUR DRAWING

INSTRUCTION TO CHILDREN:

A REPLICATION

by

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STATEMENT BY AUTHOR

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF ILLUSTRATIONS</td>
<td>vi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>vii</td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2. LITERATURE REVIEW</td>
<td>5</td>
</tr>
<tr>
<td>Children's Art</td>
<td>5</td>
</tr>
<tr>
<td>Developmental Stages</td>
<td>6</td>
</tr>
<tr>
<td>Perceptual Instruction</td>
<td>9</td>
</tr>
<tr>
<td>The Instructional Use of Modeling</td>
<td>10</td>
</tr>
<tr>
<td>The Instructional Use of Examples</td>
<td>12</td>
</tr>
<tr>
<td>Individual Differences in Children's Art</td>
<td>14</td>
</tr>
<tr>
<td>3. METHOD</td>
<td>18</td>
</tr>
<tr>
<td>Subjects</td>
<td>18</td>
</tr>
<tr>
<td>Stimulus</td>
<td>18</td>
</tr>
<tr>
<td>Experimental Groups</td>
<td>19</td>
</tr>
<tr>
<td>Procedures</td>
<td>20</td>
</tr>
<tr>
<td>Session One</td>
<td>20</td>
</tr>
<tr>
<td>Session Two</td>
<td>26</td>
</tr>
<tr>
<td>Session Three</td>
<td>31</td>
</tr>
<tr>
<td>Scoring</td>
<td>33</td>
</tr>
<tr>
<td>4. RESULTS</td>
<td>34</td>
</tr>
<tr>
<td>5. DISCUSSION</td>
<td>37</td>
</tr>
<tr>
<td>APPENDIX A: RATING SCALE</td>
<td>42</td>
</tr>
<tr>
<td>APPENDIX B: FILMSTRIP</td>
<td>44</td>
</tr>
<tr>
<td>APPENDIX C: CHILDREN'S DRAWINGS</td>
<td>47</td>
</tr>
<tr>
<td>REFERENCE NOTES</td>
<td>54</td>
</tr>
<tr>
<td>LITERATURE CITED</td>
<td>55</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inter-rater reliability for each experimental condition</td>
<td>33</td>
</tr>
<tr>
<td>2. Analysis of variance summary table</td>
<td>35</td>
</tr>
<tr>
<td>3. Mean gain: Posttest minus pretest</td>
<td>35</td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Experimental treatments by groups</td>
<td>19</td>
</tr>
<tr>
<td>2.</td>
<td>Treatment by experimental group in Session One</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>Treatment by experimental groups in Session Two</td>
<td>26</td>
</tr>
<tr>
<td>4.</td>
<td>Treatment by experimental group in Session Three</td>
<td>32</td>
</tr>
</tbody>
</table>
ABSTRACT

The experimental results of the Rush, Weckesser, and Sabers contour drawing study of 1980 compared two art education teaching aids, modeling and predrawn examples, given to third grade students. Despite expectations from research literature of art education and educational psychology, the use of instructional examples proved more effective than the use of modeling. Mean gain scores from the experimental groups receiving the instructional method of examples were significantly higher than the mean gain scores of groups receiving the modeling treatment. This study attempted to explain the unexpected results of Rush et al. by again comparing modeling and examples under more controlled conditions. Experimental drawings rated according to the same criteria showed results that were dissimilar from Rush et al.: the use of modeling proved more effective than the use of predrawn examples as third-grade instructional methods for teaching contour drawing.
CHAPTER 1
INTRODUCTION

The unexpected results of the Rush, Weckesser, and Sabers (1980) contour drawing study comparing two different instructional methods, modeling and predrawn examples, raised more questions than it answered. The instructional use of modeling (imitative learning), expected to be more significant based upon educational literature, failed to enhance the drawing skills of third grade children. In order to probe further into the validity of these findings a new study was designed that would partially replicate the first one and at the same time add some new dimensions based on current research (Edwards, 1979).

The experimental design of the Rush et al. (1980) study examined two instructional strategies of modeling and examples accompanied by two viewing conditions. Students viewed the object to be drawn, a red tricycle, from either one or two points of view. The experimenter taught contour drawing either by modeling the contour drawing procedures or by verbally discussing the predrawn examples of the object in front of the third grade children.

The instructional use of examples increased the contour drawing skills of the children more effectively than the use of modeling. The motion or viewing condition, expected to be of significant influence based upon educational literature, contributed nothing to the
children's drawing skills. Rush et al. suggested further experimental investigations. Would any kind of pre-drawn examples be more effective than modeling when teaching contour drawing to third grade children? Were children's learning behaviors affected by uncontrolled variables during the instructional use of modeling or pre-drawn examples? Would the use of both modeling and pre-drawn examples (Edwards, 1979) be more effective when combined than either modeling or examples used separately? How effective would verbal instruction be when used alone to teach contour drawing to third grade children?

The experimental design of this present replicated study attempts to answer these questions. Designed to use Edwards' (1979) contour drawing instruction utilizing both modeling and examples, four treatment groups were devised consisting of modeling and pre-drawn examples, modeling alone, pre-drawn examples alone, and verbal instruction patterned after visual perception exercises used by Edwards (1979) and by Rush et al. (1980).

The professional qualities of the experimenter-teacher included proficiencies in figurative drawing and painting plus teaching experiences with elementary, secondary, and college age students. The experimenter was proficient at conducting hands-on demonstrations (modeling) in front of third grade children. The pre-drawn examples were carefully executed in a detailed and realistic manner by the experimenter. They were of two kinds, crayon drawings in modified contour drawing format, 22 by 30 inches, and a filmstrip (Eggert, Note 1) which included visual illustrations of contour drawing concepts. None of the examples was a pure contour drawing, but several were modified
contour drawings similar to those requested of the children as part of the experimental treatments during the posttest.

The modeling procedures were carefully devised and strictly controlled to insure consistency across groups. The modeling instruction, based upon findings from research literature, encouraged imitative behavior and copying by the children. The experimenter modeled modified contour drawing procedures as the children overtly participated by "drawing-in-the-air" during those instructional sessions that included the modeling treatment.

To ensure experimental consistency, careful control of all experimental conditions (verbal instruction, modeling, and examples), was exercised during the experimental sessions. At the conclusion of the experiment, scores derived from comparison posttest drawings were examined in a two-way analysis of variance to determine the relative effectiveness of the experimental treatments. Further analysis was conducted for differences due to sex and inherent classroom learning conditions.

Attempting to answer the questions raised by the previous (Rush et al., 1980) contour drawing study, the design of this study addressed the following questions: Will examples again prove more effective than modeling when teaching contour drawing to third grade children? Will the instructional use of both modeling and predrawn examples together be more effective than modeling only or examples only? What will be the results of verbal instruction alone? Will boys respond differently than girls to the instructional treatments? Does the ability to move around an object to be drawn affect children's graphic representation
Does the teacher influence the effectiveness of different instructional methods even in controlled experimental conditions?
CHAPTER 2

LITERATURE REVIEW

Children's Art

To know a rose by its Latin name and yet to miss its fragrance is to miss much of the rose's meaning (Eisner, 1981, 4 (10), 5-9).

Observing similar visual qualities in children's art, educators and psychologists have classified these graphic characteristics into broad, age-based, biologically related stages or levels of development (Gardner, 1980). Having no specific chronological age, these stages in children's art appear as a continuous progression toward the representational realism prized by contemporary culture (Gardner, 1980; Golomb, 1980; Lewis, 1976).

Although children's art is predominantly studied in relationship to the child's longitudinal growth, there is a closely related vertical dimension to the stages that occurs within stages (Eisner, 1981). These observed differences, within stages, are related to children's individual differences in experiencing and in processing information from the phenomenal environment (Colbert, 1980; Eisner, 1981; Paivio, 1969; Wilson, 1976). Within any one level or stage of development, the quantitative similarities characterizing children's art are qualitatively influenced by cultural (Wilson and Wilson, 1980a) cognitive (Gardner, 1973, 1980; Golomb, 1980; Goodnow, 1978; Lewis and Livson, 1980; Shumaker, 1981), affective (Gordon, 1981), neurological
(Das and Malloy, 1981; LeCompte and Rush, Note 3), social (Eysenck, Russell and Eysenck, 1980; Kratochwell, Rush and Kratochwell, 1979; Wilson and Wilson, 1980a) and educational (Gardner, 1980; Rush, Weckesser and Sabers, 1980) factors.

**Developmental Stages**

During this century considerable data relating to children's art has been collected and objectively classified into age-based, biologically related stages of graphic development (Gardner, 1980; Golomb, 1980; Goodnow, 1978; Kellogg, 1979). Gardner (1980) believes that the patterns of development in children's art are common to children of all cultures and "that intervention can speed up or slow down the developmental process but cannot qualitatively alter the basic developmental sequence" (in Lovano-Kerr and Rush, Note 4). Lewis (1962) views development in children's art as characterized by a steady advance in naturalism of representation. This change is more rapid during the early years and decelerates in the later school years (Lewis and Livson, 1967).

Lark-Horovitz and Horton (in Rush et al., 1980) observed the artistic stages of childhood artistic development as the preschematic stage, ages 2-4, the schematic stage, ages 4-8, the true-to-appearance stage, ages 9-11, and the perspective stage, ages 10-13. Lowenfeld (1947) explained the child's capacity for creative development as moving from the scribbling stage through the dawning realism stage and on to the psuedo-realistic stage. Piaget (in Piaget and Inhelder,
1956) defined children's art as indications of levels of mental operations that were related to maturity and to environment.

Developmental naturalism theories are not shared by art educators who view children's art as imperfect equivalents of objects from the phenomenal environment (Arnheim, 1954; Lowenfeld, 1939; Read, 1945; Schaefer-Simmern, 1948).

Arnheim's theory of increasing developmental perceptual progress was tested by Lewis (1962). The problem encountered by the child in drawing, explained by Lewis, is overcoming ambiguities in spatial relationships. With increasing clarity the child visually depicts the structural characteristics of the depicted objects (Arnheim, 1954). Moving towards increasingly adequate three-dimensional space within the confines of the two-dimensional medium, the developmental level of these graphic expressions are determined by the adequacy of the child's experiences (Lewis and Livson, 1967). Schaefer-Simmern (in Abrahamson, 1980) believed that children expressed inherent visual gestalts that gradually emerged through motor movements and tool manipulations. When children were "taught art facts and methods which had little attunement to their own artistic natures" (p. 43) the vertical growth in complexity of innate visual concepts was adversely affected. Children naturally expressed visual clarity and gestalt forms through the use of the tools and materials of art.

Kellogg's (1979) world wide collection of children's art shows similarities exist in the visual forms used by children at the early stages of visual representational development. Studying her collection,
she noticed that growth in the complexity of realistic representation is continuous and no age level is a stage. Kellogg (1979) stated that

the capacity for creating art is innate, is entirely self-taught in early childhood and only later is it coached and redirected by adults who influence older children to copy the preferred art styles of local cultures (p. 8).

Attempts to identify developmental trends in graphic expression as common to all children have been successful only with very young children (Lovano-Kerr and Rush, Note 4). Universal patterns during the later stages of development are culturally influenced into diverse symbolic capacities for visual fluency (Kellogg, 1979; Wilson and Wilson, 1980a).

With or without formal educational instruction in art skills, children continue to express increasingly realistic visual concepts in their artwork until adolescence when most visual expressions stop (Eisner, 1956; Gardner, 1973, 1980; Kellogg, 1979; Schumaker, 1981; LeCompte and Rush, Note 3). This well documented decline during the years of adolescence is explained by various theories. Eisner (1965) views it as a social problem in which

the highly creative adolescent who engages in novel modes of behaviors or productivity may produce behaviors or products that are not acceptable to the standards of the group to which he belongs (p. 468).

Lewis and Livson (1967) view it as a structural awareness problem

the developmental course for a group of children is more like a set of spirals than a line, with naturalistically correct views as the common starting and end points with individual paths between these two points (p. 50).
Gardner (1980) sees it as an educational problem, a loss in "flavorfulness" due to art instruction.

The flowering of child art is . . . seasonal. The magic years . . . do not last--indeed they begin to evaporate almost as soon as school begins (p. 142).

Wilson and Wilson (1980a) cautioned educators about following age-based levels of development too strictly when studying children's progression toward realistic art. They characterize graphic development as a process that involves many processes "as opposed to the traditional view that it is simply an organic process" (p. 26).

Lewis (1962) warns not to confuse the observed developmental trend toward increased naturalism characterized by children's art with the developmental process per se or with "the conscious intent of the child" (p. 75).

Gardner (1980) urges art educators to study the research on childhood development to gain insights into the developmental process of children's art.

**Perceptual Instruction**

Lowenfeld (1939) observed that children who are exposed to a variety of tactile, visual, and auditory experiences produce art that is creative in accordance with innate representational stages. To account for the differences in the children's art observed during those stages, Gardner (1980) invented cognitive style, how individual children process perceptual information from the phenomenal environment.
verbalizers tended to talk more than to produce art works . . . visualizers were active producers and were reluctant to talk . . . self-starters approached tasks effortlessly . . . completers exhibited anxiety when first starting a task . . . the person-centered child was more socially oriented and focused on communications and used figures in graphic expression . . . the object centered child was more private and tended to draw objects (physical elements, machines) (Gardner, H., 1980 in Lovano-Kerr and Rush, Note 3).

Salome (1965), Salome and Reeves (1972), Salome and Szeto (1976) studied the effects of instruction on children's drawings. Using Attneave's (1954) theory of visual perception of objects along contours, Solome studied the effects of visual perception instruction upon children's realistic drawing skills. Significant improvements resulted from verbal instruction in visual perception. Rush et al. (1980) conducted further research into the effects of visual perception instruction upon contour drawing skills. The methods of the use of examples and the use of modeling were compared, relatively, accompanied by visual perception instruction. The use of examples significantly increased contour drawing skills. These results were unexpected because in art education the use of demonstrations (modeling) is also considered an effective teaching aid. This study (Rush et al., 1980) raised many questions about the complexities of modeling drawing skills by the teacher.

The Instructional Use of Modeling

Social learning theories (Bandura, 1969; Krietler and Krietler, 1972; Kuhn, 1973; Rush, 1979; Wilson, 1976; Zimmerman and Rosenthal, 1972) stress the importance of imitative behavior after
the model upon children's conceptual development. Imitation of the model, also called observational learning, copying, or vicarious learning is considered an innate behavioral mode during early childhood development. Dependent upon perceptual-cognitive abilities, the early visual acts "seem invented anew by each child" (Lewis, 1963, p. 9) as through physical activity and the fantasy of childhood play the drawing act is "imitated by motion, but it is sustained by vision" (p. 11).

Although imitation of parents, teachers, and other children is dependent upon physical development and affective playfulness (Gardner, 1973; Golomb, 1980), the level of imitation is related to developmental need. Rush et al. (1980) researched the importance of the model upon children's developmental behavior, relating that the child imitates when the behavior to be imitated is significant. Krietler and Krietler (1972) observed that the tendency to imitate is expressed linguistically, conceptually, morally, emotionally, and motionally by both children and adults. Children imitate overtly while adults express imitative behavior of kinesthetic processes psychologically.

The vigorous physical scribbles of early childhood drawings quickly become intentional as the eye observes the results of the hand's motions (Gardner, 1973; Golomb, 1973, 1976). As the child's eye recognizes potential for representation within the randomly invented visual forms in the early scribbles, those graphic configurations become self-reinforced (Gardner, 1973). The early stages in children's artwork seem
timeless and universal . . . unlike the spoken language . . .
not learned by imitating adults (Lewis, 1963a, p. 9).

Teachers may positively influence the imitative drawing behavior of children as Kratochwill et al. (1979) showed. Positive descriptive reinforcement effectively increases the number of visual forms in children's drawings. Creativity, as measured by variety in visual forms, was increased in children's drawings when the teacher reinforced the child's own productions

the children learned to produce more diversity in their art. Children were reinforced for their productions, in the absence of teacher's instructions on what to produce (p. 37).

This study challenged the assumption that the character of children's art is entirely related to biological development. Direct experience and perceptual instruction with positive reinforcement increased children's creativity in visual expression. Teacher description of the child's graphic expressions with or without praise, also reinforced the children's creative form development in this research study.

The Instructional Use of Examples

Vicarious examples of life from the media, cartoons, comics, magazines, and the other graphic expressions of contemporary culture provide visual examples for the child to imitate (Wilson, 1976; Wilson and Wilson, 1980b). Children's art is influenced by the entire environment including other people and their graphic expressions
primary reliance of individuals on innate (developmental) factors for ordering spatial relationships in drawings arrests graphic development (Wilson and Wilson, 1980a, p. 24).

Children's art products are the result of relevant influences and variables that include innate rules, "discoveries" or perceptions from the phenomenal world, and modeling (imitative examples) (Wilson and Wilson, 1980a). Attempting to characterize children's art as a process, Wilson and Wilson (1980a) described a number of influence factors that interact with innate factors to produce child art. This interplay, as opposed to the traditional organic view of development, was suggested by Willats (cited in Wilson and Wilson, 1980a). Willats supposed that the child has a knowledge of "stereotypes" that is developed through imitation of visual examples. Discovered in the chance scribbles of early childhood, built from already invented visual schemata, based upon visual perceptual experiences, or the result of explicit instruction, these stereotypes are used whenever the child attempts to draw or copy something that has been seen.

Cultural influences of the media have been responsible for the documented appearance and disappearance of visual forms in child art (Wilson and Wilson, 1980b) such as the disappearance of the two-eyed profile. Such occurrences indicate the influence of some factors other than innate development upon children's art products (Wilson and Wilson, 1980b). The child's options for graphic development result from contemporary cultural media "thus leading to greater variability in children's drawings—and less modelling of the innately derived images" (Wilson and Wilson, 1980b, p. 19).
Research shows that the ability to "read" pictures is learned. Before third grade children do not detect dynamic qualities in visual examples (Travers, 1969). Visual examples with bright colors that are developmentally superior to their own art products are preferred by children (Gardner, 1973; Lewis, 1963b). Drawing ability is related to language and extraversion (Eysenck et al., 1980). Drawing has been shown to be more effective than tracing or mere observation as an aid to memory (Lansing, Note 2). Analytical ability is related to creativity (Grossman, 1972).

Rush (1979) effectively taught visual concepts to college students through the use of colored slides, accompanied by verbal instruction. Dorethy (1973) used motion, films and slides, in drawing instruction. Salome and Reeves (1972) used illustrated booklets and visual aids to instruct children in visual perception.

Wilson and Wilson (1980a) assert that although the art characteristics of children are affected by cultural influences and objects in the environment, they are primarily influenced by other drawings. They reason that

graphic images are much more like other graphic images than they are like objects . . . inventing a graphic equivalent . . . may be more time-consuming and more difficult than merely borrowing directly from another static, simplified, schematic graphic image (Wilson, B. and Wilson, M., 1980b 22).

Individual Differences in Children's Art

Nature or nurture, the child develops biologically to adulthood (Gardner, 1973, 1980). Drawing skills advance in realism, with or without instruction (Eisner, 1965; Gardner, 1980; Lewis, 1980). As the
child grows to adolescence, there is a documented decline in visual expression that is not completely understood, but is attributed to many causes (Schumaker, 1981).

During the years of artistic development, the child is exposed to many graphic influences (Wilson and Wilson, 1980b). Child art that initially seems to be innate and independent of adult influences (Lewis, 1963a) increases in realism during the school years (Gardner, 1980). Child art, self-reinforced by the eye, is also reinforced by the teachers, parents, and peers in the child's environment.

The forms of children's art have changed since the early part of this century (Wilson and Wilson, 1980b). The innate qualities of children's art have visual referents in the environment (Golomb, 1980) that "guides the process of differentiation to an important degree" (p. 20). Golomb views the child's drawing as determined by the search for meaning and likeness, but "constrained by the child's experience with the medium, by his interest, motivation, attention span, and playfulness" (p. 21).

Recent studies in the neurosciences have increased art educators' awareness of the immeasurable complexities inherent in the diverse perceptual processing systems characterized by human brain behavior (Das and Malloy, 1981; LeCompte and Rush, Note 3). These recent scientific explanations of long-observed educational phenomena initially led art educators to jump on the "hemispherality bandwagon" (Youngblood, 1979). Devising instructional methods for creative contour drawing based upon that research, Edwards (1979) successfully used modeling
accompanied by visual examples to spectacularly increase the representational skills of college students with no previous drawing instruction. Despite the controversial reasons (Youngblood, 1979) offered by Edwards (1979) for the significant effectiveness of her instructional methods, she increased representational drawing skills with her contour drawing exercises.

More recently, central brain processing and sensory stimulation from the phenomenal environment are being studied in relationship to children's observed cognitive style (Das and Malloy, 1981). Showing the diversity of children both between age levels and within age levels in processing and experiencing sensory information, these studies reveal that from birth, children appear to innately process information consistently with either global or analytical methods. Specific instructional strategies appear to have insignificant effects upon these innate processing modes (Das and Malloy, 1981).

The function of the emotions on cognition is a recent research topic (Tucker, 1981). Exactly how the emotions affect learning is yet to be fully understood, but emotionally well-adjusted children produce better quality drawings (Swenson, 1968). Quality is measured by the amount of detail, the accuracy of rendering, and the level of drawing skill. Strong emotional feelings, positive or negative, result in highly detailed drawings showing highlights and embellishments (Gardner, 1973).

Despite increased interest in education with processes, (Das and Malloy, 1981), the social sciences study children's art through generalized statements about central tendencies and significant
differences due to experimental treatments (Eisner, 1981). Quantitative measures tend to mask the qualitative differences in children's art. The process approach, based upon neuropsychological studies, suggests learning strategies that include the diverse learning characteristics represented by the cognitive styles of individual children (Das and Malloy, 1981; Gardner, 1980).

Eisner (1981) cautions educators with developing "methodological monism" (p. 9) due to the quantitative emphasis of empirical experimental research in art education. Visual art research that deals with "normal" populations and "with careful attempts to articulate broad models of artistic development" (Lovano-Kerr and Rush, Note 4, p. 7) is a basic issue of growing concern in the literature of children's art (Eisner, 1981). Eisner sees a need for qualitative research in art education and urges art educators to be

less concerned with the discovery of truth than with the creation of meaning . . . because with both we can achieve binocular vision. Looking through one eye never did provide much depth of field (Eisner, E. W., 1981, 10(4), p. 9).
CHAPTER 3

METHOD

Subjects

All subjects were male and female third grade students (mean age 8 years 9 months) in four existing art classes in an upper-socio-economic level school district in Tucson, Arizona. They were comparable in all respects to children used in the previous (Rush et al., 1980) study except the mean age of those students was 8 years. Students were randomly culled after the experiment to establish four groups of 20 students with equal numbers of males and females overall. All of the children participating in this study had previous drawing instruction. Groups experiencing modeling with predrawn examples and predrawn examples alone had contour drawing instruction previously during the school year, while the groups assigned modeling alone and verbal instruction alone had not had contour drawing specifically.

Stimulus

A large aluminum tricycle with hard, black, rubber wheels and one black handle grip was the stimulus-object of the experiment. All groups viewed the tricycle from many directions during the verbal instruction in visual perception. Groups 1 and 2, because of crowded classroom conditions, observed the tricycle from the front, side, and rear as they moved from side to side in the classroom. Groups 3 and 4,
because of spacious classroom conditions, were able to view the tricycle from all directions as they circled the stimulus-tricycle in the classroom. In both viewing situations, the stimulus was prominently displayed in an elevated position to allow unimpeded visual access to it by all of the children.

**Experimental Groups**

The experimental treatment conditions were assigned at random to these four third grade classes (see Figure 1). Group 1 received verbal instruction using modeling and predrawn examples together. Group 2 received just verbal instruction with examples. Group 3 received verbal instruction with modeling. Group 4 received neither modeling or examples, but did receive the same verbal instruction in the visual perceptions of the contour drawing as the other groups. Group 4 acted as the control group.

<table>
<thead>
<tr>
<th>Verbal Instruction</th>
<th>Modeling</th>
<th>Examples</th>
<th>(Group 1)</th>
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</thead>
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<tr>
<td>Verbal Instruction</td>
<td>No Modeling</td>
<td>No Examples</td>
<td>(Group 2)</td>
</tr>
<tr>
<td>Modeling</td>
<td>No Examples</td>
<td>No Modeling</td>
<td>(Group 4)</td>
</tr>
</tbody>
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*Figure 1. Experimental treatments by groups.*
Procedures

Session One

The objectives of Session One were to give the pretest and to familiarize the students in the experimental groups with the basic understandings of the visual perceptions of objects in contour drawing. The following matrix (Figure 2) defines the experimental procedures by groups.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
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<td>X</td>
</tr>
<tr>
<td>Verbal Instruction</td>
<td>X</td>
</tr>
<tr>
<td>Modeling Treatment</td>
<td>X</td>
</tr>
<tr>
<td>Examples Treatment</td>
<td>X</td>
</tr>
</tbody>
</table>

Figure 2. Treatment by experimental group in Session One.

Pretest and Posttest. The experimenter gave one black crayon and one piece of white 12 x 18 inch drawing paper to each student in the experimental group. While she passed our the drawing supplies, she said:

Write your name and age in the upper right hand corner of your paper.

The experimenter indicated the correct corner and held up an example for the group to see. While setting up the stimulus-tricycle, in view of the experimental group, she said:

Show me how well you can draw this tricycle. Draw it once on this piece of paper. Do not begin to draw until I tell you to do so.
Hold your crayon up (experimenter demonstrates). READY
... SET ... BEGIN.

The experimenter collected the pretest (posttest) drawings from the
members of the experimental group and the pretest (posttest) was over.

This pretest (posttest) was conducted, identically, with all
four experimental groups.

Group 1 -- Verbal Instruction, Modeling, and Examples. Students
in this group viewed and discussed a sound filmstrip (Eggert, Note 1)
about modified contour drawing. The visuals of the filmstrip consisted
of modified contour drawings of the same kind that would be asked of
the students during the experimental treatment (see Appendix B:
Filmstrip). After viewing this filmstrip, the experimenter led the
students in discussing the visual concepts of shape, space, and drawn
contours of the objects visually depicted. Individual students from
the experimental group verbally responded in the following discussion:

Learning to draw is like learning to see. Look at this (chair,
boat, plant, bicycle, teddy-bear). How does this line show us
the shape of the object and about the space around the object,
at the same time? What spaces are not part of the shape? How
can a line do two things at once?

The predrawn example-drawing of the stimulus-tricycle was studied, as
the experimenter pointed to it and said:

What part of the tricycle does this line tell about? (Experi-
menter points along the line of the drawing and asks volunteers
to point out the comparative shapes, spaces, and shared edges
of the stimulus-tricycle with the tricycle drawing.)

The experimenter lead the experimental group in a fantasy drawing, in
the air, by modeling and saying:
Let's pretend that you are drawing this tricycle in the air with your finger (experimenter demonstrates with her finger). Are you ready? (Experimenter puts finger near the stimulus-tricycle and pretends to draw a line while the students do it also.)

Now, let's draw this drawing with our fingers. (Experimenter puts her finger on the predrawn example and traces around it as the students draw in the air.) Now, close your eyes. I will name parts of the tricycle, and when I name them . . . . you try to remember how the part looks. Ready? . . . (Experimenter names major parts of the tricycle in logical order of occurrence.)

Now . . . open your eyes. Did you remember all the parts, just the way they are?

Let's play a guessing game.

The experimenter made big, imaginary tricycle shapes in the air with her arms and her hands and asks:

What part of the tricycle did I make? (Answer from group.) Now you make it . . . . (And so forth, until all major shapes are identified.)

When the experimental procedures in Session One for Group 1 were over, the experimenter announced the end of Session One and promised more drawing fun for the students in Group 1 next week.

Group 2 -- Verbal Instruction and Examples. This group viewed and discussed the seven minute filmstrip of modified contour drawing exercises, just as Group 1. After viewing the filmstrip, the group discussed the concepts of shape, space, and contours of a group of familiar objects taken from the filmstrip. These objects are a chair, a boat, a plant, a bicycle, and a teddy-bear.

Sections of the filmstrip were reshowed and used as predrawn modified contour drawing examples of the concepts of shape, space and
shared edges in contour drawing. Individual students from the experimental group pointed out responses to the following questions:

Learning to draw is like learning to see. Look at this (chair, boat, plant, bicycle, teddy-bear). How does this line show us the shape of the object? Where does this line tell us about the shape of the object and about the space around the object, at the same time. What spaces are not part of the shape? How can a line do two things at once?

The predrawn example drawing of the stimulus-tricycle was studied, as the experimenter pointed to it and said:

What part of the tricycle does this line tell about? (Experimenter points along the line of the drawing and asks volunteers to point out the comparative shapes, spaces, and shared edges of the stimulus-tricycle with the tricycle drawing).

The experimenter lead the experimental group in a fantasy modified contour drawing, with no modeling, by saying:

Let's pretend that you are drawing this tricycle. Are you ready? (Experimenter indicates a place on the stimulus to begin.) Follow these edges with your eyes. Around the handle bars, over the frame, around the seat, etc. . . . (until all the parts have been named and the beginning point is reached).

Now let's pretend to draw this drawing of the tricycle. (Experimenter talked the students, using no hand movements or modeling, around the predrawn example.)

Now, close your eyes. I will name parts of the tricycle, and when I name them . . . you try to remember how the part looks. Ready? (Experimenter named major parts of the tricycle in logical order of occurance.)

Now . . . open your eyes. Did you remember all the parts of the tricycle, just the way you see them now?

When the experimental procedures of Session One for Group 2 were over, the experimenter announced the end of the session and
promised more drawing fun for the students in Group 2 next week, same time and same place.

**Group 3 -- Verbal Instruction and Modeling.** This group did not see the sound filmstrip, but imagined, guided by the experimenter, the familiar objects of the filmstrip. The concepts of shape, space, and contours were discussed as follows:

Learning to draw is like learning to see. Look at a (chair, boat, plant, bicycle, teddy-bear). In your mind, imagine the shape of the (named object above). Pretend you are making a line around the object. Where does your line tell about the shape of the (object) and the space around the object, at the same time? What spaces are not part of the shape of the (object)? How can a line do two things at once?

The experimenter lead the experimental group in a fantasy modified contour drawing, in the air, by modeling and saying:

Let's pretend that you are drawing this tricycle in the air with your finger (experimenter demonstrated with her finger). Are you ready? (Experimenter put her finger near the stimulus-tricycle and pretended to draw a line, while the students did it also.)

What part of the tricycle does this line (experimenter made a line with her finger) tell about? (Experimenter asks volunteers to point out comparative shapes, spaces, and contours of the stimulus-tricycle with kinesthetic modeling of the experimenter's movements.)

Now, close your eyes . . . I will name parts of the tricycle, and when I name them . . . you try to remember how the part looks. Ready? . . . (Experimenter names major parts of the tricycle in logical order of occurrence.)

Open your eyes. Did you remember all the parts, just the way you see them now?

The experimenter made big, imaginary tricycle shapes in the air with her arms and her hands and asked:

What part of the tricycle did I make? (Group answers.) Now, you make it . . . (And so forth, until all the major parts are identified, again.)
The experimenter announced the end of Session One and promised more drawing fun for the students in Group 3 next time.

**Group 4 — Verbal Instruction Only.** This group was the control group, because the verbal instruction and the stimulus-tricycle were the only teaching aids. This group did not see the filmstrip, or predrawn examples of contour drawing, and did not observe the experimenter modeling the stimulus-tricycle.

This group discussed familiar objects and how to draw them, as the experimenter guided the instruction by saying:

Learning to draw is like learning to see. In your imagination, draw the shape of a (chair, boat, plant, bicycle, teddybear). Pretend you are making a line around the object. Where does your line tell about the shape of the object and the space around the object at the same time? What spaces are not part of the shape of the object? How can a line do two things at once?

The experimenter lead the group in a fantasy drawing, totally imaginary with no modeling, by saying:

Let's pretend that you are drawing this tricycle in your imagination. Are you ready? (Experimenter names, in order of occurrence, the parts of the stimulus-tricycle, while instructing the students to imagine that they are drawing a line around each part.)

What kind of line did you make for this part? (Experimenter again names the major parts of the stimulus-tricycle and asks volunteers to describe the shape, space, and the shared edges of the tricycle parts.)

Now close your eyes. I will name parts of the tricycle and when I name them, you try to remember how they look. Ready? . . . (Experimenter names major parts of the tricycle in logical order of occurrence.)

Now, open your eyes. Did you remember all the parts of the tricycle, just the way you see them now?
Next time, we will practice drawing this tricycle. The experimenter announced the end of Session One and promised more drawing fun for the students in this group next time. Thus ended the experimental procedures for Group 4 in Session One.

Session Two

The objectives of Session Two were to review the visual concepts of shape, space and contours in contour drawing from Session One and to develop a better understanding of these visual perceptions by participation in contour drawing exercises. The following matrix presents the experimental procedures by groups.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Review of Verbal Instruction</td>
<td>X X X X</td>
</tr>
<tr>
<td>Modeling</td>
<td>X X</td>
</tr>
<tr>
<td>Examples</td>
<td>X X</td>
</tr>
<tr>
<td>Blind Contour Drawing</td>
<td>X X X X</td>
</tr>
<tr>
<td>Modified Contour Drawing</td>
<td>X X X X</td>
</tr>
</tbody>
</table>

Figure 3. Treatment by experimental groups in Session Two.

Group 1 — Verbal Instruction, Modeling, and Examples. This group reviewed the contour drawing filmstrip, without the sound; the visuals from the filmstrip were used as predrawn modified contour examples in this session. The vocabulary, visual concepts presented, and the content of the verbal instruction was a review of Session One.
The experimenter modeled modified contour drawing of the stimulus-tricycle with a black crayon on a 22 x 30 inch piece of drawing paper. As the experimenter drew the stimulus-tricycle, she said:

Now direct your eyes to one specific edge on the tricycle. Imagine in your mind's eye that you are drawing the tricycle as I draw it on this piece of paper. Find the edge of the tricycle and draw it with a single, slow, exact line on a piece of paper (experimenter demonstrated).

Experimenter named the parts of the tricycle as she drew it and instructed the students to pretend that they were drawing at the same time. The students then observed the completed modified contour drawing of the stimulus-tricycle.

Five minutes of pure contour drawing followed. The experimenter said:

Put your drawing paper in front of you. Hold it down with your left (right or nondominant hand). Place your black crayon on your paper. We will try to draw the tricycle without looking at the paper in front of you.

The experimenter continued the instructions by saying:

Now find a point on the tricycle where you wish to begin drawing (Experimenter suggests the handlebars by pointing to them). Now find a point on your paper where you will begin to draw. Now, do not look at your paper. Very slowly start to draw the line that shares the edge of the tricycle with the space around it. As your eye moves, move your crayon. (Experimenter demonstrated.)

Ten minutes of modified contour drawing was next. The procedures were similar to pure contour drawing, but some looking at the paper was allowed. The students heard the following verbal instructions:

Hold your paper in front of you. Put your crayon on the paper where you want to begin your drawing. As you move
your eyes, move your crayon. Remember to mostly look at the tricycle, but you can take little peeks at your paper, so that you know where you are.

Remember, you are an eye-hand machine. When your eye moves, so does your hand. Draw slowly.

At the end of ten minutes of modified contour drawing, the experimenter announced the end of Session Two for Group 1.

Group 2 -- Verbal Instruction and Examples. This group reviewed the contour drawing filmstrip, without the sound, and the visuals from the filmstrip partly served as predrawn modified contour examples in this session. The vocabulary, visual concepts presented, and the content of the verbal instruction were a review of Session One.

The experimenter showed predrawn modified contour drawing examples of the stimulus-tricycle and said:

Imagine in your mind's eye, that you are drawing the tricycle. Find the edge of the tricycle, on this drawing, and pretend that you are drawing a single, slow, exact line on this piece of paper.

The experimenter named the parts of the tricycle, slowly, as the students pretended that they were drawing, in their imagination.

Five minutes of pur contour drawing followed. The experimenter said:

Pur your drawing paper in front of you. Hold it down with your (nondominant) hand. Place your black crayon on your paper. We will try to draw a tricycle without looking at the paper in front of you.

The experimenter continued the instructions by saying:

Now find a point on the tricycle where you wish to begin drawing (experimenter suggested the handlebars by pointing to them). Now, find a point on your paper where you will begin to draw. Do not look at your paper. Very slowly start to draw a line that shares the edge of the tricycle with the
space around it. As you move your eye, move your crayon.
Draw slowly.

After five minutes, the experimenter announced ten minutes of modified contour drawing. The students heard the following verbal instructions:

Hold your paper in front of you. Put your crayon on the paper where you want to begin your drawing. As you move your eyes, move your crayon. Remember to mostly look at your paper so that you know where you are drawing.

Remember, you are an eye-hand machine. When your eye moves, so does your hand. Now, draw slowly and look carefully.

At the end of ten minutes of modified contour drawing practice, the experimenter announced the end of Session Two for Group 2.

Group 3 -- Verbal Instruction and Modeling. This group reviewed the concepts of space, shapes, and contours from Session One.

The experimenter modeled the modified contour drawing of the stimulus-tricycle with a black crayon on a white piece of paper the same way as the student's would be asked to make during treatment as she said:

Now, direct your eyes to one specific edge on the tricycle. Imagine in your mind's eye that you are drawing the tricycle as I draw it on this piece of paper. Find the edge of the tricycle and draw it with a single, slow, exact line.

The experimenter named the parts of the tricycle as she drew them and instructed the students to pretend, with their fingers in the air, that they were drawing at the same time as the experimenter was modeling the modified contour drawing procedures.

Five minutes of pure contour drawing followed. The experimenter said:
Put your drawing paper in front of you. Hold it down with your (nondominant) hand. Place your black crayon on your paper. We will try to draw the edges of the tricycle without looking at your paper.

The experimenter continued the instructions by saying:

Now find a point on the tricycle where you wish to begin drawing (experimenter suggested the handlebars by pointing to them). Now, find a point on your paper where you will begin to draw. No, do not look at your paper. Very slowly start to draw the line that shares the edge of the tricycle with the space around it. As your eye moves, move your crayon. (Experimenter modeled).

At the end of five minutes, the experimenter announced ten minutes of modified contour drawing. The students heard the following instructions:

Hold your paper in front of you. Put your crayon on the paper where you want to begin your drawing. As you move your eyes, move your crayon on the paper. Remember to look mostly at the tricycle, but you can take little peeks, so that you know where you are.

Remember you are an eye-hand machine. When your eye moves, so does your hand. Draw slowly.

At the end of ten minutes of modified contour drawing, the experimenter announced the end of Session Two.

Group 4 -- Verbal Instruction Only. This group verbally reviewed the concepts of space, shapes, and contours from Session One. They observed no modeling or predrawn examples.

The experimenter directed the students attention to the stimulus-tricycle and said:

Direct your eyes to one specific edge on the tricycle. (Experimenter points at the handlebars.) Imagine in your mind's eye that you are drawing the tricycle. Find the edge of the tricycle and slowly pretend to draw it with a single, slow, exact line.
The experimenter named the parts of the tricycle as she verbally guided the students in making an imaginary line around the stimulus.

Five minutes of pure contour drawing followed. The experimenter said:

Put your drawing paper in front of you. Hold it down with your (nondominant) hand. Place your black crayon on your paper. We will try to draw the edges of the tricycle without looking at the paper.

The experimenter continued with the following instructions:

Find a point on the tricycle where you wish to begin drawing (experimenter indicates the handlebars). Find the point on your paper where you will begin to draw. Do not look at your paper. Very slowly begin to draw the line that shares the edge of the tricycle with the space around it. As your eye moves, move your crayon.

At the end of five minutes, the experimenter announced ten minutes of modified contour drawing. The students heard the following verbal instructions:

Hold your paper in front of you. Put your crayon on the paper where you want to begin your drawing. As you move your eyes, move your crayon on your paper. Remember to look mostly at the tricycle, but you can take little peeks, so that you know where you are.

Remember, you are an eye-hand machine. When your eye moves, so does your hand. Draw slowly.

At the end of ten minutes of modified contour drawing, the experimenter announced the end of Session Two for Group 4.

Session Three

The objectives of Session Three were to review the concepts of shape, space, and contours in drawing. The following matrix (Figure 4) defines the experimental procedures by group. Session Three ended with a posttest for all groups.
Groups

Treatment                  | Groups
|--------------------------|--------
| Review of Verbal Instruction | 1  X  X  X  X  |
| Modeling                 | 2  X    |
| Examples                 | 3  X    |
| Posttest                 | 4  X  X  X  X  |

Figure 4. Treatment by experimental group in Session Three.

Group 1. The experimenter modeled a modified contour drawing of the stimulus-tricycle as the students followed in the air with their hands. Then, the group discussed the shape, spaces, and contours of the modeled modified contour drawing of the stimulus-tricycle. Individual students were asked to point out comparisons between the modeled drawing and the stimulus. Five minutes of modified contour drawing followed with the instructions identical to Session Two.

Group 2. This group discussed the predrawn modified contour example of the stimulus-tricycle, without modeling, using the same procedures as Group 1.

Group 3. The experimenter modeled modified contour drawing of the stimulus-tricycle. Individual students were asked to point out comparisons between the modeled modified contour drawing and the stimulus-tricycle. Five minutes of modified contour drawing followed.

Group 4. This group discussed the shapes, spaces, and the contours of the stimulus-tricycle, verbally, without modeling or examples. Individual students were asked to point out shapes, spaces, and contours on the stimulus-tricycle. Five minutes of modified contour drawing followed.
Posttest. All subjects in the four experimental groups made drawings of the tricycle as the posttest using the same instructions and methods as for the pretest. (See the pretest instructions.)

Scoring

The pretest and posttest drawing were scored for five discrete visual criteria by two raters, working independently, using a rating scale modified from one developed by Salome (1965) and Salome and Reeves (1972) (see Appendix A). Both raters, certified elementary art teachers, were carefully trained by the experimenter with drawings not used in the experiment. Experimenter bias of the results was controlled by randomly numbering the experimental drawings and scoring them without knowledge of the pretest, posttest, or experimental group origins.

A measure of inter-rater reliability was computed using gain scores on a Pearson Product Moment Correlation, separately computed by experimental groups for pretest and posttest scores, showed high agreement between the raters.

Table 1. Inter-rater reliability for each experimental condition.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Verbal Instruction, Modeling and Examples</td>
<td>.84**</td>
<td>.66**</td>
</tr>
<tr>
<td>2. Verbal Instruction, Examples</td>
<td>.76**</td>
<td>.47*</td>
</tr>
<tr>
<td>3. Verbal Instruction, Modeling</td>
<td>.76**</td>
<td>.54*</td>
</tr>
<tr>
<td>4. Verbal Instruction</td>
<td>.89**</td>
<td>.74**</td>
</tr>
</tbody>
</table>

*P < .01  **P < .001
CHAPTER 4

RESULTS

A score for each pretest and posttest drawing was obtained from each rater. The sum of the two sets of pretest scores was subtracted from the sum of both raters' posttest scores. Each child's contour drawing performance was assessed by the resulting gain score. Measures of inter-sex and inter-classroom reliability was made using these gain scores a one-way analysis of variance. Neither sex nor the use of different classrooms affected student's responses (p < .95 and .74 respectively), so all data were combined to examine the experiments main effects.

A 2 (modeling/no modeling) x 2 (examples/no examples) simple analysis model was therefore used on all gain scores to analyze the children's contour drawing performance. Analysis of variance confirmed that the modeling strategy significantly affected the kinds of drawings produced by the third grade children in this experiment (F (1,76) = 6.65, p < .01) (see Table 2). Groups 1 and 3 for whom contour drawing was modeled produced greater gains from pretest to posttest (3.35 and 3.05 respectively) than did the groups (2 and 4) who received no modeling (see Table 3).

There were no significant effects attributable to having viewed predrawn and other examples. These groups (2 and 4) showed gain scores
Table 2. Analysis of variance summary table.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling</td>
<td>1</td>
<td>195.312</td>
<td>6.647*</td>
</tr>
<tr>
<td>Examples</td>
<td>1</td>
<td>3.613</td>
<td>.123</td>
</tr>
<tr>
<td>Modeling x Examples</td>
<td>1</td>
<td>10.512</td>
<td>.358</td>
</tr>
<tr>
<td>Residual</td>
<td>76</td>
<td>29.382</td>
<td></td>
</tr>
</tbody>
</table>

*p < .01

Table 3. Mean gain: Posttest minus pretest.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Mean Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (Verbal Instruction, Modeling, Examples)</td>
<td>7.05</td>
<td>10.400</td>
<td>3.35</td>
</tr>
<tr>
<td>Group 2 (Verbal Instruction, Examples)</td>
<td>8.600</td>
<td>8.100</td>
<td>-.50</td>
</tr>
<tr>
<td>Group 3 (Verbal Instruction, Modeling)</td>
<td>6.775</td>
<td>9.825</td>
<td>3.05</td>
</tr>
<tr>
<td>Group 4 (Verbal Instruction only)</td>
<td>7.225</td>
<td>7.875</td>
<td>.65</td>
</tr>
</tbody>
</table>
of -.50 and .65, respectively. No significant effects were observed as a result of an interaction between the two independent variables.

Overall, absolute gain scores were in the present study similar to those recorded earlier by Rush et al. (1980) study. Due to subsequent modification of the Salome scale, however, less possible total points were available. The 1980 rating procedure used a 10 point scale with a maximum of 30 points for the first three criteria versus the 5 point rating scale with a maximum of 15 points for these same three criteria in the present study's scale (see Appendix A). Thus a drawing on the 1980 scale could earn a possible total of 32 points, while the same drawing on the present rating scale could earn 17. The mean gains in the present study, therefore, represent absolute gains that are almost twice as high as those produced previously.
CHAPTER 5

DISCUSSION

Analysis of these data showed some results similar to the previous study and some exactly opposite. The finding of the earlier experiment that viewing conditions (one vs. two points of view) had no noticeable effect on the competency of children in making modified contour drawings was upheld. The hypothesis was retested by placing the modeling-examples and examples-only groups in the classroom with the most restricted viewing conditions and the modeling and verbal-instruction-only groups in the classroom with the most diverse viewing conditions. Gain scores from the two modeling groups were almost identical. The subsequent analysis of scores from the two schools bore out this initial observation.

The assumption that boys and girls would respond the same in these learning situations was not tested previously, and was considered by some reviewers to be a serious flaw in the design of the first study. Present findings showed gain scores of boys and girls to be similar, despite some evidence in the literature of sex differences with regard to performance on tasks requiring visual perception of space and other art-related skills.

The preceding study showed that the use of predrawn examples enhanced children's drawings more than exposure to modeling, but in the present study the situation was just the opposite. Modeling of contour
drawing procedures was effective in encouraging more sophisticated drawings, but neither examples alone nor verbal instruction alone produced any noticeable differences. Children viewing the filmstrip and real drawings showed no improvement from the pretest to the posttest whatsoever, performing with exactly the same proficiency on both—a condition exhibited also by the children receiving no visual information at all. The combined use of examples and modeling procedures produced no enhanced results for that particular group, which showed the same amount of gain from pretest to posttest as the modeling-only group.

While findings from the two experiments are quite different, the present study may be slightly more believable because of the precautions taken to assure consistency of treatment presentation. The experimenter spent equal time with each group (three 30-minute sessions as opposed to two 45-minute sessions earlier). The efficacy of these shorter three session exposures may be visible in the relatively larger absolute gains recorded for children in the second study.

The current investigation also was undertaken at a different time of year than previously. The first set of treatments were given early in the fall semester of the school year, while the second set were given almost at the end of the spring term. All of the second groups of children had a higher mean age (8 years 9 months as compared to 8 years before) and all had received third-grade drawing instruction in their regular art classes prior to our pretesting. This second group of youngsters was much more visually sophisticated and technically
proficient, and this higher skill level manifested itself in higher pretest scores than those recorded two years ago.

The higher gains from pretest to posttest in this study might also be explained by changes made in the rating scale from the previous study to this one. A five-point rating scale for the first three items was substituted for the ten-point scale used earlier for those same three items. This change resulted in 17 as compared to 32 total possible points. While the results of the two analyses of variance are comparable, the mean gains do not correspond exactly. The gains in this study should be read as approximately twice as high in order to get some idea of their value when compared to those reported for the first experiment.

In retrospect, given the aims of replicating the previous study, changing the scale was an unwise decision. Given the diametrically opposite sets of results, an exact comparison now appears desirable. For that to be possible, all of the drawings will have to be rescored according to the original instrument. The decision made to change the rating scale for the sake of expediency will necessitate considerable additional effort before the results will be ready for publication.

A graphic understanding of the differences between the earlier and later sets of drawings can be had from comparing the drawings themselves without resorting to any rating scale whatsoever. Those from the first study are clearly less proficient than ones from the second, even on the posttest. The attempt to provide more thorough instruction,
coupled with the advanced age and expertise of the students, seems to have succeeded. The second set of drawings are more advanced in representational realism containing many details and embellishments, with even rudimentary perspective present in both the pretest and posttest drawings. The posttest drawings of the modeling groups (1 and 3) are very large with numerous details of graphic changes due to color, shape, and size in addition to just the contour lines of the object drawn.

The results of the present study now have upheld the expectations for the earlier study with regard to the efficacy of modeling, since the experimenter was more careful with and confident in the procedures this time. As for predrawn examples, was it their quality? They were much more thorough; perhaps they were too complex for children of this age. Perhaps, on the other hand these older children had already seen things similar to them and therefore found them uninteresting, that is, found no new information in them. All of the examples, especially the filmstrip, were judged quite good and complete by the experimenter and other art teachers. The question of why the examples group did not outperform the group that saw no visual material thus becomes important because this finding runs counter to established art education practice, theory, and research literature.

One major area to be investigated in this regard is the sensitivity of the rating instrument used. Does it give proper weighting to the items that it does measure? Some items may be worth 5 (or 10) points; others only one. What if the yes-no items were scored either
5 or 0 (10 or 0)? Would this change the pattern of performance? Does it measure the significant features that describe artistic growth? What other items might be included that may be discerned by looking at the drawings?

Also there is still one major variable uncontrolled: the difference in experimenters from one year to the next. One may have enjoyed teaching with examples and one may have preferred modeling. Both observed many apparent differences in their students, and the former claimed her examples groups were the livelier, while the latter felt the same about her modeling students. Their data in both cases supported their intuitive conclusions. Many differences reported by these experimenters were not statistically significant, however, such as classroom variation, boy-girl ratios, teacher discipline, and the like, so the matter remains speculation. It is a good lesson in the vicissitudes of experimental research in the visual arts and the powerful effect of the teacher, and perhaps the teacher's expectations, on the student behavior. Few studies in art education to date have examined the variance introduced into any experiment by the experimenter himself or herself. The recent call for replication is one way to address this issue.
APPENDIX A

RATING SCALE

The five-criteria rating scale with a total possible point value of 17 used in this experimental design was modeled on a scale developed by Salome and Reeves (1972). Each of the first three criteria were followed by two statements describing the degree to which a drawing achieved that measure. Criteria four and five were worth one point each, providing the drawing indicated achievement on those items. Drawings were analyzed in terms of the following dependent variables:

1. **Quality of Line**: 1-5 points, ranging from lines not firm or directionally controlled to all lines firm, directionally controlled, relevant to object drawn, and free of wavering.

2. **Closure-Clarity**: 1-5 points, ranging from major forms not enclosed and/or many parts missing; and/or lines mainly irrelevant to object and parts to parts enclosed by lines which accurately describe the straight and the curved edges of the object.

3. **Angles and Curves**: 1-5 points, ranging from less than 1/2 of points and/or irrelevant location to accurately locating and differentiating between angles and peaks of curvature in curvature of major and minor shapes.
4. **Joining Lines:** 1 point, if lines are joined without overlap or extension of ends beyond places of joining (allow two errors).

5. **Lines Due to Color Change:** 1 point, if drawing includes lines affected by color change in the object (includes at least two instances).
APPENDIX B

FILMSTRIP

Contour Drawing

<table>
<thead>
<tr>
<th>Visuals</th>
<th>Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Music up--5 seconds.</td>
</tr>
<tr>
<td></td>
<td>Music fades and Voice up:</td>
</tr>
<tr>
<td>1. Title</td>
<td>Contour Drawing</td>
</tr>
<tr>
<td>Examples</td>
<td>Voice fades and Music up--5 seconds.</td>
</tr>
<tr>
<td>2. Chair</td>
<td></td>
</tr>
<tr>
<td>3. Bear</td>
<td></td>
</tr>
<tr>
<td>4. Bicycle</td>
<td></td>
</tr>
<tr>
<td>5. Plant</td>
<td>Music fades and Voice up:</td>
</tr>
<tr>
<td>6. Picture of Sailboat</td>
<td>Imagine, in your mind's eye, a sailboat on a lake . . . imagine that the sailboat, the clouds, and the water are all puzzle pieces . . .</td>
</tr>
<tr>
<td>7. Puzzle of Sailboat</td>
<td></td>
</tr>
<tr>
<td>8. Black and white</td>
<td>How would the puzzle look if all the pieces were black and white? . . . (pause) . . . The edges of the puzzle pieces join the edges of the back-ground shapes . . . (pause) . . . and everything fits together to make the whole picture . . . (pause) . . . Let's look at more puzzles of pictures . . .</td>
</tr>
<tr>
<td>puzzle pieces.</td>
<td></td>
</tr>
<tr>
<td>9. Puzzle pieces put</td>
<td></td>
</tr>
<tr>
<td>together with the</td>
<td></td>
</tr>
<tr>
<td>division lines</td>
<td></td>
</tr>
<tr>
<td>(contours) evident.</td>
<td></td>
</tr>
<tr>
<td>10. Chair Example</td>
<td></td>
</tr>
<tr>
<td>11. Bear Example</td>
<td>Music up--10 seconds (end of Visuals)</td>
</tr>
<tr>
<td>12. Bicycle Example</td>
<td>Music fades and Voice up:</td>
</tr>
</tbody>
</table>

44
<table>
<thead>
<tr>
<th>Visuals</th>
<th>Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Plant Example</td>
<td>The puzzle pieces form shared edges or contours with the background of the picture. . .</td>
</tr>
<tr>
<td>14. Bear</td>
<td>Voice fades and music up—until end of visuals</td>
</tr>
<tr>
<td>15. Chair</td>
<td></td>
</tr>
<tr>
<td>16. Bicycle</td>
<td></td>
</tr>
<tr>
<td>17. Plant</td>
<td></td>
</tr>
<tr>
<td>18. Subtitle: Shapes</td>
<td>The shapes of the objects . . .</td>
</tr>
<tr>
<td>19. Chair shape</td>
<td>Music up during Visuals.</td>
</tr>
<tr>
<td>20. Bear shape</td>
<td></td>
</tr>
<tr>
<td>21. Bicycle shape</td>
<td>Music fades and Voice up:</td>
</tr>
<tr>
<td>22. Plant Shape</td>
<td></td>
</tr>
<tr>
<td>23. Subtitle: Spaces</td>
<td>. . . and the spaces around the shapes of the objects . . .</td>
</tr>
<tr>
<td>24. Space around Bear</td>
<td></td>
</tr>
<tr>
<td>25. Space around Chair</td>
<td></td>
</tr>
<tr>
<td>26. Space around Bicycle</td>
<td></td>
</tr>
<tr>
<td>27. Space around Plant</td>
<td>Music fades and Voice up:</td>
</tr>
<tr>
<td>28. Contour of Bear</td>
<td>. . . all fit together to make a whole contour drawing . . .</td>
</tr>
<tr>
<td>29. Contour of Chair</td>
<td>Music up as Voice fades under.</td>
</tr>
<tr>
<td>30. Contour of Bicycle</td>
<td></td>
</tr>
<tr>
<td>31. Contour of Plant</td>
<td></td>
</tr>
<tr>
<td>32. Subtitle: Shapes</td>
<td>Look at the shapes of what you want to draw . . . then look at how the space fits in and out and around the shapes . . .</td>
</tr>
<tr>
<td>33. Subtitle: Space</td>
<td></td>
</tr>
<tr>
<td>Visuals</td>
<td>Audio</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>34. Close-up of space/shape concept</td>
<td>Music up as Voice fades under.</td>
</tr>
<tr>
<td>35. Same</td>
<td></td>
</tr>
<tr>
<td>36. Same</td>
<td></td>
</tr>
<tr>
<td>37. Same</td>
<td>Music fades as Voice up:</td>
</tr>
<tr>
<td>38. Contour Drawing</td>
<td>Then draw all the contours just the way you see them . . .</td>
</tr>
<tr>
<td>39. Contour Drawing Example</td>
<td>Music up as Voice fades under</td>
</tr>
<tr>
<td>40. The End</td>
<td>End of Filmstrip—Music fades.</td>
</tr>
</tbody>
</table>
Reyna (Group 2) Pretest

Reyna - Posttest
Preston (Group 1) Pretest

Preston - Posttest
Michael (Group 2) Pretest

Michael - Posttest
Nathan (Group 2) Pretest

Nathan - Posttest
Maricela (Group 3) Pretest

Maricela - Posttest
David (Group 3) Pretest

David - Posttest


Shumaker, M. S. Figure drawing comparisons between eighth graders and adults. Unpublished master's thesis, University of Arizona, 1981.


