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Developing critical thinking skills through microteaching for Spanish-speaking students with learning disabilities in a western Massachusetts urban school district.

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DEVELOPING CRITICAL THINKING SKILLS THROUGH MICROTEACHING FOR SPANISH-SPEAKING STUDENTS WITH LEARNING DISABILITIES IN A WESTERN MASSACHUSETTS URBAN SCHOOL DISTRICT

A Dissertation Presented

by

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To

My Son, Edgardo Oyola

and

My Mother, Tomasa Oyola

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ABSTRACT

DEVELOPING CRITICAL THINKING SKILLS THROUGH MICROTEACHING FOR SPANISH-SPEAKING STUDENTS WITH LEARNING DISABILITIES IN A WESTERN MASSACHUSETTS URBAN SCHOOL DISTRICT

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This study examines the impact of microteaching techniques toward the development of the thinking process from simple to complex skills. The study was conducted with twenty-three Spanish-speaking students in the Springfield (Massachusetts) Public Schools who were enrolled in the Special Education Program for children with specific learning disabilities. The students attended Van Sickle Middle School and Chestnut Middle School. Two groups were utilized in this study: Group A received treatments with microteaching techniques, while Group B did not receive any treatments with microteaching. Both groups were submitted to pre/posttests. Group A's teacher was trained with microteaching techniques, while Group B's teacher was not. Group A was subjected to three pre/posttests for the

purpose of manipulation of a variety of treatments. Group B was submitted to a pretest/posttest. This was the test used to compare the results of both groups at the end of the study. This exploratory study did not deal with hypothesis testing. It set the basis for the formulation of hypothesis to be tested in future research endeavors.

The instruments used in this study were in Spanish and consisted of three pretests/posttests used to evaluate simple and complex thinking skills. The pretests/posttests consisted of short readings in order to: determine the order of details using pictures; identify issues related to the main character in the study; express ideas that were not explicit in the stories; and find the central idea, order of successes, imply ideas, imply cause-and-effect, and main idea.

The following microteaching techniques were used in the development of simple and complex thinking skills by the teacher that worked with Group A: diagnostic, introduction to learning, multiple reference markers, the art of formulating questions, and contra-interrogatory. The teacher who worked with Group B did not use the microteaching technique.

Results indicated that Group A, after having used microteaching techniques in the posttests ("The Greedy Bear" and "The Wave That Wanted to Travel"), obtained

69 percent control in the following skills: order of successes, details, personal characteristics, imply ideas, imply cause-and-effect, and main idea.

According to the results, after having utilized the test "The Wave That Wanted to Travel", it was found that the students from Group B were not able to master the simple and complex thinking skills. With Group B, the microteaching technique was not used.

Based on the results mentioned, recommendations were formulated for administrators and teachers, as well as for future work and research in the field of Special Education with Spanish-speaking students.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Throughout the researcher's years as a Special Education teacher, it was observed how important it is to master teaching skills in order to accomplish educational objectives to the benefit of the students.

Each student in Special Education should have an individual plan with specific educational goals consistent with their potential learning skills. In order to assist students with specific learning problems, the researcher felt compelled to further research and identify how these students can develop simple and complex thinking skills that would facilitate their learning.

A child with specific learning disabilities is one with average or above-average intelligence without problems such as vision or hearing impairment, deficient motor skills, or emotional difficulties. It could be a problem with underdeveloped reading skills and difficulties with the following functions:

- Improper acquisition, integration, and utilization of language skills;
- Difficulties in perceptions, thinking process, writing, spelling, mathematics, and problem-solving skills.

Another way to define specific problems in the learning process is by grouping students according to their abilities already attained, or deficiencies in language and commonly-known medical problems, like dyslexia.

Under the concept of specific learning problems, grouping could also include those with minimal brain dysfunctions, with or without dyslexia, and with other prominent disabilities that interrupt the learning process, such as aphasia (Kass, 1969).

The Worldwide Neurological Federation Dyslexia Committee defines dyslexia as "a disorder that manifests itself in difficulties with reading, understanding conventional instructions, adequate intelligence, and an inability to adapt to social/cultural demands, dependent on basic cognizant inabilities" (Hammill, Leigh, McNutt, & Larsen, 1981).

Neurological maturity is one of the three factors that causes learning process problems. The very nature of the nervous system and its functions require constant stimulation in early childhood in order to gain proper and adequate maturity which allows adaptation to the social environment in which we live. Stimulation of the nervous system is vital since it helps the child in his or her behavior and creates a need in the child to learn.

Children that are deprived of maternal, social, and environmental stimulation may not mature neurologically

as quickly as others. This will interrupt the process of learning. Some children have learning disabilities due to chronic diseases, retardation, psychological factors, vision and hearing impairment, or sense of touch.

Other disabilities that can delay the process of learning for a child could be due to perceptual defects in the nervous system or cerebral damage. Problems in speech and motor skills can also interrupt the process of learning.

It is vital to encourage children with special needs to learn simple and complex skills which will enable them to reach their full potential in the learning process. The learning of simple and complex thinking will enable the person with special needs to be a more complete person, a better worker and professional.

These skills can be obtained through learning, intellectually, when attitudes and concepts are attained. The effectiveness of thinking depends on certain attitudes and the use of different skills, such as problem solving, discussing events, attaining goals, and an understanding of others (Hammill, Leigh, McNutt, & Larsen, 1981).

The school should contribute to the development of these skills and attitudes by providing information that will facilitate students' knowledge and concepts to a degree that they can develop skills in diverse situations.

When a child commences school, he or she has the capacity to think, make judgments, solve problems, and make

decisions. It is the responsibility of the educational system to help him or her to effectively develop in his or her thinking and creativity.

When one analyzes the capacity of thinking with an educational purpose, one comes to the conclusion that the process of thinking comes from information that is stored through the years in memory. The information is then effectively used according to the concepts and skills attained by the student. As a result, the student learns to use the available strategies in different situations. This is known as metacognition skills. Once the metacognition skills are attained, the student learns to recognize his or her mistakes, realizing the need to think carefully, to reason, and to control the process of thinking.

The thinking process, with its diverse elements, can be analyzed as the whole of specific skills and activities that receive, process, and produce information. These skills can be divided into simple (or basic) and complex. The simple skills are related to our capacity to receive information and use it in a significant manner. The complex skills are more inclusive and lean on the basic skills. The teacher will help the child develop basic and complex skills and the thinking capacity of receiving, processing, and producing information, and as such, learning the ability of careful thinking.

We must not forget that our goal is to develop effectiveness in the thinking process to be creative and critical. To teach someone to think means that the teacher will provide an environment that will motivate the student to think. This requires organizing activities that will develop skills that motivate the process of thinking. This can be accomplished by the teacher by skillfully planning activities that motivate the student to intellectually establish goals that require the use of thinking skills (Departamento de Instruccion, San Juan, Puerto Rico, 1987).

Significance of the Study

Studies conducted by many universities and schools regarding Special Education agreed that many teachers have difficulties with educational strategies for children with learning difficulties (Bayliss, 1985; Wallace, 1980).

To improve thinking skills of students with special needs, in the public schools of Massachusetts and Puerto Rico, it is necessary to develop consciousness in the different strategies of learning styles of students with particular needs so that students may be prepared to learn the different strategies and methods of the thinking process.

The New Organic Law of the Department of Education in Puerto Rico established priority in the development of skills in the thinking process in the public schools. The Department of Education in Puerto Rico defines the development of thinking/critical skills (in their revision of 1985) as one of the three principles in the renovation and integration of the curriculum. Chapter I federal legislation highlights the need of orientation in strategies in the thinking process.

According to Villarini (1991), the focus in thinking skills is one that is not only centered in the United States but is worldwide and should be the primary objective in the educational movement.

In order to be effective in the teaching process, the development of thinking skills is indispensable in the learning process, if we want to achieve our goal which is to enable the student to develop to his or her full capacity in the learning process and become a useful and good citizen in our community. If our goal is to educate and be effective educators, we should develop strategies that may help to develop thinking skills in the learning process. Eugenio Maria de Hostos highlights: "To teach is to educate, to know, and to guide reasoning in the learning process" (Villarini, 1991).

According to Bloom (1975), teaching objectives in the development of thinking skills require a combination of

intellectual concepts which will enable the student to obtain the necessary skills in problem solving and new techniques. Problems that require intellectual aptitude will motivate the student to organize, recognize, and use material in problem solving, and this will lead to intellectual development (Skills + Knowledge = Intellectual Skills).

In order to accomplish our learning objectives in the learning process, it is necessary to plan and prepare activities which will reflect good results, not only individually but as a whole, in the classroom (Villarini, 1991).

It is the objective of this study to present a new vision toward the development of thinking skills in the learning process of children with specific learning disabilities. It will provide material in the development of simple and complex skills for children with specific learning problems.

Purpose of the Study

The objective of this exploratory research study was to:

- Analyze material related to the theme to determine adequate learning strategies to help children with specific learning problems;

- Identify relevant microteaching techniques that will help children with specific learning skills to develop simple and complex skills in the thinking process;
- Develop materials and procedures for Special Education children that will improve simple and complex skills in the thinking process.

Delimitations of the Study

Following are limitations of this exploratory research study:

- There were a limited number of subjects within the public schools participating in this study.
- The placement of the students was not in agreement with the educative needs of these students.
- There were a limited number of materials provided in Spanish.

Definition of Terms

The following definition of essential terms give direction to this study:

Contra-Interrogatory: Rest in the skills of making up questions, inquire, ask, carefully examine, try out the

questions, interpret, scrutinize, drill. One can say that it is a refined phase of that of asking a question (Selles, 1963).

Complex Skills: Complex skills means the processing of information at a higher level; a profound way of thinking, such as analysis, evaluation, and solution of problems, where a combination of various skills and concepts is required (Villarini, 1991).

Diagnostic: This exam is used to determine how much the student knows about a topic (Selles, 1963).

Interaction Patterns: The climate of work demands continuous interaction between teacher and students. The teacher should deliberately use different types of interaction in the same class in order to make the presentation content more interesting (Selles, 1963).

Learning Disabilities: The term "children with specific learning disabilities" means those children who have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. These disorders include such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Such term does not include children who have learning problems which are primarily the result of visual,

hearing, or motor handicaps, of mental retardation, of emotional disturbance, or environmental, cultural or economic disadvantage (Act 94-142 of 1975, pp. 89-794).

Microteaching: Microteaching is the technique utilized by many universities in the United States and other countries of the world as part of the training for a prospective teacher's education. It consists of small lessons taught by teachers to volunteering students. The lessons are recorded on video and closely examined by teachers and supervisors to review the aspects of the lesson and to determine how it can be improved. The same lesson is taught once again with the specified modifications. By using this method, the teacher learns better techniques for teaching, which in turn improves his or her effectiveness as a teacher and at the same time benefits the students. Microteaching is said to be the teaching method measured by scales which serves three basic purposes: (1) An experience and preliminary practice in teaching; (2) An investigation to explore the effects of training under controlled conditions; and (3) An instrument of training in service (Allen, 1969).

Multiple Reference: Multiple reference is the various means used to transmit the message (Selles, 1963).

Pedagogy Closure: At this time, the students experience the satisfaction of understanding what they are investigating (Selles, 1963).

Simple Skills: These are limited to a superficial process of stimulus or information: observe, remember, and compare with previous information attained. At this level, the information understood is literal or immediate without establishing relationships with other information attained. As simple as they are, these skills are necessary since the complex will not be able to function unless you attain the basic skills first, such as the analytical (Villarini, 1991).

Skills: Skills are the mental and/or physical abilities acquired by observation, study, or experience that are basic to the mastery of school work or other activity. Such abilities may include proficiency in planning and investigating, operational techniques, comprehension, organization, execution, remembrance, and application of knowledge to acquire a desired result (Shafritz & Others, 1988).

Strategies: As a whole, it is articulated pedagogical instruction with an objective established (Shafritz & Others, 1988).

Technical: A term denoting a level of knowledge and skills possessed by an individual or required of an individual to perform an assignment. The level of skill

is attained through education and training, usually including (at a minimum) an associate's degree (or its equivalent) obtained through special study and/or experience (Shafritz & Others, 1988).

Thinking: The action of using one's mind to produce thoughts, and interpret a significant thought of ideas to transform the stimulus received from the environment and create concepts, ideas, and knowledge that will enable the person, in the future, to have reading of a text requiring literal reading. Different ways to view and understand the environment, intelligence, and thinking depend mostly on biological and sociocultural factors besides acquiring intellectual tools, such as attitude and conceptual skills which can be taught and attained (Shafritz & Others, 1988).

Organization of the Study

The dissertation consists of five chapters. Chapter I includes the statement of the problem, significance of the study, purpose of the study, delimitations of the study, and definition of terms. Chapter II provides the conceptual base for the research. It consists of a review of the related research and literature. Chapter III discusses the design of the study. The procedures for instrumentation and data collection are included.

Chapter IV centers on analysis of the data and interpretation of the findings as they relate to the research objectives that guide this investigation. Chapter V includes recommendations for action to improve and develop the thinking skills of children with specific learning problems.

C H A P T E R II

REVIEW OF THE LITERATURE

Introduction

This chapter will present a review of the literature regarding the development of simple and complex thinking skills, what is thinking, techniques, and a focus as to how to work with children with specific learning problems. As part of the review of the literature, microteaching is presented as an effective strategy for the development of simple and complex thinking skills in children with specific learning problems.

Specific learning problems are one of the most complex exceptions to be diagnosed due to their nature. Also, in the majority of cases, children are viewed as retarded or possessing emotional problems.

In today's society, there are a variety of tests that help to detect children with possible learning problems. Teachers, however, must assume great responsibility for these children. They must find the precise treatment to aid in their progress and to develop to their maximum potential. Thinking skills should be developed in the first years of schooling, learning the necessary skills and developing those skills to the maximum.

What Is Thinking?

In order to determine the simple and complex learning strategies of thinking, the definition of thinking should be presented. "Thinking" is defined as: "A somewhat colloquial term for higher-level mental processes that may involve memory, imagination, problem solving, etc." (Dictionary of Education, 1988, p. 474). Attempts to describe this complex concept include A Study of Thinking by Bruner, Goodnow, and Austin (1986) and Teaching Thinking Skills: Theory and Practice by Boykoff Baron and Sternberg (1987).

According to Costa (1985), thinking is generally assumed to be a cognitive process, a mental act by which knowledge is acquired. Although cognition may account for several ways that something may come to be--as in perception, reasoning, and intuition--the current emphasis on thinking skills emphasizes reasoning as a major cognitive focus. Consider, for example, the following definitions of thinking: (a) The mental derivation of mental elements (thoughts) from perceptions and the mental manipulation/combination of these thoughts; (b) the mental manipulation of sensory input to formulate thoughts, reason about, or judge; and (c) the extension of evidence in accord with that evidence so as to fill up gaps in the evidence; and this is done by moving

through a succession of interconnected steps which may be stated at the time, or left until later to be stated (Costa, 1985).

Several interesting aspects underline these definitions of thinking. Thinking processes are related to other kinds of behavior and require active involvement on the part of the thinker. Notable products of thinking--thoughts, knowledge, reasons--and higher processes, like judging, can also be generated. Complex relationships are developed through thinking, as in the use of evidence over time. These relationships may be interconnected to an organized structure and may be expressed by the thinker in a variety of ways. If anything, these definitions indicate that thinking is a complex and reflective endeavor as well as a creative experience (Costa, 1985).

The document Principles for the Integration of the Curriculum (Department of Public Instruction, 1987) defines thinking as the capacity the human being has to construct a mental representation or interpretation significant in its relation with the world. The capacity to think means to:

(1) Produce concepts and understanding about oneself and one's world. The human being relates to his or her world by thinking. For the human being, his or her world is how he or she makes it intellectually for

him/herself, and how he or she adjusts to the stimulus that raises from him/herself and that assimilates the mental structures that he or she already possesses.

(2) Face problems, look for solutions, arrive at conclusions, and make decisions when there are diversified alternatives known in the world.

(3) Establish goals, means, and plans to reach. This way his or her activity is oriented and he or she can acquire a sense of direction.

(4) To communicate, understand, and interact with other thinking persons.

One simple way to understand what thinking means is to analyze the following everyday expressions: "Don't do things without thinking about it first"; "Don't get desperate before you actually say or do something; think about it"; "You must sit down and think calmly about this." All of these expressions make it clear that in everyday life we know the difference between a passive thought, not organized, automatic, mechanic, routinely made, associative, reflective ("the first thing that comes to mind") and an active reflective thought, organized and effective. These expressions also state that we should

think in an original way, break the present ideas, look for new alternatives, utilize our own ingenuity and not fall into routines or what others have said, make use of our own imagination and think creatively. Finally, expressions also refer to a demand that we sometimes subject our own minds to tests and evaluations, that we try to see ourselves from different points of view; that is to say we are our own critics.

Although this document asks that schools contribute to its development by means of its diverse materials, it is the continuous effort, organized and directed with a purpose, that gives meaning to our relationships with the world. For there to be thinking, so that the students "begin to think", there needs to be something that will activate their thinking.

The school contributes to the development of effective, creative, and critical thinking. It helps students to be organized and become familiar with its purpose. This happens through opportunities and experiences so that the student makes up a problem and tries to explain it to the world, that he or she has goals and makes plans to reach them, and that he or she tries to understand other human beings at the same time.

The object of developing thought or the intellectual capacity of the students rests on the educative assumption that this is a capacity that can be learned. It is

certain that intelligence and thinking depend on the biological sociocultural factors, as well as certain intellectual factors (such as attitudes, dexterities, and concepts). These can be taught and learned. As Eugenio Maria de Hostos (1953) stated: "There can be no more methods of teaching than those which spontaneously follow the reasoning to think and, in this case, the formal aim (pedagogical) and the essential (psychological) are one and become the same in the functions of the mind. The only way to assure that the teaching will be effective is by guiding the subject to think. The general method that should be followed in order to activate understanding is that which, in part, is always being seen, as a principle of illumination and as a method of discipline, which makes the following true: that the objective of teaching is not so much to provide the knowledge, but rather to activate the organs in a way in which they themselves will be capable of acquiring it."

The efficiency of thinking depends upon certain attitudes; the use of diverse techniques of skills and how they are combined or joined in a process or how they are part of a strategy to solve a problem, explain events, have goals and means to reach them, and to understand other human beings. The school has to continue to develop these activities and skills and at the same time make it possible for the students to carry out the process. The school

gives the students an opportunity to learn these concepts and acquire this information that helps them apply the skills in different situations.

Presseisen (1986), in her book Thinking Skills, gives many elaborate definitions from different authors. Sternberg (1984) presents his triarcular theory of intelligence that emphasizes thinking and learning skills drawn from an information processing approach. He specifies particular mental mechanisms that lead to more or less intelligent behavior which includes learning how to do things, planning what to do and how to do them, and performing the task. Sternberg is also concerned with understanding situations that require the use of these mental mechanisms and the student's awareness of the external world in which thinking is to be enacted.

Ennis (1985) proposed critical thinking as the major emphasis of learning to think. He considers critical thinking to be the reasonable, reflective thinking one performs when deciding what to believe or do. It involves both dispositions and abilities, such as inference, induction, and deduction. In his viewpoint, much depends on the thinker's interaction with other people in his or her environment. Ennis also stressed the importance of clarity of information to inform the thinker's decisions.

Lipman (1985) stresses the importance of philosophy and reasoning with language as the basis of developing children's thinking abilities. Very similar to the critical thinking approach in his philosophy for children's programs, Lipman developed classroom materials and a teacher education model for early childhood through secondary school instructions that are being used around the world.

DeBono (1983) defined thinking as "the operating skill with which intelligence acts upon experience." He maintains that such skills can be taught directly and that certain aspects, such as lateral thinking, are more valuable to the teacher than other aspects. DeBono emphasized the creative nature of thinking and the development of its perceptual base. He further proposed that just being critical is not enough for good thinking in school or life in general.

Perkins (1984) emphasized creative thinking in much of his research. He is concerned with the aesthetics of product development, as well as with the enhancement of originality of thought. In his most recent work, Perkins examines informal reasoning and the development of frames for thinking. He concludes, from empirical research, that thinkers can learn to be better reasoners--better "situation modelers"--in real life activities. Perhaps also expressed is his interest

in the use of video technology and its influence on thought development.

Whimbley (1984) emphasizes a holistic orientation on learning to improve one's thinking. He emphasized complete and precise processing, and the combination of various reasoning skills into extended, sequential, and multiple-step applications of thinking focused on a particular problem. Whimbley also is interested in students' explanations of their own thinking and teaches with questions and probes in the classroom to help students become aware of better thinking strategies. He is a strong advocate of the idea that thinking can be taught.

In a study by Feuerstein (1988), concern is emphasized about retarded adolescents, but his research on structural cognitive modifiability suggests thinking patterns can be changed with appropriate intervention at any time in life and for any population. Based on extensive field applications, the Israel psychologist presents learning activities designed to help students adapt to new situations and to develop different perceptions of what needs to be done to succeed in these situations. The teacher's role as a mediating influence is the key to success in his instructional approach.

After reviewing these definitions of thinking, it is concluded that thinking is the mental capacity the human

being has and his or her relation with the world, that is initiated in the repetition. When the human being receives the information and concentrates on it, he or she can then apply it to a new situation. It is the ability to be able to resolve problems, analyze, reach conclusions or hypothesis, and look for a solution to a problem.

How Thinking Functions

According to Villarini (1991), thinking is a mental process that has a psychological base in the brain, but we cannot directly see what it consists of. Using diverse methods, psychological and philosophical techniques, he has tried to construct a representation or an idea of how thinking functions. One of the more popular ideas today is what the function of thinking represents when compared to the process of similar information in its function, such as with a computer.

Villarini (1991) also stated that, according to the psychological theory in the processing of information, the function of thinking can be compared analogically to the way a computer processes information. The brain would be the physical component of the computer (hardware), and thinking would be the program (software) which the computer has to process information.

To simplify reality a little, Figure 1 visually represents the functions of a computer. Entry of information, for example, is by way of the keyboard.

By analogy with the computer, we describe the way the computer uses information entered into it which happens when we think of a process where information is received, organized, or restructured (processed), to show a new understanding (product). Figure 2 represents this process using a stimulant of the surrounding atmosphere.

As can be observed in the example and as John Dewey (1933) said, human beings begin to think and process information when they have an idea which is hindered by problems and obstacles that prohibit them from resolving it. Unless they begin to think about the problem, they will not overcome the obstacle. Human beings "begin to think" not only to receive information but to process it when they have challenges that put their capacity and mental powers to the test. That is why a classroom that stimulates thinking is one in which the students establish goals and find challenges and obstacles that make them think. The teacher is then said to be a thinking provocateur for the student. He or she makes them use their capacity and power. He or she stimulates them to process information and helps them construct understanding.

In order to be able to process information and reach an understanding, the human minds need:

INFORMATION

The information is received and translated into the language of the computer and stored in the memory.

↓

PROCESS

The information is organized or restructured, according to the program of the computer; it is transformed into new information.

↓

PRODUCT

The organized or restructured information is expressed, for example, by way of the screen or a printed page.

An example of the way information is processed by the computer follows: Randomly, by way of the keyboard, 100,000 names are entered with old addresses of telephone companies.

INFORMATION

The names and addresses are filed in the memory (hard disk) of the computer in alphabetical order.

↓

PROCESS

Instructions are given to the computer so that it uses one of its programs to alphabetize the names by town on the island.

↓

PRODUCT

A list of the 100,000 names is produced which are grouped alphabetically by town.

Figure 1. The process of information by computer.

INFORMATION

Reception and identification of the stimulants by means of language to transform them into significant information.

↓

PROCESS

Reorganization of the information by means of concepts and skills.

↓

PRODUCT

Conclusion. New understandings. An example of this would be: discomfort, inconvenience, difficulty in the environment when having to do one piece of homework; place 100,000 names in alphabetical order according to town.

↓

INFORMATION

Recognition of a problem; we do not know how to do the homework. Manually, it is very difficult to place in alphabetical order.

↓

PROCESS

State the problem. Analyze. Look for alternatives. Find a solution. Design a program for the computer.

↓

PRODUCT

Problem solved. We know how to do the homework. The designing of a list with the 100,000 names grouped alphabetically by town.

Figure 2. The process of information using stimulants of the surrounding atmosphere.

(1) A system of organization or representation of the information. This system is made up of images, ideas, and concepts that are the ways we represent stimulants in order to transform them into significant information, thanks to images and concepts of the human beings to be able to observe and recognize the stimulants of the atmosphere that surrounds him or her.

(2) A system to process, restructure, or reorganize information previously identified. We retain and repeat when we hear and remember information. We are informed but we have not processed the information. If it is in complex form, we have not begun to think or to construct understanding.

Diverse studies tend to indicate that, unfortunately, 90 percent of the time homework that is assigned and completed in the classroom is dedicated only to receiving and identifying information. This shows that 90 percent of the time is dedicated to development at much lower levels of thinking. Only 10 percent is used in the development of complex levels of thinking that require thinking in order to process information and gain new understandings.

The importance that the focus of thinking should be directed toward the development of thinking skills to process information should not make us lose sight of the importance of the capacity of memorizing information. The focus of thinking insists that the principle objective of teaching should be to process information and produce understanding. Producing understanding requires more than just memorizing information. It requires information to be processed and converted into significant information. The following example shows the distinction between memorization (recorded information) and an understanding (significant processed information):

> The teacher asked Juan and Pedro to read a story which dealt with friendship and to prepare a presentation for the class summarizing the main idea of the story. The next day, Juan presented a summary. He literally repeated everything that happened in the story. He left out a few details he did not remember. When the teacher asked him about the concept of friendship presented in the story, Juan said he did not remember any specific paragraph in the story that spoke about the concept of friendship. Pedro's presentation was totally different. He spoke about what the story taught him about friendship. He compared the

story with personal experience which helped him explain the theme in a simple way.

As one can see, Juan and Pedro were given the same homework assignment and the same source of information. However, the product of how one summary compared to the other was completely different. Juan demonstrated that he took everything he read literally and remembered (memorized) what he read. Pedro did not only memorize but he also interpreted the story. He processed it in a significant way and generated a new understanding. We should suppose that given the same information and having different products, the difference in the products is the way in which the information was used or processed. Juan limited himself by remembering; Pedro remembered but also reorganized the story by using his skills, concepts, and attitudes. Pedro's product contained information not directly stated in the story.

There is a difference in being informed (memorization) and producing information (understanding). When we understand what is received and memorized (information), it is processed, reorganized, and converted into significant information or understanding (see Figure 3).

For educational purposes, we can say that the system of processing information in the mind is a team of operational functions or thinking skills. Thinking skills are the diverse activities and operations that the

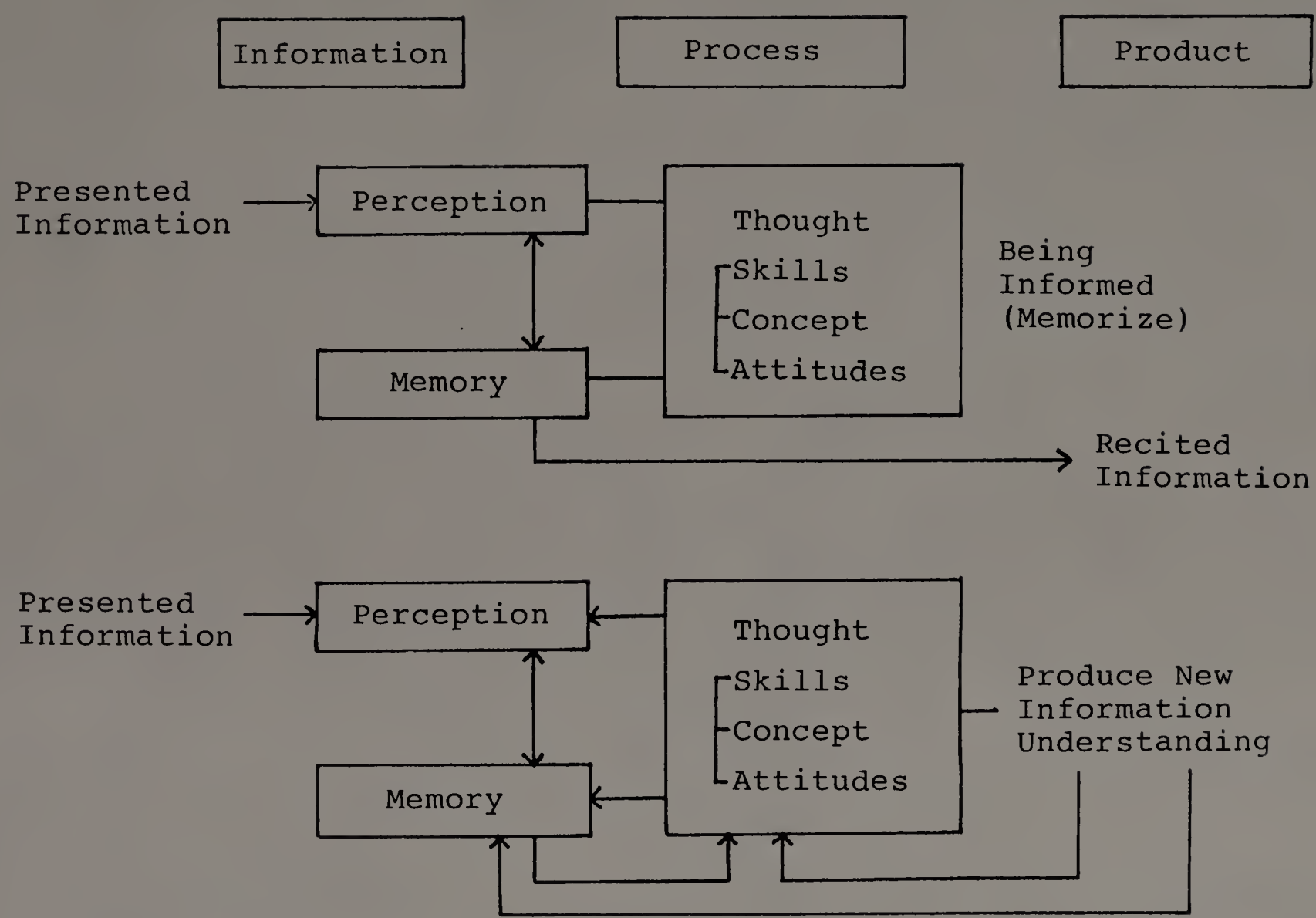


Figure 3. The process of memorization and understanding (Villarini, 1991).

mind completes using the information to restructure, reorganize, and produce new understandings. The skills are procedures (steps) that are executed about the information.

Just as hands work on raw material in order to give it form and ultimately create a product, the human mind activates or works with stimulants (images and concepts) that transform in order to be reorganized and produce new understanding.

The mind needs raw material, stimuli transformed into information such as previous images and concepts that are found in the memory, as much as it needs to use the operations and activities with the restructured or reorganized information, in other words, using skills.

Memory and thought are needed mutually. Memory is not a recipient into which information is crowded. Memory is an active mechanism, an operation of selection and organization of stimuli. We do not remember randomly, but rather we select that which surprises and interests us and what we use, etc. That is why the more significant or pertinent a situation is, the better we organize (process) it and the better we remember it. If children memorize pertinent information that they have had the chance to process, they will remember it for a longer period of time. Focusing on critical thinking helps improve the capacity of memorization in students.

On the other hand, thinking could not function or process information if it lacked present information in memory. The entire thinking process and its activities depend on concepts that make up the structure and guide such activities. As with any skills, thinking skills are accomplished when followed by certain information or instructions on how to accomplish the procedure (sequence of steps) of which the skills consist. For this reason, when teaching thinking skills, memorization skills should be taught as well.

The Pattern of Thinking

The patterns of thinking are hypothetically constructed based on how thinking functions or should function in order for it to effectively produce a result, in other words, process information and construct understanding.

There are probably as many patterns as there are schools of psychology and philosophy. For educational purposes, so that the teacher may have an idea that will help him or her become familiar with teaching the development of thought, the Department of Education of Puerto Rico adopted the following pattern of thinking (see Figure 4) as a process of information:

(1) Thinking is a process that begins with the reception (information) of stimuli that

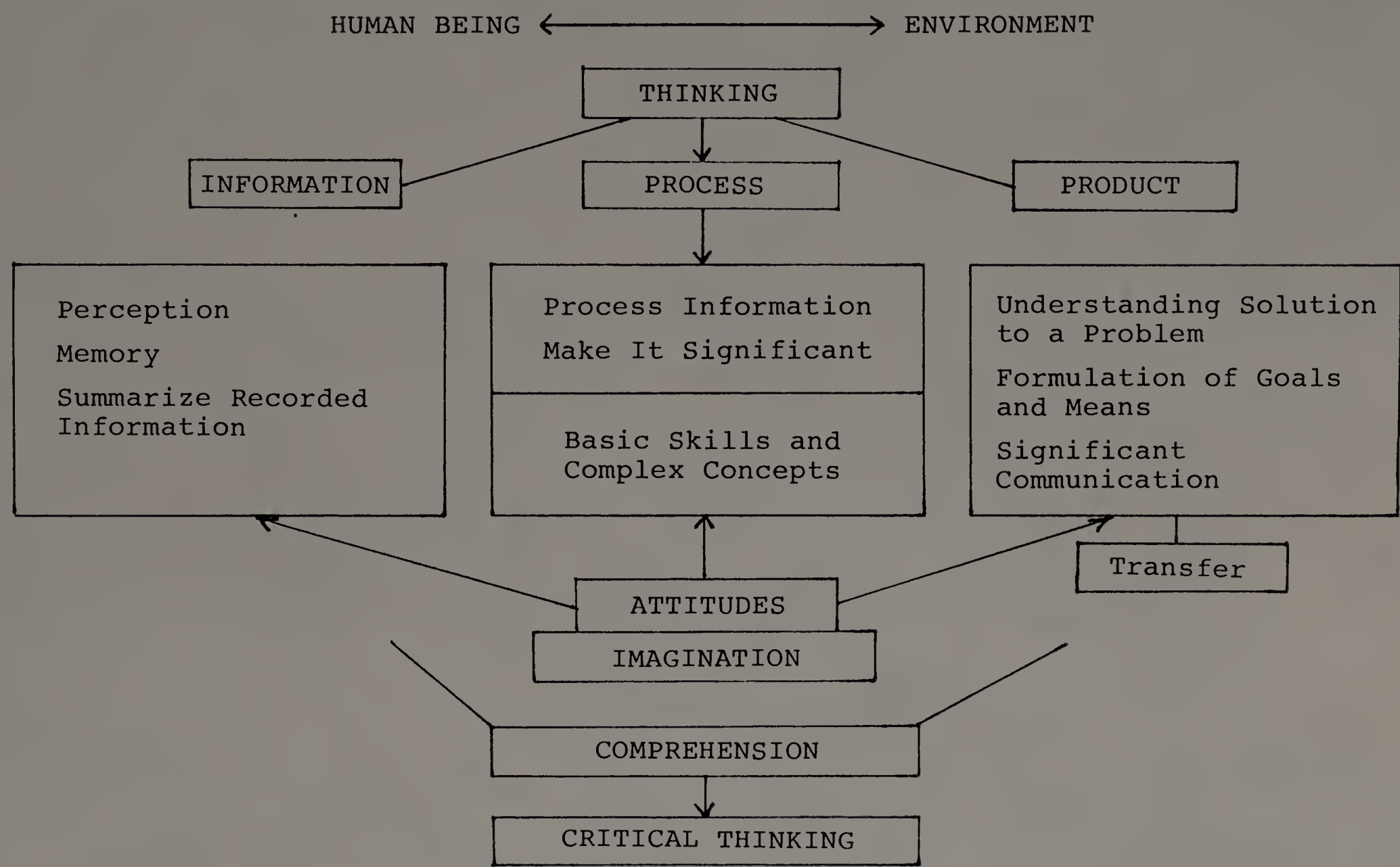


Figure 4. The pattern of thinking as a process of information (Villarini, 1991).

reaches us by ways of feeling. Stimuli is transferred into perceptions or information through images and concepts that are archived in memory. New information can be retained for a short or a long time in the memory.

(2) Information is transformed into new understanding when it processes, assimilates, comprehends, or reorganizes through the action of thinking (skills, concepts, attitudes). Stimuli transformed into significant information or understanding (images, concepts, propositions) can be archived in the memory and utilized later in the execution of diverse intellectual homework.

(3) The process of thinking culminates with the production of an understanding: a judgment, an argument, the solution of a problem, etc. It can be transferred or applied to new situations.

Current literature on thinking presents multiple lists of cognitive processes that can be considered thinking skills. It is dangerous to confuse one level of thinking with another in terms of its power or significance. Beyer (1984) stresses the importance of defining skills

accurately and suggests reviewing the work of researchers like Bloom (1956), Guilford (1969), and Feuerstein (1988) to find useful definitions. Clear definitions, Beyer (1984) maintains, do not confuse distinctly different processes like inquiry and simple recall. Furthermore, consistent with other researchers of cognitive processes, Beyer distinguishes between lower, essential skills and complex, multiple-process strategies. For example, there is a great difference between picking identical examples of a particular insect and finding the antidote to the sting of the same insect. One task involves the basic processes of identification and comparison; the other task requires multiple, sophisticated, replicable, and sequential steps of problem solving.

What are the basic or essential skills of thinking? Nickerson (1981) suggests that no one taxonomy exists. Educators would be wise, he advises, to select abilities that represent what they want students to be able to do and incorporate these particular skills into their curricula and school programs. Researchers' lists can be the basis of such selections. Consider, for example, the categories of skills suggested by Bloom and others (1956) and Guilford (1967) over 25 years ago (see Table 1).

Each of Bloom's (1956) cognitive categories includes a list of a variety of thinking skills and indicates the

Table 1

Basic or Essential Skills of Thinking

Bloom's Taxonomy	Guilford's Structure of Intellect
Knowledge	Units
Comprehension	Classes
Application	Relations
Analysis	Systems
Synthesis	Transformations
Evaluation	Implications

kind of behavior students are to perform as the objectives or goals of specific learning tasks. For example:

- Knowledge: Define, recognize, recall, identify, label, understand, examine, show, collect.
- Comprehension: Translate, interpret, explain, describe, summarize, extrapolate.
- Application: Apply, solve, experiment, show, predict.
- Analysis: Connect, relate, differentiate, classify, arrange, check, group, distinguish, organize, categorize, detect, compare, infer.
- Synthesis: Produce, propose, design, plan, combine, formulate, compose, hypothesize, construct.
- Evaluation: Appraise, judge, criticize, decide.

Some of these tasks are also evident in Guilford's (1967) six categories. For example:

- Recognizing a particular object is a units skill.
- Showing a group of similarly colored or shaped objects is a classes-based task.
- Forming a geometric structure out of six matchsticks is a systems task.

In both researchers' work, there are some unstated dimensions to the thinking skills sequence. Tasks generally move from simpler to complex operations, from more observable and concrete to abstract dimensions, and from an emphasis on working with known materials toward creating or inventing new, previously unknown approaches or materials. Guilford is interested in both convergent and divergent operations, and his ultimate goal is a thorough exposition of the nature of intelligence.

Since the initial work of Bloom and Guilford, a greater concern for the development appropriateness of tasks or thinking skills has emerged. Hudgins' (1977) study of thinking and learning emphasizes Piaget's research on the development of thinking processes as the child grows intellectually (pp. 10-20). This research assumes that there is a regular sequence to children's cognitive development, but not precisely in direct age correlates. Piaget (1970) suggests that youngsters first entering school are mostly "preoperational" or dominated by their perceptions (pp. 703-732). Gradually, they develop systematic explanations or concrete rules for resolving conflicting situations or explaining diverse phenomena; they form conceptualizations. By their early teens, most students develop the ability to perform higher forms of cognitive operations; they learn to vary interpretations or descriptions in abstract form and to

construct formal explanations of cause and effect. Somehow, says Hudgins (1977), the stage of thinking skills expressed in a K-12 curriculum needs to relate to this development and cumulative sequence as well as to the empirical research it represents. The relationship of particular subject matter to the specific skills to be learned may also be of developmental consequence.

Another issue regarding essential thinking skills is the concern for various models of thinking that are available to the learner, such as types of symbol systems. Much school learning involves linguistic or verbal abilities as well as quantitative, numerical reasoning. Spatial or visual depictions of mental processing are becoming more significant to instruction, especially with the advent of video technologies in the classroom. How do these different modalities or modes of thinking influence cognitive development? That is an open research question. But the testing of cognitive abilities already reflects the appreciation of multiple modes of thinking to the instructional process and the learning of essential thinking skills. The Development Cognitive Abilities Test (1980) is designed around a content format that uses Bloom's Taxonomy and a three-mode organization content--verbal, quantitative, and spatial--for grades 3-12 subjects.

Ideally, then, there are a host of candidates for a basic thinking skills taxonomy. In planning a curricular

sequence, it is wise to consider the developmental level of the learners, the mode of presenting information to them, and the subject matters ultimately to be related to. At least five categories of thinking skills merit consideration. Figure 5, which draws from the work of Bloom (1956) and Guilford (1967), is a basic framework for a first-order, operational taxonomy.

Complex Thinking Processes

The five categories suggested in Figure 5 (causation, transformations, relationships, classification, and characteristics) are essential thinking skills programs. The "macro-process strategies" are based on the essential skills but use them for a particular purpose. Cohen (1971) distinguishes processes that rely on external stimuli and seek to be productive, such as making judgments or problem resolution, from processes that depend about equally on external and internal stimuli and seek to be creative (p. 26). He suggests at least four different complex thinking processes:

(1) Problem Solving: Using basic thinking processes to resolve a known or defined difficulty; assemble facts about the difficulty and determine additional information needed; infer or suggest

CAUSATION (Establishing cause and effect, assessment):

- Predictions
- Inferences
- Judgments
- Evaluations

TRANSFORMATIONS (Relating known to unknown characteristics, creating meaning):

- Analogies
- Metaphors
- Logical Inductions

RELATIONSHIPS (Detecting regular operations):

- Parts and wholes, patterns
- Analysis and synthesis
- Sequences and order
- Logical deductions

CLASSIFICATION (Determining common qualities):

- Similarities and differences
- Grouping and sorting, comparisons
- Either/or distinctions

CHARACTERISTICS:

- Units of basic identify
- Definitions, facts
- Problem/task recognition

Figure 5. A model of thinking skills: Basic processes (Costa, 1985).

alternate solutions and test them for appropriateness; potentially reduce to simpler levels of explanation and eliminate discrepancies; provide solution checks for generalizable value.

(2) Decision Making: Using basic thinking processes to choose a best response among several options; assemble information needed in a topic area; compare advantages and disadvantages of alternative approaches; determine what additional information is required; judge the most effective response and be able to justify it.

(3) Critical Thinking: Using basic thinking processes to analyze arguments and generate insight into particular meanings and interpretations; develop cohensive, logical reasoning patterns and understand assumptions and biases underlying particular positions; attain a credible, concise, and convincing style of presentation.

(4) Creative Thinking: Using basic thinking processes to develop or invent novel, aesthetic, constructive ideas or products,

> related to precepts as well as concepts, and stressing the intuitive aspects of thinking as much as the rational. Emphasis is on using known information or material to generate the possible, as well as to elaborate on the thinker's original perspective.

These complex processes obviously draw on and elaborate on the underlying essential skills. Certain essential skills may be more significant to one complex process than others, but current research has not clarified a discrete understanding of such relationships. What seems most important is that young learners develop competence in the essential skills during the early years of schooling, and then--in the middle or junior high school--are introduced to the more complex processes in specific content matter that is closely related to the use of such skills.

Late middle school or early junior high school is an appropriate time for introducing instruction about higher order skills or complex thinking processes. The adolescent learner's growing cognitive capacities offer ripe opportunities for the challenge of more complex thinking (Presseisen, 1982). Elementary students can benefit from early exposure to varied thinking processes and to different media presentations, but probably can

only approach more complex sequences as they gain experience and apply similar skills in multiple content areas. Beyer (1984) suggests that an effective thinking skills curriculum will introduce only a limited number of skills at a particular grade level, will teach these across all appropriate content areas, and will vary the media and contents of presentation (p. 559). Subsequent grades should enlarge the thinking skills base and provide additional and more elaborate applications of skills already introduced.

Some complex thinking processes may be more relevant to certain subject areas than to others. For example, problem-solving thinking skills seem ideal for mathematics or science instruction. Decision making may be useful for social studies and vocational studies; critical thinking may be more relevant for the debate team, language arts class, and problems of democracy or other American government courses. Creative thinking might enhance all subjects, as well as be particularly meaningful to art, music, or literature programs. Most important, the goals of the specific complex process and objectives for learning in the particular subject area should be parallel and reinforcing.

Figure 6 presents a suggested model of complex thinking processes. The relationship of any one process to the underlying essential skills is tentatively drawn and is

HIGHER ORDER SKILL:	PROBLEM SOLVING
Task:	Resolve a known difficulty
Essential Skills Emphasized:	Transformation
Yields:	Causation/Solution

HIGHER ORDER SKILL:	DECISION MAKING
Task:	Choose a best alternative
Essential Skills Emphasized:	Classification
Yields:	Relationship/Response

HIGHER ORDER SKILL:	CRITICAL THINKING
Task:	Understand particular meaning
Essential Skills Emphasized:	Relationship/Transformations/ Causation
Yields:	Sound reasons, proof, theory

HIGHER ORDER SKILL:	CREATIVE THINKING
Task:	Create novel or aesthetic
Essential Skills Emphasized:	Qualification/Relationships/ Transformations
Yields:	New meaning, pleasing products

Figure 6. A model of thinking skills: Complex processes (Costa, 1985).

relative to the skills presented in Figure 5. Other potential complex processes might be examined as to how they compare to the four strategies presented in terms of underlying characteristics and ultimate outcomes.

Metacognition and Thinking

A useful taxonomy of thinking must somehow account for metacognitive aspects of the current thinking skills movement. "Metacognition refers to one's knowledge concerning one's own cognitive processes and products" (Flavell, 1976, p. 232). Learners must actively monitor their use of thinking processes and regulate them according to their cognitive objectives. Henle (1966) considers such regulation the essence of autonomous self-education (pp. 53-63). Costa (1985) suggests that this ability to "know what we know and what we don't know" is a uniquely human trait, but not necessarily one that all adults acquire. He proposes metacognitive skills as a key attribute of formal thinking or higher-process skills instruction and stresses that the teacher's classroom methodology must constructively deal with metacognition. Other researchers maintain that metacognition skills are also significant factors in developing subject-skilled performers.

One of the most salient characteristics of metacognition is that it involves growing consciousness. One becomes more aware of the thinking processes themselves and their specific procedures, as well as more conscious of oneself as a thinker and performer. As learners acquire an understanding of what the various thinking processes are, they can better understand and apply them. Some researchers suggest that is why, initially, thinking skills should be taught directly and in relatively content-free situations (Beyer, 1983, pp. 44-49).

Metacognitive thinking has two main dimensions. The first is task-oriented and relates to monitoring the actual performance of a skill. The second dimension is strategic; it involves using a skill in a particular circumstance and being aware of getting the most informative feedback from carrying out a particular strategy. Figure 7 elaborates on these dimensions.

Monitoring task performance requires learners to watch their own activities. Students cannot tell if they are at the right place if they are not aware of the assigned task and the directions for completing it. They might be advised to discriminate subgoals of a task and relate to ultimate objectives. In mathematics problems involving reading, for instance, students might identify addition or subtraction as an appropriate operation prior

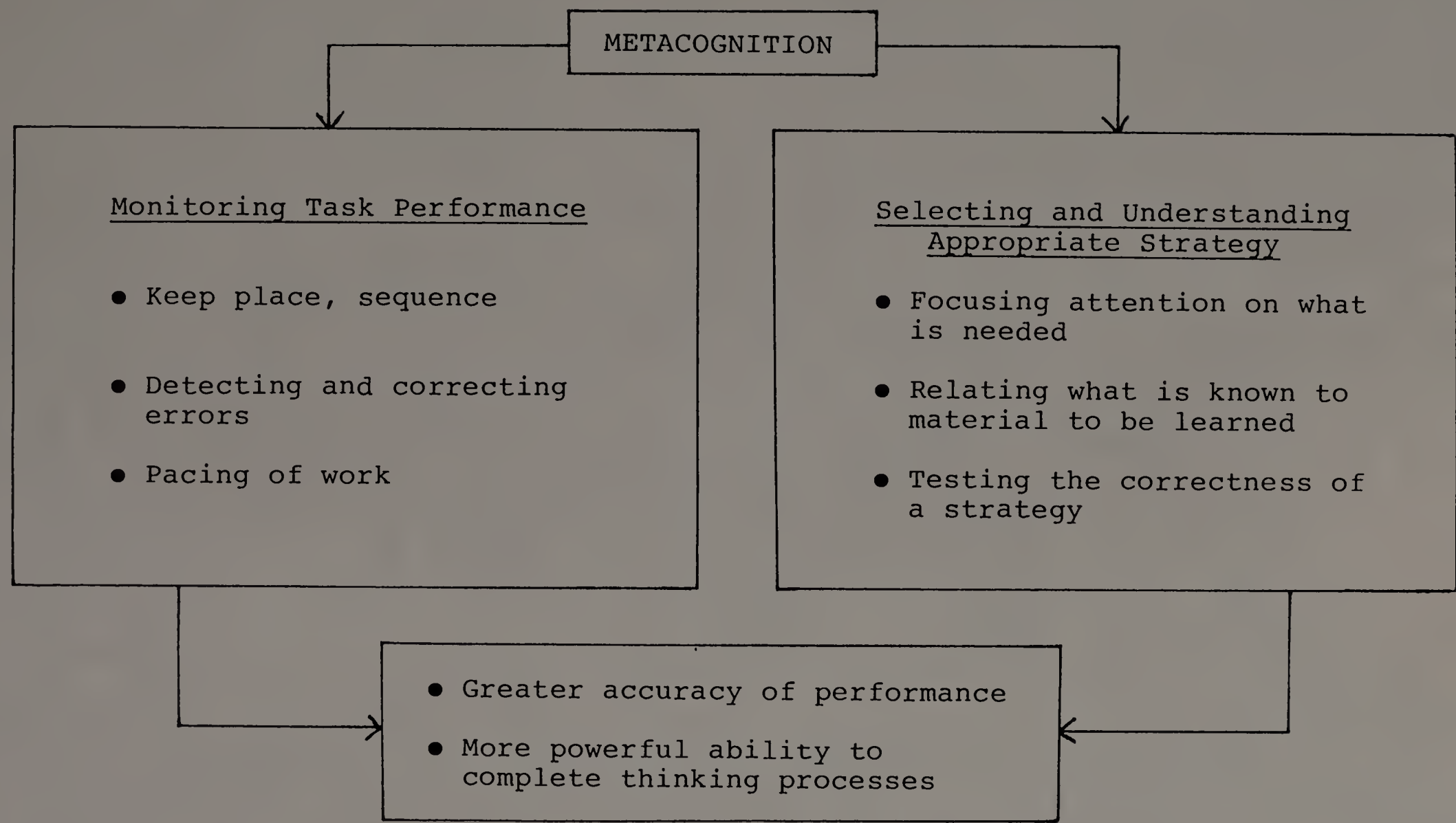


Figure 7. A model of metacognitive thinking skills (Costa, 1985).

to actually determining a final answer. Detecting errors while working may involve checking or proofreading, rereading passages, recalculating or translating material. Allocating time across work or checking coverage in qualitative dimensions ("Is my outline extensive enough?") are aspects of pacing the completion of an assignment. The metacognitive thesis is that any and all of these behaviors can enhance the success of particular task performance. Often these same behaviors are also characteristic of sound study skills programs.

In terms of selecting appropriate strategies to work by, metacognitive theory suggests that the first order of learning is to recognize the particular problem and determine what information is needed to resolve it and where to obtain it. Through such consideration, the student comes to recognize the limitations of the learning and the ultimate boundaries of the solution being sought. Sternberg (1984) considers these the "executive processes" of sound reasoning (pp. 5-15). Flavell (1976) refers to the various aspects of information retrieval in learning to think--remembering, monitoring, and updating information--and draws parallels between classroom learning and experiences involving thinking in the world outside school (p. 234). Henle (1966) suggests that recognizing what is understood and to what degree ultimately helps learners come to terms with the power of

their own thoughts (p. 57). Consider, for example, the importance of knowing the difference between a wild guess, an informed guess, a hypothesis, an intuition, and a fact. Finally, testing the accuracy of a strategy provides an opportunity to apply varying sets of evaluative criteria and to determine if, in fact, the right approach is being employed. The learner has an opportunity to assess the initial selection of strategy, as well as to develop insight into a potentially better choice. A more holistic understanding of strategy and the development of fluency of competence in a particular strategy are involved in this type of learning. From the metacognitive viewpoint, the thinker becomes more autonomous as these skills are developed and refined.

Toward a Common Understanding

When we focus on what we mean by thinking, we need to consider the various levels of thought that humans are capable of. The complexity of the cognitive process becomes evident. The three-level model has been generated by this examination:

(1) Cognition: The skills associated with essential and complex processes.

(2) Metacognition: The skills associated with the learner's awareness of his or her own thinking.

(3) Epistemic Cognition: The skills associated with understanding the limits of knowing, as in particular subject matter, and the nature of problems that thinkers can address.

Once this taxonomy is considered, educators can examine the kinds of material available to them for enhancing thinking instructions in the classroom. They may also become aware of the need to devote attention to relating thinking to current school programs and to teachers' understanding of what thinking is and what it means to student development and classroom instruction. How to assess student achievement in the various abilities related to thinking is also a prominent issue.

Without a common understanding of what we mean by thinking, we cannot even begin to address the extensive problems associated with the development of students' higher cognitive performance (Costa, 1985).

In order to develop the skills of basic and complex thinking, we should first identify the sequence in which the production of new knowledge occurs (Department of Education, Puerto Rico, 1987).

Basic Skills

The sequence and identification of basic skills follow:

1. To perceive
    (a) Observe and remember
    (b) Compare and contrast
2. To conceive
    (a) Group and label
    (b) Classify
3. Arrange in series
    (a) Order
    (b) Arrange in sequence
    (c) Establish patterns
4. Analyze
    (a) Distinguish between fact and opinion
    (b) Distinguish pertinent information from non-pertinent information
    (c) Distinguish reliable means/ non-reliable means
    (d) Ask
5. Implication
    (a) Significance of sentences
    (b) Relations of cause/effect
    (c) Generalization
    (d) Predictions
    (e) Guesses
    (f) Points of view

Complex Skills

The sequence and identification of complex skills follow:

1. Reasoning
   (a) Deductive
   (b) Inductive
2. Evaluation
   (a) Establish problems
   (b) Judge
3. Solutions to problems
   (a) Identify problems
   (b) Make and confirm hypothesis
   (c) Come to conclusions
4. Make decisions
   (a) Identify objectives
   (b) Consider alternatives
   (c) Establish a course of action

The following study observes how effective the development of thinking skills is in the learning-teaching process.

The Learning Potential Assessment Device in Developing Thinking Skills

Feuerstein (1988) conducted a study with special education students and applied systems derived from the

theory of structural cognitive modifiability, the theory of mediated learning experience, and the active modification approach. In the first part, they attempted to answer two major questions that stem from the issue of cognitive redevelopment and the enhancement of intelligent behavior. The first question was: "Is modification important in the cognitive area?" In answering, they described the essential role of cognition in the adaptation of the individual, particularly its meaning for the person whose retarded performance limits him or her to a marginal place in society.

Indeed, they contended that cognitive processes are a vital part of the individual's personality and overall competence. The second question was: "Is cognitive modification possible?" In answering, they showed, both by individual case histories and through group studies, that not only is structural cognitive modifiability possible, it is a unique characteristic of human beings.

Now they will try to answer a third major question, one that follows naturally from the first two: "If cognitive modification is indeed important and possible, how can it be done?" How shall one go about actually modifying the cognitive structures of an individual with retarded performance, doing it in a way that will allow him or her to modify him/herself?" The answer to this question certainly does not reside in a single approach. There are

several approaches and theories stressing a belief in the modifiability of the individual. These, too, are the products of a belief that modifiability is both necessary and possible. Many of these approaches are, however, oriented mainly toward the normal functioning individual. Few address the whole range of cognitive dysfunctions.

Furthermore, many of the programs based on these approaches deal with the content of cognitive processes, be it specific skills, units of information, or mental operations. Few are geared toward the establishment of the prerequisites of thinking.

Educational applications based on the theory of structural cognitive modifiability take form in (1) the learning potential assessment device (LPAD), (2) the instrumental enrichment program, and (3) the shaping of modifying environments.

Based on the study theory instruments and techniques by Feuerstein, Rand and Hoffman (1979), modifying the individual begins with the way of the learning potential assessment device (LPAD), a dynamic assessment approach designed to evaluate the individual's capacity to become affected structurally by both formal and informal opportunities for learning.

In describing the three applied systems, we will begin by introducing the case history of J. The learning potential assessment device (LPAD), the

instrument enrichment program (IE), and a modifying environment, working together, changed J.'s life in a dramatic manner.

J. was referred to one of the authors for placement within the framework of Youth Aliyah, an organization charged with the gathering of Jewish children. (At that time, one of the authors was the director of Youth Aliyah's psychological services, responsible for the intake and placement of children with developmental problems.)

The government authorities dealing with J.'s case claimed that they had made great efforts to place him but without success. The problem was how to handle immigrant childen who were categorized as mentally defective. In the 1950s, the author had already confronted this dilemma many times when dealing with children from North Africa on their way to Israel, and even earlier when working as a youth leader and teacher of young children and adolescents who had survived the Holocaust.

It was during these periods that Feuerstein (1988) developed his approach to retarded performance, deciding to use a dynamic approach to evaluate the individual's propensity for, and readiness to, change rather than focusing on what he or she was able to do as measured by static psychological tests.

When first seen, J. was a small, forlorn, dull-appearing, shy child, showing total lack of interest in everything but the piece of cake that was on the table in front of him. In his village, he was notorious for stealing from the marketplace and from homes, showing more of this activity than any other of his peers. Thirteen years old at the time of his referral to the institute, J. did not seem to be interested in being helped, and this passive resistance disarmed even the most earnest and skilled educator.

When during the LPAD administration he was asked to draw a human figure, he hastily drew a "blob" and looked happy with his production (especially with the "cowboy hat" he placed on the creature's head). His lack of self criticism and many other signs of retarded performance made the authors consider the possibilities of modifiability to be rather limited.

When they started to mediate the drawing of an articulated human body to him, showing him that between the head and the trunk there is a neck, he listened carefully. But when asked to draw a human body again, he drew the same body image. In order to change his drawing, the authors drew a figure in front of him, accompanying their rendition with the verbal description of the parts they were drawing, and their location. But, again when asked to draw a figure, he returned to his old

human body image--a blob--which he then drew for the third time.

At this point, they decided to concentrate their efforts on teaching him the prerequisites of thinking about lines and shapes. Thus, they taught him to compare shapes and lines with those he drew using four simple geometrical figures--square, triangle, circle, and diamond. When they saw the difficulties he experienced in producing a proper square and, even more, a diamond, they went back a step and taught him to draw individual vertical and horizontal lines and then to link them into a square, and to draw diagonal lines and link them into a diamond.

The deficient functions that interfered most were impulsively on both input and output processes (i.e., when gathering information as well as when responding to it); lack of special orientation (up and down, left and right); lack of systematic search (how could one be systematic in looking for something that had not really been seen in the first place?); sources of information.

J.'s assessment continued for about three weeks. At first, he did not attend for more than twenty minutes without starting to stretch, yawn, and quit. With continuous efforts and increased success on his part, his interest accelerated dramatically, to the extent that eventually the examiner had to call each session to a

halt. By the end of the LPAD assessment, all they needed to do was to give J. verbal instructions and he was able to draw these shapes by himself, relying on his stored information gathered through previous acquisitions. Soon he becamse able to solve analogy problems and to deal with the symbolic processes needed for reading.

Equipped with this data, they started again to look around for placement possibilities. Unhappily, the staff of prospective settings remained unconvinced that J. would be a good candidate. J.'s being a wayward, abandoned, and delinquent child made many of them reluctant to accept him. Unable to find a suitable placement, they decided to place him in one of their own educational facilities, which accepted the child, no matter how severe his condition.

Once placed there, J. proved to be a model student. He learned to read proficiently in a very short time. In fact, his appetite for reading was such that it earned him the name of "the professor". He also became active in the religious community of the village and an accepted member of the Israeli Youth Movement.

Three years after his placement in his special environment oriented toward modifying the cognitive structure of its students, J. was able to enter a regular vocational high school. Before placing him in the academically-oriented high school, J. was provided

private tutoring in mathematics, physics, and chemistry. His private tutor claimed that he had seldom found a learner as efficient as J. placed in the eleventh grade of the academically-oriented program. He proved to be an excellent student.

Shortly thereafter, however, he dropped out of school without warning, and it was only after many efforts to trace him that it was discovered that the reason for his abrupt departure was that his mother was dying. He had decided to abandon everything in order to be of help to her in her last days. He also took over the responsibility for his hospitalized sister, as well as for an older brother who had been placed in a home designated as one for the severely retarded.

Today, J. is a probation officer, successfully married, and promises to finish high school and to continue his academic education, hoping to become an example due to his deep concern for wayward children.

J. serves as a powerful illustration of the role of dynamic assessment in unraveling the potential of the individual to be modified. LPAD revealed his modifiability, the instrument enrichment (IE) program increased his modifiability, and the powerful modifying environments in which J. was placed produced incredible changes.

J. developed the ability to think critically; find solutions to problems and make decisions through the

whole process of developing his thinking skills. More studies like this one should be done to obtain clearer results with respect to these kinds of children and be able to effectively help them.

Through writing, we can develop simple and complex thinking skills. In order for the child to be able to write, he or she first must learn to think and later write. Following we can observe the process of the development of thinking skills through writing.

How the Writing Process Develops Thinking Skills

Developing the writing skills of students also helps to improve their thinking skills. One of the first steps in the writing process is to have students write the ideas they will develop in their topics. To do so, they have to organize their ideas which is part of the thinking process. During the writing process, the students learn how to organize their ideas following a pattern or semantic map. During the editing part (one of the last stages of the writing process), the writers are asked to be critical of their own writing, which is very important in developing thinking skills. This leads students to self-monitor and self-evaluate in order to determine if they followed their organizational plan. Finally, writers are asked to think of two or more questions about their writing that would help add more

information to their topics. As part of the pre-editing state of the writing process, students read their topics, analyze parts that are unclear, and think about how to improve those parts. As part of the evaluation process, students need to think about the parts that are their favorite and how those parts can be developed.

During the writing process, teachers are responsible for guiding the students through dialogue that may help develop their thinking skills. To model writing strategies, teachers think aloud or verbalize the steps of a strategy as they demonstrate how to implement the strategy in the writing process. This is intended to help students internalize the thinking strategies.

Second, teachers should focus on developing Special Education students' abilities to regulate the writing process. A primary tool for accomplishing this is inner speech, which directs students during the writing process. The writers should be encouraged to internalize the questions that guide thinking in each of the writing subprocesses, such as planning ("What am I to do? What do I know about this topic?"); organizing ("What text structure should I use? What questions does this text structure ask? What key words and phrases should I use?"); drafting ("Translate my plan into writing."); editing and revising ("Evaluate my paper: Did I answer the text structure questions? Did I answer the readers' questions?

Is my paper interesting? How can I fix it?"). Teachers should monitor the accuracy of students' thinking by having them think aloud just as the teachers thought aloud when they modeled the writing subprocesses. Teachers should step in when the students' dialogue slacks off. This ensures that students master the inner thinking that regulates and directs performance during writing.

Throughout the teaching process, the teacher has a critical role as an agent who models the dialogue and inner thinking that directs strategy use in each of the writing subprocesses. The long-term goal is not just the improvement of students' written products, but the improvement of students' understanding of the processes that underline successful written communication (Englert et al., 1988).

Using the Computer to Develop Problem Solving and Critical Thinking Skills for Special Education Students

The computer offers new approaches, activities, and tools for Special Education students in the familiar curriculum areas of reading, writing, mathematics, science, and social studies. Some of what the computer has to offer does not relate to the development of thinking skills as part of the traditional subject matter categories.

However, software that helps students of Special Education learn how to solve problems offers them opportunities to develop confidence and skills in decision-making and critical thinking processes that we know will be of great importance to their survival beyond school. The following represents examples of programs for critical thinking skills.

Snooper Troops

Snooper Troops is a simulated mystery story in which the user plays the role of detective. Students must travel around the town to collect clues by interviewing various characters in the story. In the research conducted by Jan Schraitle, Snooper Troops was used with her class of twelve seventh grade learning disabled students in order to focus on student improvement in six areas: map skills, organizational skills (such as note taking), deductive reasoning, communication skills, cooperation with peers, and the ability to work on a project not completed within one class period.

The students were at least two grade levels behind in reading as well as two to three grade levels behind in written expression skills. The class was in the computer lab two days a week to use the word processor; and on one of these days, students used Snooper Troops on a rotating basis.

Jan introduced the whole class in the mechanics of operating the program. They chose partners based on particular objectives she had for work on interpersonal skills. Students began by practicing the mechanics of the program, such as driving the Snoopmobile. Students at first had difficulty thinking ahead in order to press the command to stop in time. To a chorus of "Oops" and "Oh, no not again," students gradually learned to control the car. At first, Jan gave no direction for proceeding to solve the case; but as students worked, it became clear (both to her and to the students) that further direction was needed. She devised a worksheet to help students organize information from the booklet which accompanies the program and an outline map on which students could fill in the places located as they investigated. She met with each group at "frustration times," directing the students through questioning, in order to guide the next steps. At intervals, three pairs would meet as a group to compare notes and learn from each other.

In working with this game, students learned of the necessity to keep good notes, to read information in the booklet, and to use their maps. Students also learned that they could not solve the case simply by guessing. While this was frustrating at times, they learned that they had to gather facts to back up their suspicions. Students loved this game, and those who solved the mystery

were secretive and amused by others' guesses. Jan saw particular improvement in organization, communication, and cooperation among her students in the course of working with this software.

This study includes examples of how special needs teachers have used problem-solving software in different ways, the learning objectives they have developed, and how they see their role in supporting students' use of this software.

Agent U.S.A.

Agent U.S.A. challenges students to locate and neutralize the "fuzz-bomb". In order to do so successfully, students travel on tarins around the United States searching for the fuzz-bomb, a search which requires attention to both time and geography. Steve Spencer used this program with a self-contained class of ten students, grades four to six, with reading or language problems and behavior problems directly related to their learning difficulties. Steve's goals included organizational skills, helping students to expand their strategies beyond a trial-and-error approach, reducing antisocial behavior, and improving students' self-images as learners.

Steve began with a short introduction to Agent and almost immediately began playing the game and having students join in. Because his students have difficulty

listening to a long stream of information, he felt that the best approach was to involve them in trying the games immediately, then gradually adding information through discussion. When the students were initially unsuccessful, he helped the group discuss possible strategies.

Steve found that a group of three students at the computer was the most effective grouping. One student studied the map, one typed, and the third helped out with strategies. He often included in the group one student with severe reading problems, but average conceptual skills, and one student who was a better reader with poorer cognitive skills.

One group of three twelve-year-old boys became particularly involved with Agent. They saw it as different from the usual school tasks and were surprised that Steve allowed them to play it frequently. As they worked with the game, the group began discussing and trying new strategies and establishing long-term goals. Steve noticed increased skills, concentrations, and cooperation. One boy in particular, Allen (with a severe reading disability and visual, perceptual, auditory, and memory problems), had refused to try anything and was becoming a troublemaker. He was turned off to everything. As Steve says, "If you can't solve that problem, you can't teach." But like many learning disabled students, Allen was smart and was able to develop effective strategies in this

context--one that appealed to him and in which he left more in control. The experience boosted his view of himself and developed important organizing strategies.

Steve felt that this activity required a lot of teacher supervision. He checked in with his students often while they used the game, helping them to consider new ideas and strategies. In the future, he thinks a group discussion after each session, to review what occurred and to develop strategies for the next round, would be useful. An interesting footnote to Steve's experience is that none of his students actually solved the game. However, Steve's students found immense satisfaction and success in getting better and better at a challenging, demanding activity. We often protect special needs students from frustration and failure by ensuring that they gain immediate success, yet frustration is a necessary component of the learning process. In real life, success is often measured in years rather than minutes. This kind of experience with a long-term problem may help students develop the kind of concentration and involvement they will need when tasks do not begin and end within a forty-five minute period.

Gertrude's Secrets and
Gertrude's Puzzles

Gertrude's Secrets and Gertrude's Puzzles each contain a series of games which require sorting and classification by shape and color. For example, in one of the puzzles, the user must arrange puzzle pieces in three rows and three columns so that no piece is in the same row or column as another piece of the same shape or color. Many Special Education teachers have used these programs with a range of populations. Linda Ware used both "Secrets" (the easier of the two programs) and "Puzzles" with her junior high school resources class of students with learning and emotional problems. Her objectives in using this software were to promote her students' ability to discriminate between color and shape, order and classify by pattern and by sequence, categorize and infer patterns and rules, recognize similarities and differences, use deductive reasoning, and use critical thinking.

The teacher found that her students are eager to use the computer, considering it "play" rather than "work"; but that their responses clearly indicate that they were thinking not only about selecting an answer but about why they were selecting a particular response. They organized her class into groups of three, and introduced the computer work to one group, to help the next group of three get started. This kind of organization enabled the teacher

to then work with other students not involved with the computer.

Linda had been particularly interested in developing off-computer activities to provide students with an opportunity to use and extend the learning she saw going on while her students were using the computer. She created worksheets that guided students to use the same kinds of comparison and categorization skills with which they have been engaged on the computer in other areas of the curriculum. In one activity, students worked on the similarities and differences among animal, plant, and human cells from their state. Arguments arose from their work on classifying rock musicians. Linda reported that their classification scheme was complex and entirely student-directed. "Throughout their work, they immersed themselves in the data in a manner which rarely occurs in the classroom; they were thinking about the data rather than merely memorizing it without meaning-making." With her support, she felt that there was an obvious transfer of skills learned while using Gertrude to other content areas.

Many teachers have begun by trying out problem-solving software with their students without preconceived ideas about goals and objectives, to see what the potential uses are for their particular group of students. Teachers find they cannot always predict how their

students are going to interact with problem-solving situations. However, after some experiences with a piece of software, teachers usually devise more specific goals. They translate the general objectives they started out with (objectives such as concentration, organization, or "cognitive exercise") into more specific, more manageable goals that can be included in children's educational plans and which lend themselves in monitoring and documentation. Depending on the constraints or flexibility in their particular setting, their own teaching styles, the strengths and needs of their students, and the curriculum for which they are responsible, teachers may choose to concentrate on social skills. More and more schools are including objectives in critical thinking or problem solving in their curriculum for all students. Teachers' use of problem-solving software with Special Education students often match such objectives extremely well (Russell et al., 1989).

Descriptive Studies

Besides the strategies of writing and the use of the computer for the development of thinking skills, the following is another effective strategy for the development of these skills. Through the reading, we can analyze, reflect, synthesize, evaluate, reach a

conclusion, etc. To first accomplish this, we must first learn to think.

Ellis Edwin Descriptive Study

A descriptive study conducted by Ellis Edwin in 1986 depicts how teachers may improve their thinking and reasoning skills through reading.

This study was taken from an analysis done by four teachers about behavior. In this analysis, they tried to determine if there was any relationship between the information provided by the teacher during the class and the attention given by a group of slow learners after instructions and tests were given. Considering the hypothesis given by the teachers, the following may result: (1) increased interest of slow learner groups; and (2) increased advantageous thinking. Initially, the teachers were given written training materials along with five sessions of interventions. As the teachers learned, they used these strategies in the classroom.

The teachers were interviewed six times, and students were interviewed after each session to determine how and when they would utilize the acquired strategies.

After the explanatory study, all lessons were considered as were interviews with students. It was determined that there were interviews with students between the instructions by the teachers and student span

of attention. It was discovered that when the instructions were poorly presented, there was a decrease in the attention span of the students.

The opposite results were achieved when teachers offered explanatory instructions. The children were more attentive and thus the results were better.

The progress in thinking skills through reading was measured through a pretest/posttest. In three months time, the students' comprehensive thinking skills were twelve months ahead of schedule. The results of the other group were less impressive, spurred by teachers that were less attentive.

They expected the four teachers participating would be able to implement strategies at a higher level of proficiency. Only the teacher, who was consistent and effective in the strategies, was able to implement them at a higher level.

The question that arises is: "Why weren't they all effective if all received the same training for the same period?" The training process used to determine if there were any differences between the effective teacher and the other three teachers was examined. The findings of the study will be useful in future investigations of behavioral changes.

Training Procedures. The data obtained for this study was taken from the process training used in the

explanatory behavior study. There were four trainers; each trainer trained one teacher in five different sessions.

The period of training was thirty to sixty minutes during the free period for twelve weeks. Each trainer used the same instructional material.

Since the training was followed by observing the instructions in thinking skills through reading, the teacher pretended to practice while in session. It was necessary to adjust sessions according to the teacher's needs and consequently the contents of sessions varied from one teacher to the other.

Collection of Data. After each session of training, the trainer taped a descriptive report of the session. They followed their individual reports in the strategies used, the response to the teacher observed, and any other important information. Added to the report was a forty-five minute interview with the teacher after each session.

The report of the trainer and the teacher was analyzed and data included twenty auto-information of the trainer. There were five for each teacher and four final interviews with the Special Education teacher.

Data Analysis. The data were analyzed in order to identify the characteristics of changes in teachers that succeeded in the implementation of new strategies in the thinking process through reading.

The training session and teacher interview responses were compared--both the successful interviews and those which were not very successful. The general ideas were later categorized and described. The conclusion was that there was critical differences that were later discovered and categorized.

Finding. Descriptive findings indicated that four teachers received virtually identical training from the trainers. Each trainer distributed training in three phases: (1) provided information; (2) followed the model of information; and (3) allowed the teacher the opportunity to explain it.

When the interaction of trainer/teacher was examined, there seemed to be a qualitative lack of coherence in the way the trainer implemented the training model in all three phases. It seems that the trainer of Teacher B not only provided the information but also practiced the new structure cognizant of the strategy session.

Specifically, the teacher manipulated two of the key elements in explanatory behavior, changing sessions where the trainer intervened the sessions. The study demonstrated that when a teacher is trained in thinking skills strategies, the advantage to the students is greater.

Effective Intervention in the Classroom Study

The study reports a descriptive investigation that revealed elements that contribute to the effectiveness of interventions in the classroom. It was designed by four trainers for teachers trained to use explanatory behavior involved in educational programs for teachers. It was expected that the teachers would learn and implement the behavior desired, but only one succeeded. Each process used by trainers was analyzed to determine the differences. At the beginning, it appeared that four teachers received virtually identical help during the training, but the descriptive data revealed three great differences:

- Teachers that succeeded received emphasis in thinking that the teacher was supposed to plan and implement in a lesson and demonstrate behavior expected instead of giving oral and written explanations;
- The training of those that did not succeed was abrupt; with the ones that succeeded, the training was continuous and strategies implemented;
- The trainers of those that succeeded used oral illustrations to communicate to the teachers the plans they should use before implementing the process (Bayliss, 1985).

Studies in Microteaching

The following literature presents the effectiveness that the strategy of microteaching has in the development of thinking skills.

Cripwell and Geddes (1979) developed studies relating microteaching techniques in the teaching of some foreign languages. These studies took place at the Institute of Education at the University of London (England).

One group of teachers in the study decided to establish steps in the design of the skills of microteaching. The other groups started defining the terms "skills" and "teaching techniques". They arrived at the following definitions:

- Skills: The degree of appropriateness and success in using them.
- Teaching Techniques: The various devices that a teacher uses to achieve his or her objective.

The different forms of using the skills were classified as follows: introducing techniques practice and production.

The first group of participants found that it is very important to establish a positive relationship between the teacher and his or her class. This positive relationship could be obtained using microteaching

per se but microteaching offers a revision of the old way.

The above assumption is valued if we can visualize microteaching as a product and not as a way for improvement (Cripwell, 1979).

Microteaching is more acceptable when it is new as a preparatory stage that provides enrichment activities to the students.

The second group decided not to attempt to define "skills" and "techniques" but instead to consider teaching "abilities". They drew up a hierarchy of levels of abilities:

- Abilities in Group Organization: Positive reinforcement, gesture clarity, teacher movement, class management.
- Abilities in Organizing Learning: Use of aids (blackboard, etc.), correction, questioning, reading out loud, elicitation, teacher withdrawal, role play, etc.
- Abilities in Organizing Language Work: Choral drilling, repetition of model, contextualizing, etc.

The second group also took time to discuss the tapes of microteaching. This step was necessary in order for the teacher to fully understand his or her role in using the techniques. Another relevant area in using

microteaching was the use of instructional lessons with which they are familiar. They also used microteaching as a foundation in the teaching of foreign languages. Group Number Two found that when there was preparation for the use of microteaching, particular needs should be emphasized (for example, the evaluation should be a creative one).

In general, using microteaching in the teaching of a language facilitates the use of better models in this area.

In selecting a model, one should be aware if it can be used as a whole or in fraction. Another point is to determine if the model will be used from the beginning of the project.

Madike (1989) studied the relationship between the teacher's behavior using microteaching and student learning. He found that the student teachers that used microteaching demonstrated more tolerance to modify their behavior, and the students obtained better academic achievement. The results confirm the findings obtained by Rosenshine and Furst (1972). The use of good teaching techniques have a positive effect in the academic achievement of students. Present research results indicate that these nine technical teaching skills and the unit of high school mathematics content jointly contribute significantly to student achievement in mathematics. In addition,

the results of this study confirms the findings by Wright and Nuttall (1975) that students are likely to learn significantly more units of subject content, in as brief a time as possible, in classrooms that feature teacher-student and in which the teacher employs various types of questioning techniques and other technical teaching skills that form a cluster to enable students to over-learn units of subject content. In brief, cycles of neatly integrated teaching skills that have been found to be positively correlated to students' achievement can be used by well-prepared neophyte teachers to translate their genuine intentions not actual student achievement.

Perry (1981) developed the hypothesis that teachers using microteaching techniques are more effective in their teaching than those that do not. He used graduate students to teach undergraduate students. The graduate students that used microteaching were more effective than the ones that did not. The studies also showed that individual differences were more apparent in the conclusions.

A program was developed at the University of Massachusetts at Amherst using these techniques. These classes were requirements for Education students at the preparatory secondary level (Fanslow, 1991; Ramos, 1991). The first person to implement microteaching was Dwight W. Allen, the former Dean of the School of Education at the University of Massachusetts at Amherst in 1968. Students

were provided by the Amherst Regional Junior and High Schools. They received a small stipend for their participation. At the beginning of each class, the teacher presented the objectives. Each lesson lasted twenty-five to thirty minutes. The lesson gave an opportunity for the student teachers to gain better teaching techniques and control of the group.

Summary

According to the literature analysis on students with specific problems learning simple and complex skills in the thinking process, the researcher concludes that the knowledge of the teacher with students with specific learning problems is variable and effects the student's learning process. Besides strategies, the teacher needs to consider the characteristics and needs of each student in order to determine the strategies to develop simple and complex skills in the thinking process.

Among the diverse strategies presented in the literature analysis, the computer is effective as a tool to develop skills in the thinking process. This is accomplished by the use of programs specially designed to develop diversity in the critical thinking phases in a logical sequence. Although the use of the computer is effective in the development of skills in the critical

thinking process and other microteaching skills, it is more useful in aiding the teacher to be more effective on the development of skills applicable to critical thinking.

Following this literature analysis, it appears that the better strategy for developing simple and complex skills in the thinking process of children with specific learning problems could be the microteaching strategy.

CHAPTER III

METHODOLOGY

Introduction

The methodology utilized to develop this study was exploratory in nature and follows exploratory investigative steps. This study investigated how influential the utilized strategies of teachers are, working with Spanish-speaking students with specific learning disabilities and simple and complex skills in the thinking process.

Research Questions

This research study explored how microteaching techniques affect the learning of simple and complex skills of students with a specific learning problem. The following research questions were addressed and guided this study:

- Which of the complex thinking skills are the most difficult to master by a child with specific learning problems?
- To what extent is microteaching effective in simple and complex skills in the thinking process to help children with specific learning problems?

- What difficulties does a child with a specific learning problem have to face to master learning skills?
- How much can a teacher provide towards the acquisition of skills in the simple and complex skills in the thinking process of some children?
- In what way will the diagnostic test help in the development of simple and complex skills in the thinking process?
- How will inducement of teaching help in the development of simple and complex skills in the thinking process of children with specific learning problems?
- How can the multiple use of references contribute to the development of simple and complex skills in the thinking process of children with specific learning problems?
- How can the use of questions exert influence in the development of simple and complex skills in the thinking process of children with specific learning problems?

Design of the Study

The Springfield Public School System, the largest public school system in the western part of the State of Massachusetts, was selected as the site for this study. The Springfield Public School System is comprised of thirty elementary schools, six intermediate schools, two high schools, and one vocational school.

During the 1991-1992 school year, the System served 24,000 students. Of the 24,000 students, 4,352 were Special Education students. The district had a Special Education distribution by ethnic background of 3,300 Anglo and 1,052 Hispanic.

Sample Population

This exploratory study was conducted among twenty-three students from the Springfield Public Schools who were enrolled in Special Education programs for children with specific learning problems. Van Sickle Middle School and Chestnut Middle School were considered because the characteristics of the students were the same. The study was conducted with all of the students. Twenty-three students were Puerto Ricans who were evaluated by various specialists (psychologists, speech pathologists, and others) before being placed in Special Education classes. The subjects who participated in this exploratory study

had been identified as having been in the Bilingual Special Education Program since 1988.

Out of the twenty-three students, thirteen were selected randomly to be part of Group A, for the selections "The Ant and the Grasshopper" and "The Greedy Bear".

In the short story, "The Wave That Wanted to Travel", twenty students were chosen randomly and separated into equal groups. One group was named Group A and the other Group B. All twenty-three students participated. The students attended either Van Sickle Middle School or Chestnut Middle School. They were characterized with the characteristics which were evaluated before the story was given to them. The following characteristics were considered for the selection of these students:

(1) Age (12, 13, 14)

(2) Learning Level (Third Grade)

(3) Puerto Rican

(4) Time Living in Massachusetts (Five Years)

(5) According to the IEP, the students presented difficulty in the following areas:

(a) Short attention span

(b) Thinking

(c) Reading

(d) Writing

(e) Spelling

(f) Resolving mathematical calculations

Details About the Investigation

This study determined how influential the utilized strategies of teachers, working with students with specific learning problems, are in simple and complex skills in the thinking process.

The thinking skills evaluated during the study are shown in the following:

A. Simple

(1) Order of successes

(2) Details

(3) Personal characteristics

B. Complex

(1) Imply ideas

(2) Imply cause and effect

(3) Main idea

The following microteaching techniques were used in the development of simple and complex thinking skills by the teacher who worked with Group A. The teacher who worked with Group B did not use the microteaching techniques:

(1) Diagnostic

(2) Introduction to learning

(3) Multiple reference markers

(4) The art of formulating questions

(5) Contra-interrogatory

(6) Closure pedagogy

The skills mentioned were developed in a microteaching laboratory at Stanford University in California, during the second year of the microteaching laboratory, by William Johnson and Donald Wehmeyer (1969). These skills are explained in detail in Chapter IV.

During the study, two Puerto Rican teachers certified in Special Education participated: one with Group A and one with Group B.

Once the researcher received the authorization to proceed with the study (see Appendix A) and the necessary orientation, she began to gather the data required for the study. The researcher prepared a list of students in the Springfield (Massachusetts) Public Schools to be involved in the study. They were enrolled in Special Education programs designed for students with specific disabilities in the learning process.

To gather the data, the researcher used report cards and the individual educational plan of the student. Throughout the school year, Group A (with special needs) received help in the following: skills required to order of successes, details, personal characteristics, imply ideas, imply cause and effect, and main idea.

The results of this investigation demonstrated the importance for teachers to master the use of various and

diverse skills strategies in order to be effective with children who have specific disabilities in the thinking process.

Finally, the researcher organized all the information obtained, analyzed the data, and made recommendations.

Instrumentation Description

Various resources were utilized to reconcile the data. The first one was a cumulative report which provided specific characteristics about each student, such as the sex and age of the student.

The second resource was the educational plan of each student to learn about designation, administered tests, the disability affecting the student, specific learning problems, and treatment and/or medical conditions.

Following are the instruments used to evaluate simple and complex thinking skills.

The first instrument was an illustrated reading about "The Ant and the Grasshopper". The Ant worked during the Summer looking for food for the Winter. The Grasshopper only wanted to dance and walk around. When Winter came, the Grasshopper did not have food. The pretest and posttest to be utilized were the skills tests in thinking, prepared by the researcher (see Appendix B). It consisted of the following:

- Short readings
- Determine order of details of the story by using pictures
- Identify issues happening to the main character by reading the story
- Express ideas not exposed through questions
- Four exercises to identify details, main idea, and theme
- Three exercises to identify the central idea

The second instrument was about "The Greedy Bear". The only thing that he did was to work without entertaining, because he did not want to spend his money. He buried his money far away from his home. One day somebody stole his fortune. A diagnostic test of skills in the thinking process, prepared by the researcher (see Appendix B), was utilized. It consisted of:

- Three short readings
- An exercise of multiple selections
- Determine relevant details of characters (the student demonstrated through the reading that the answer is correct)
- Infer main idea
- Determine qualities and attitudes of characters

The third instrument was "The Wave That Wanted to Travel". It was about a wave that wanted to travel to

land. One day, a Big Wave threw her over a rock. A group of children discovered her, and took her to their house and put her in front of a water fountain. One day, The Traveling Wave missed her parents, Giant Sea and White Wave, and became sad. The Sun, seeing her sad, started to warm her and she felt a new emotion. The Traveling Wave started to rise and rise. The rain started to fall and The Traveling Wave closed her eyes. When she woke up, she was at her house. To be utilized was another diagnostic test of thinking skills, prepared by the researcher (see Appendix B). It consisted of the following:

- A multiple selection exercise
- Fill-in blank exercise
- Questions exercise with thinking and critical interpretation
- Exercise skills by listing story accounts in order

The purpose of these tests was to determine mastery of thinking skills of students with specific problems in the learning process, and to determine Groupings A and B after the investigation period.

Test administration was reviewed by the Director of Innovative Research of Educational Programs and the Director of the Trujillo Alto School, which are part of the Educational Region of San Juan, Puerto Rico (see

Appendix A). The Director of the Trujillo Alto School has an M.S. Degree in Education, specializing in Administration and Supervision of Schools. The Director of Innovative Research of Educational Programs has a Doctorate in Counseling. Once the tests were approved, they were field-tested with twenty-five Spanish-speaking Reading students from the Trujillo Alto School. Necessary changes were made on the tests following the field-testing before administering the tests in Massachusetts.

The twenty-five students the tests were administered to understood the instructions of each part of the tests. They answered the tests with a minimum of expected error.

The researcher used a school district in Puerto Rico to field-test the instrument for assurance that questions were valid and properly phrased in Spanish. The researcher manipulated the treatment of, and observed the behavior effect in, the subjects, while remaining aware of factors that would affect the results.

A comparison was made of the specific design of pretests/posttests of skills in the thinking process in both groups: those that went through the training with teachers mastering diversity of strategies and those that did not.

Two groups were utilized in this design. Group A received "X" treatment, while Group B did not receive

any treatment at all. Both groups were submitted to pretests/posttests.

Group A was subjected to three pretests/posttests for the purpose of manipulation of a variety of treatments. Group B was submitted to a posttest/pretest in order to compare results of both groups at the end of the study.

All of the instruction given, including the short stories used and the pretests and posttests, were conducted in Spanish.

Data Collection

Once all authorizations were received, the researcher met with the Superintendent of the Springfield Public Schools to receive permission to mail letters to the Principals of Van Sickle Middle School and Chestnut Middle School (see Appendix A).

The researcher distributed three pre-instrumental diagnostic tests in the thinking skills process. The group tested was administered by the same teacher who received training in strategies for the learning/thinking skills. These instruments were offered during the Spanish period in the classroom for five days (one hour for each instrument). The teacher collected the instruments and the researcher analyzed them.

Data Analysis

For tabulation and analysis of the obtained data, the following procedure was used.

Age and sex information and identification numbers were obtained from the cumulative report card. Pretests/posttests were tabulated by separating subjects by group.

Group A and Group B were individually analyzed and compared. Data were presented in the following:

_____ Test distribution by group, age, and sex

Group A - Group B

_____ Results of pretest of subjects

Group A - Group B

_____ Results obtained by subjects in posttest in thinking skills

Group A - Group B

_____ Results obtained by subjects in two pretests

Group A

_____ Results obtained by subjects in two posttests in thinking skills

Group A

_____ Results obtained by subjects in two pretests in thinking skills

Group A

_____ Determine relationship of variables affecting the conduct of subjects in treatment

Group A

Comparison between instrumental items were made by percentage. Each item on instruments was individually analyzed.

Percentage of analyzed data was presented in the following scale: age, average dispersion, style, percent of mastered skills, individual, arithmetic average, and percentage of mastering groups. The statistical findings were presented on a scale table in order to be visualized. The relevance of the study was used to determine conclusions and recommendations.

Emerging Model: Teacher's Handbook

As a consequence of this study, a Teacher's Handbook was designed for use by the teacher (see Appendix C). Mini-lessons for skills to be taught are presented in the Handbook.

C H A P T E R IV

FINDINGS

This chapter presents the results of three tests administered before and after using the microteaching techniques. The tests measured the development of thinking skills of Spanish-speaking students with specific learning problems. The results of the study showed the impact of the microteaching strategies in the development of simple and complex thinking skills.

The chapter is divided into three parts. The first part addresses the research questions which guided this study. The second part consists of the distribution of the mastery level obtained by Group A in the pretests/posttests of the short stories "The Ant and the Grasshopper" and "The Greedy Bear". The third part is a comparison of the results obtained by Groups A and B in the pretests/posttests based on the short story "The Wave That Wanted to Travel".

Research Questions

The following research questions were designed to guide this study. They are answered in turn.

Which of the Complex Thinking Skills Are the Most Difficult to Master by a Child With Specific Learning Problems?

According to the findings of the pretests/posttests of Group A and Group B in the short story "The Wave That Wanted to Travel", the most difficult skills for students to master are "Details" and "Main Idea".

The distribution of the subjects in Group B where no treatment with microteaching techniques was given showed that 70% of the subjects had 0% and 30% of the subjects had .25% mastery in "Main Idea", and 20% of the subjects had 0% and 60% of the subjects had less than 55% mastery in "Details".

In Group A where the microteaching techniques were used, 30% of the subjects had only 50% mastery in "Main Idea", and 10% of the subjects had 50% and 20% of Group A had 0% mastery in "Details".

As this is an exploratory study, it cannot be said that the results are statistically significant because there are a lot of variables that can affect the results. (See summary distribution of the subjects based in the percentage of mastery of skills in Figures 8 and 9 and Table 5 in "Summary of Findings".)

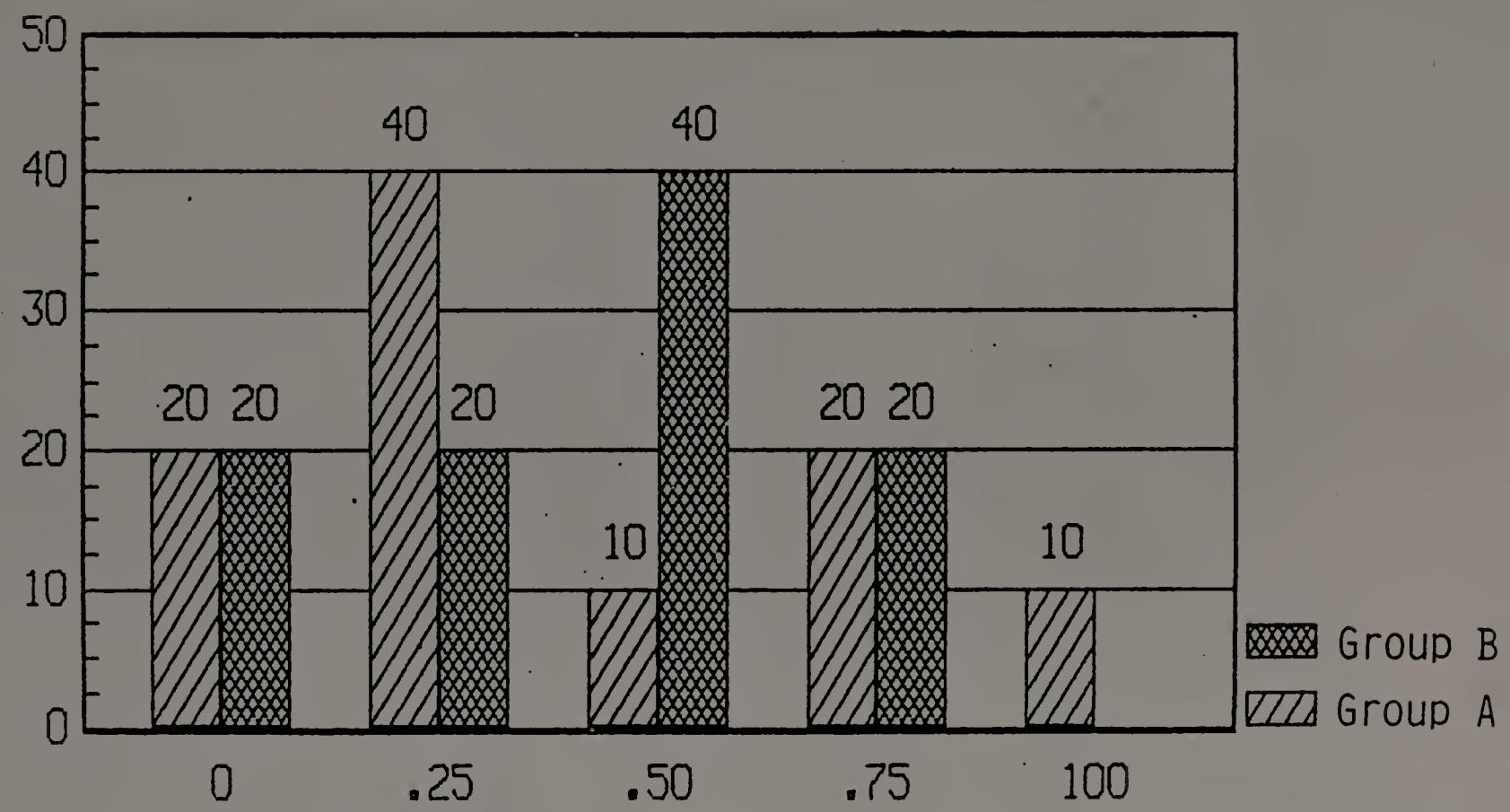


Figure 8. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

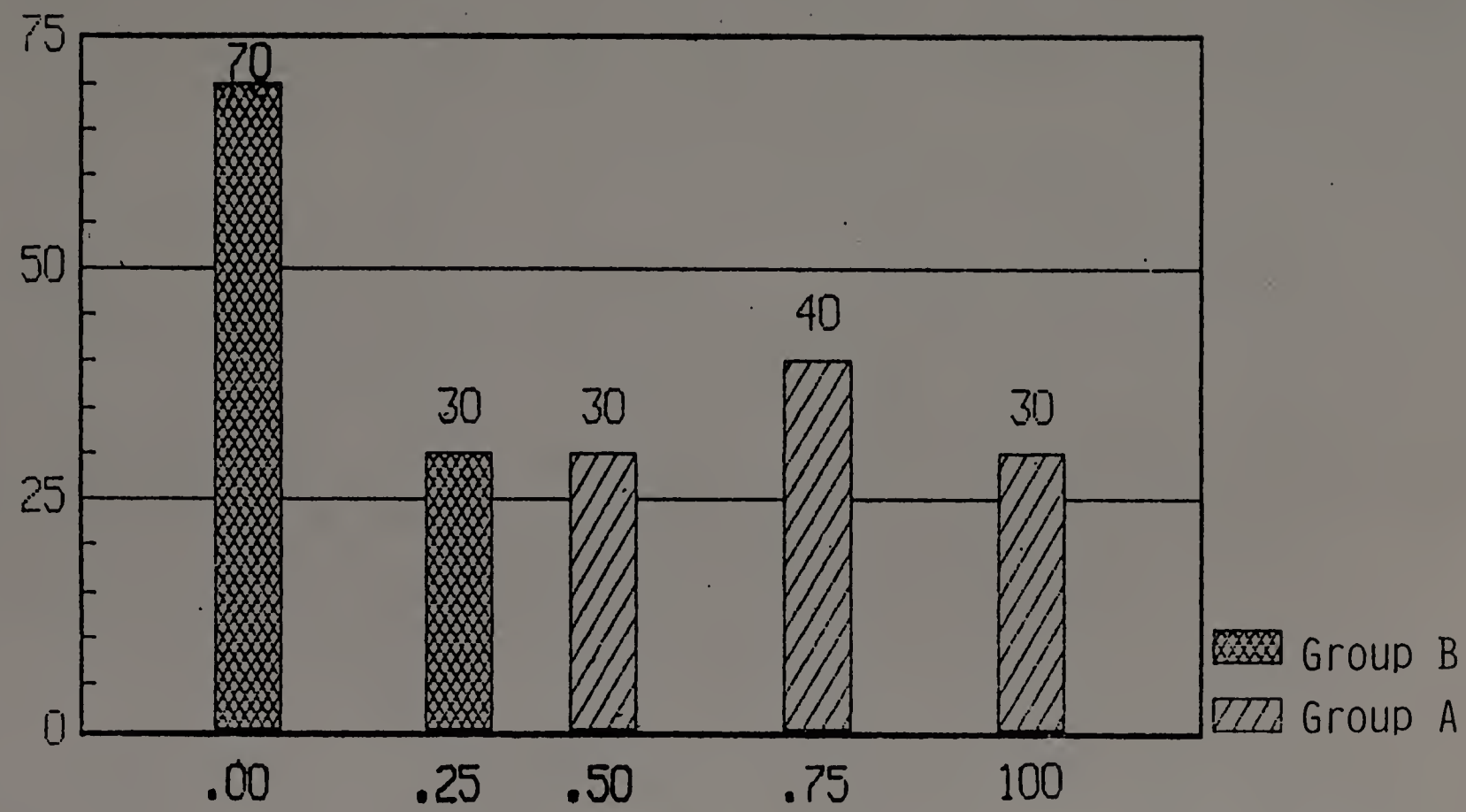


Figure 9. Distributon of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

To What Extent Is Microteaching Effective in Simple and Complex Thinking Skills in the Thinking Process to Help Children With Specific Learning Problems?

Based on the story "The Wave That Wanted to Travel", it can be said that the use of microteaching techniques is effective in the development of thinking skills. After having a five-week exposure to treatment, Group A showed better mastery of the simple and complex skills. Seventy percent of the subjects in Group A had less than 50% mastery in the "Details" skill before the use of microteaching techniques. After the use of such techniques, only 30% had 50% or less mastery.

In Group B where no treatment with microteaching was used, 70% of the subjects had less than 50% on the pretests/posttests. Figures 10 through 19 show the effectivity of the use of microteaching techniques in the development of simple and complex thinking skills in children with specific learning problems.

What Difficulties Does a Child With a Specific Learning Problem Have to Face to Master Learning Skills?

During the process of the study, it could be seen that the students faced problems, such as assimilation, remembering, attention, reading problems, and recuperation. They got upset easily because of their inability to complete tasks promptly.

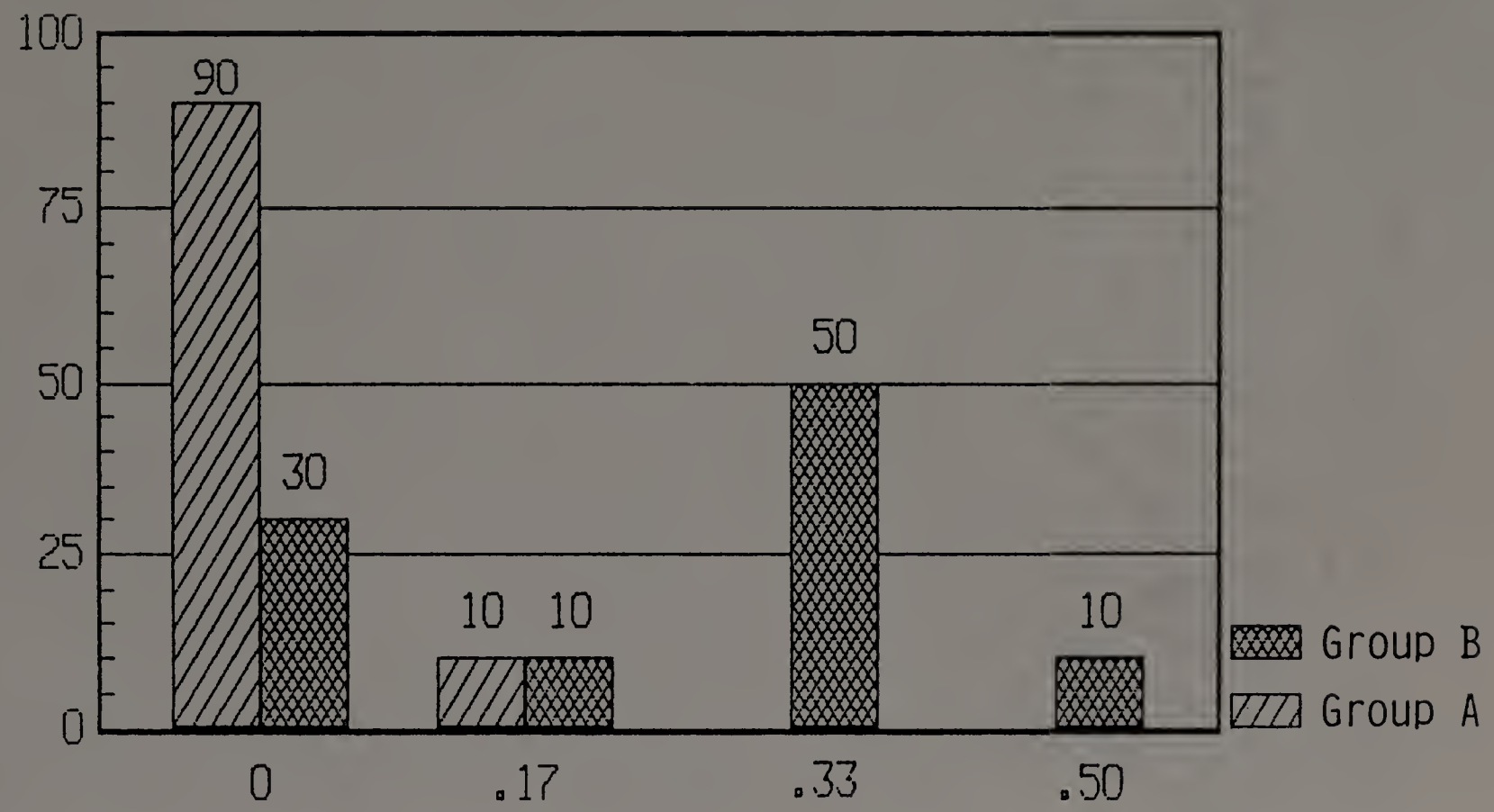


Figure 10. Distribution of the subject based on the pretest of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

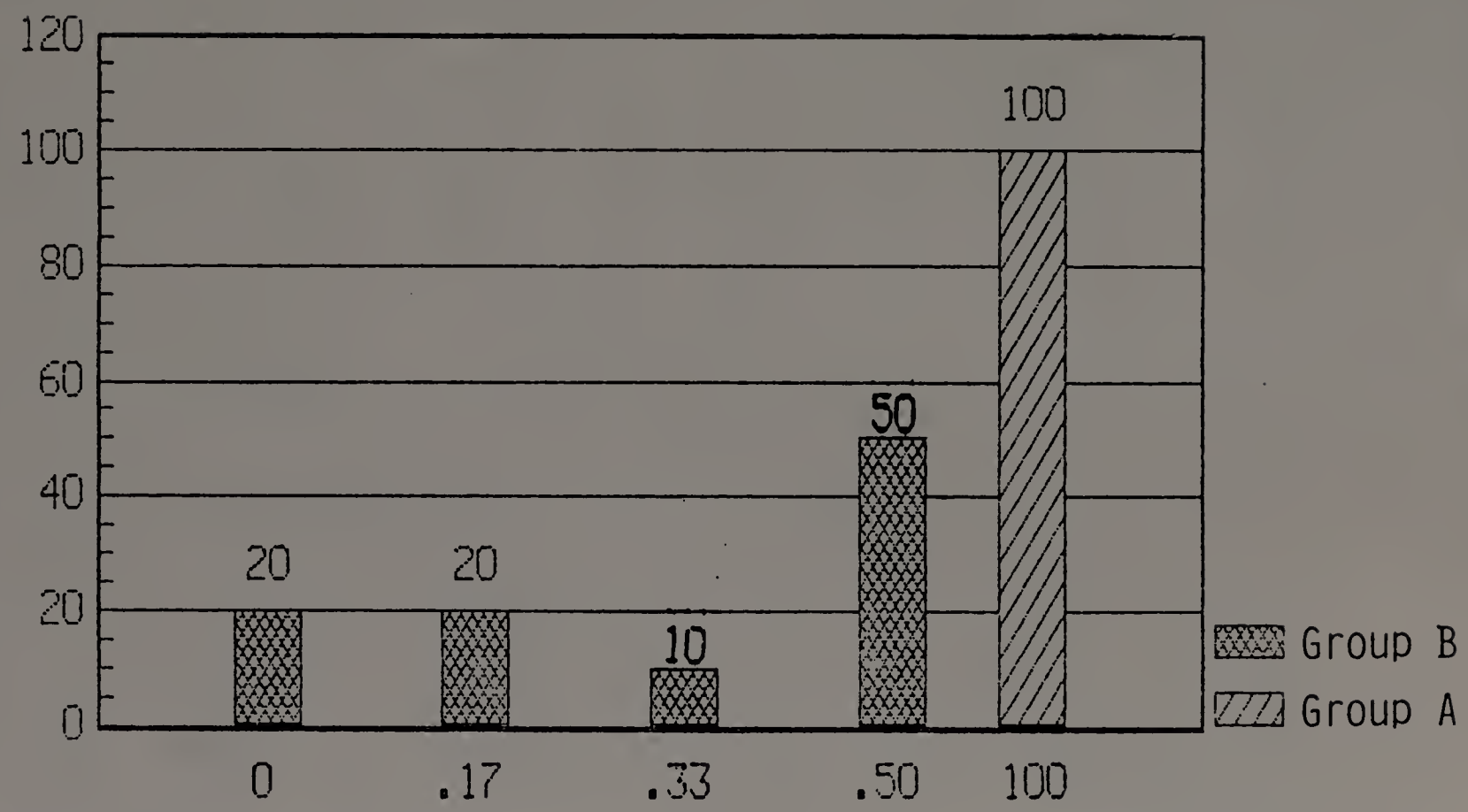


Figure 11. Distribution of the subject based on the posttest of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

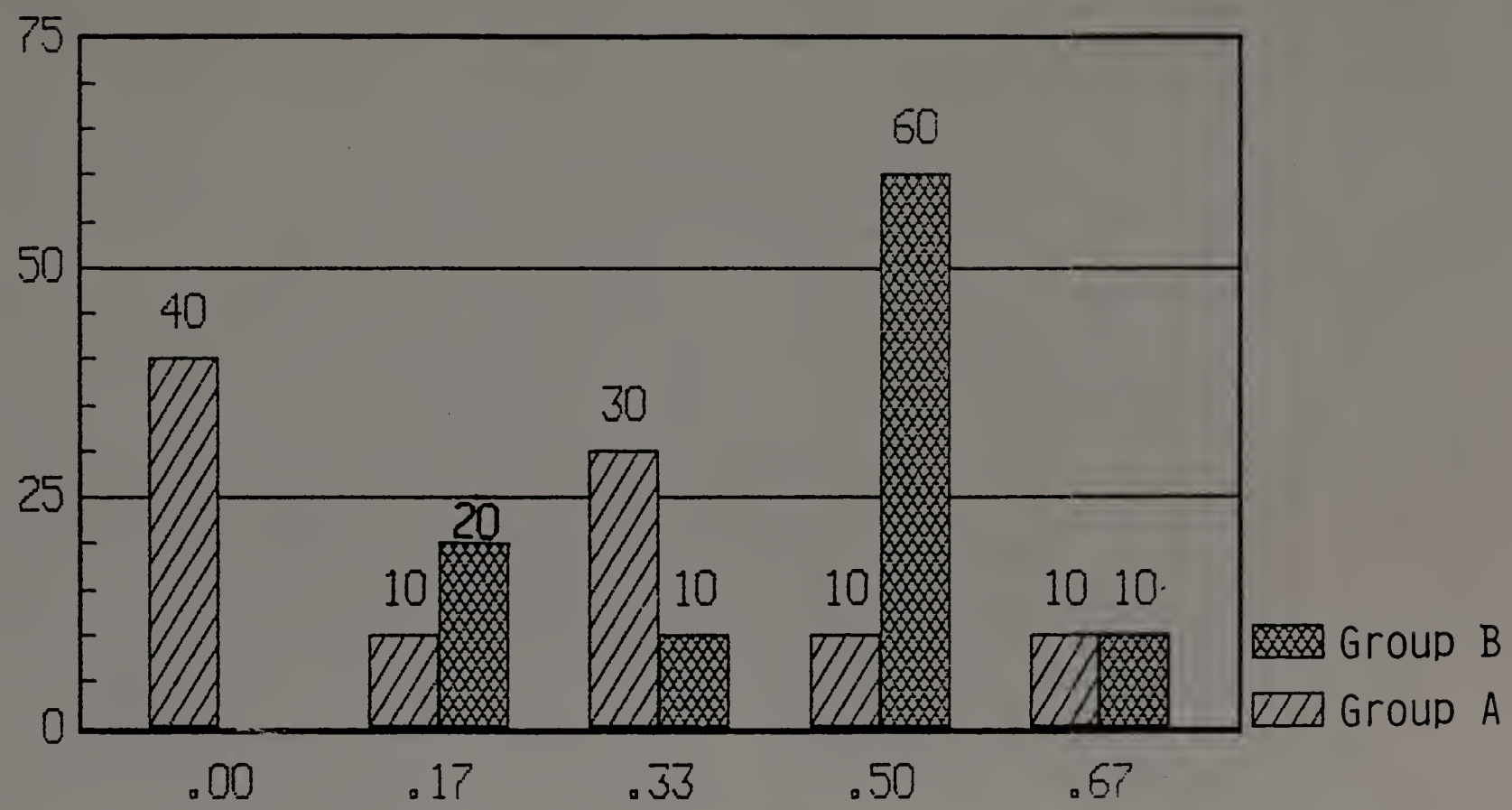


Figure 12. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

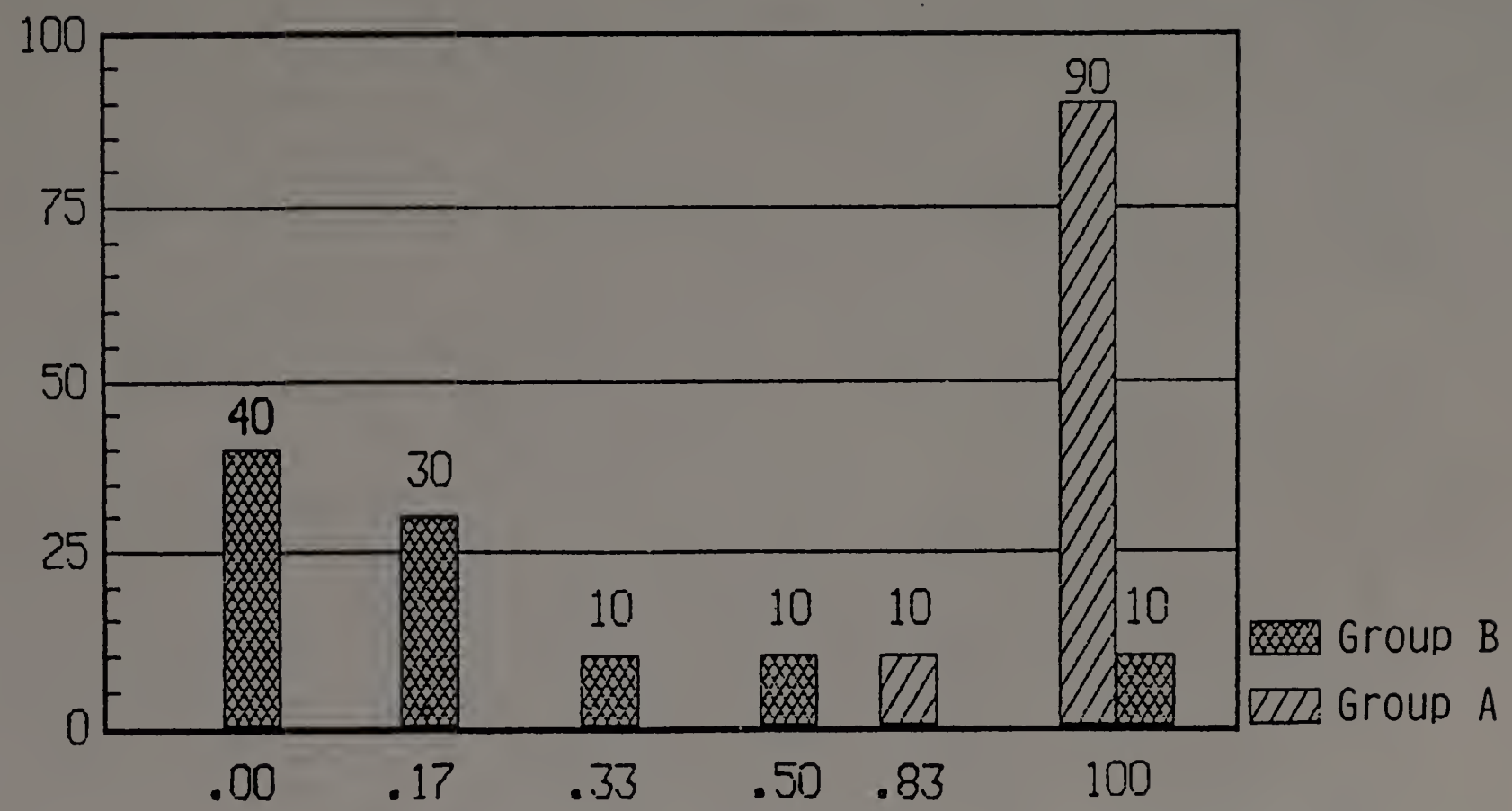


Figure 13. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

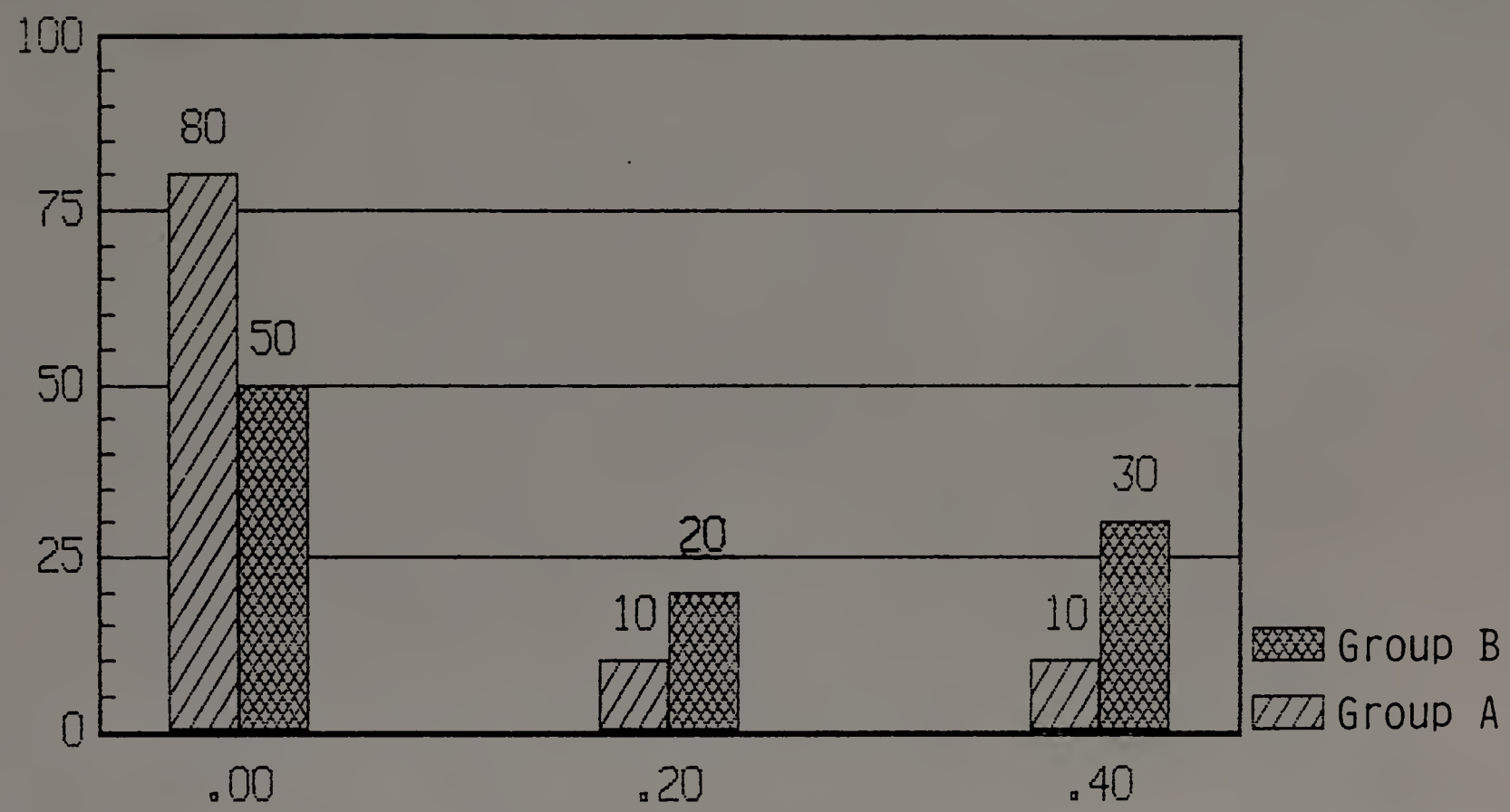


Figure 14. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

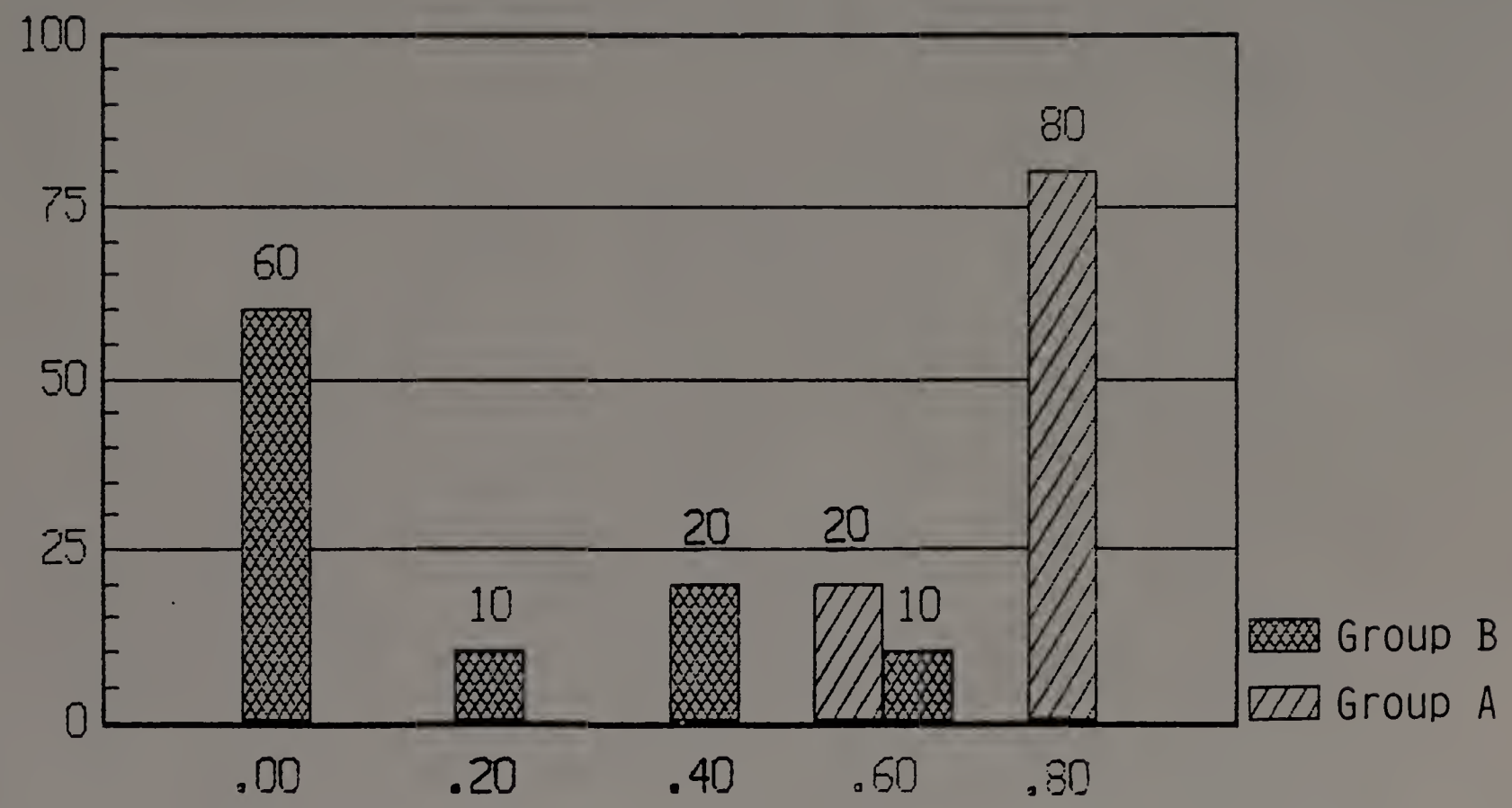


Figure 15. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

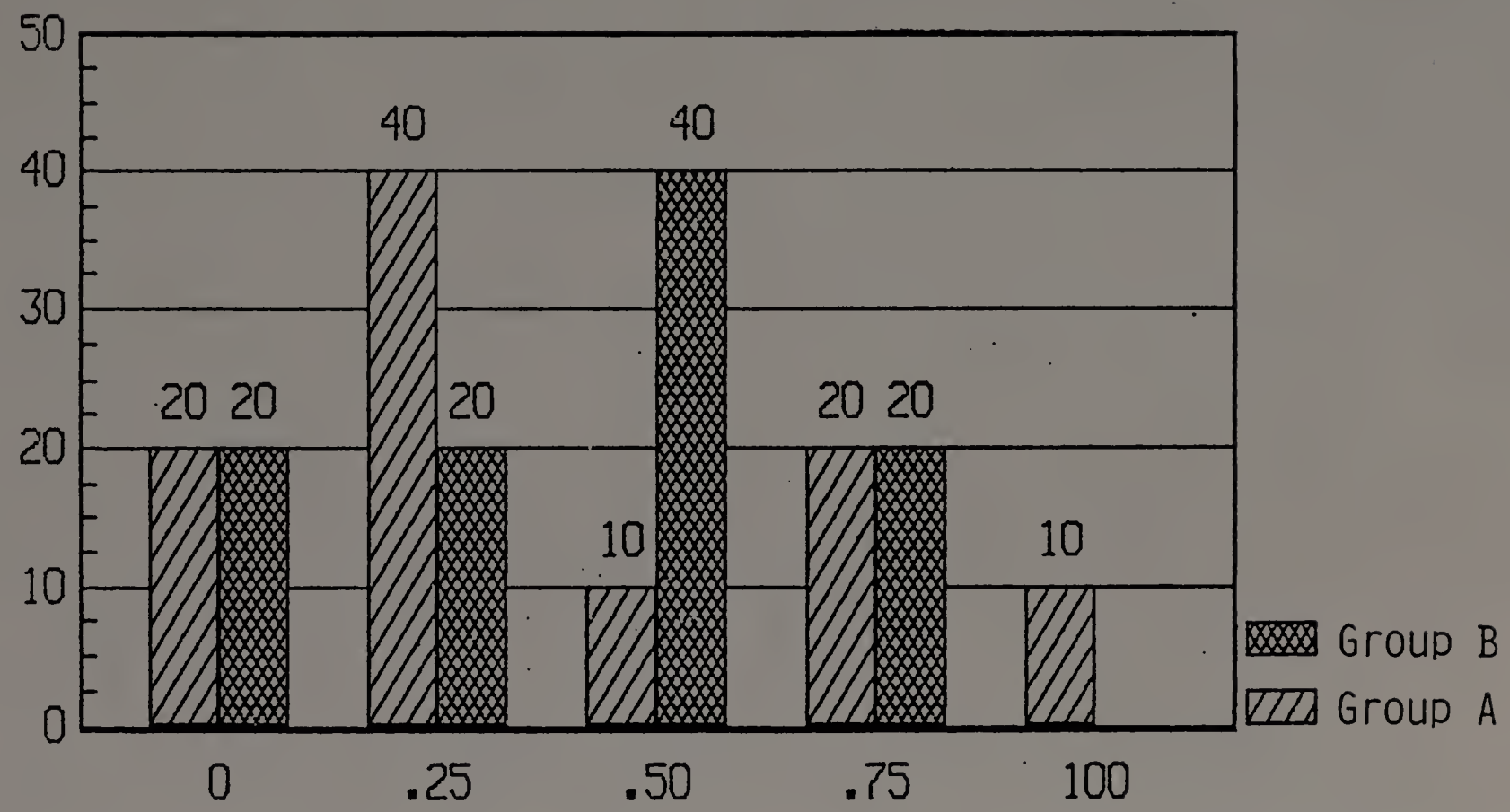


Figure 16. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

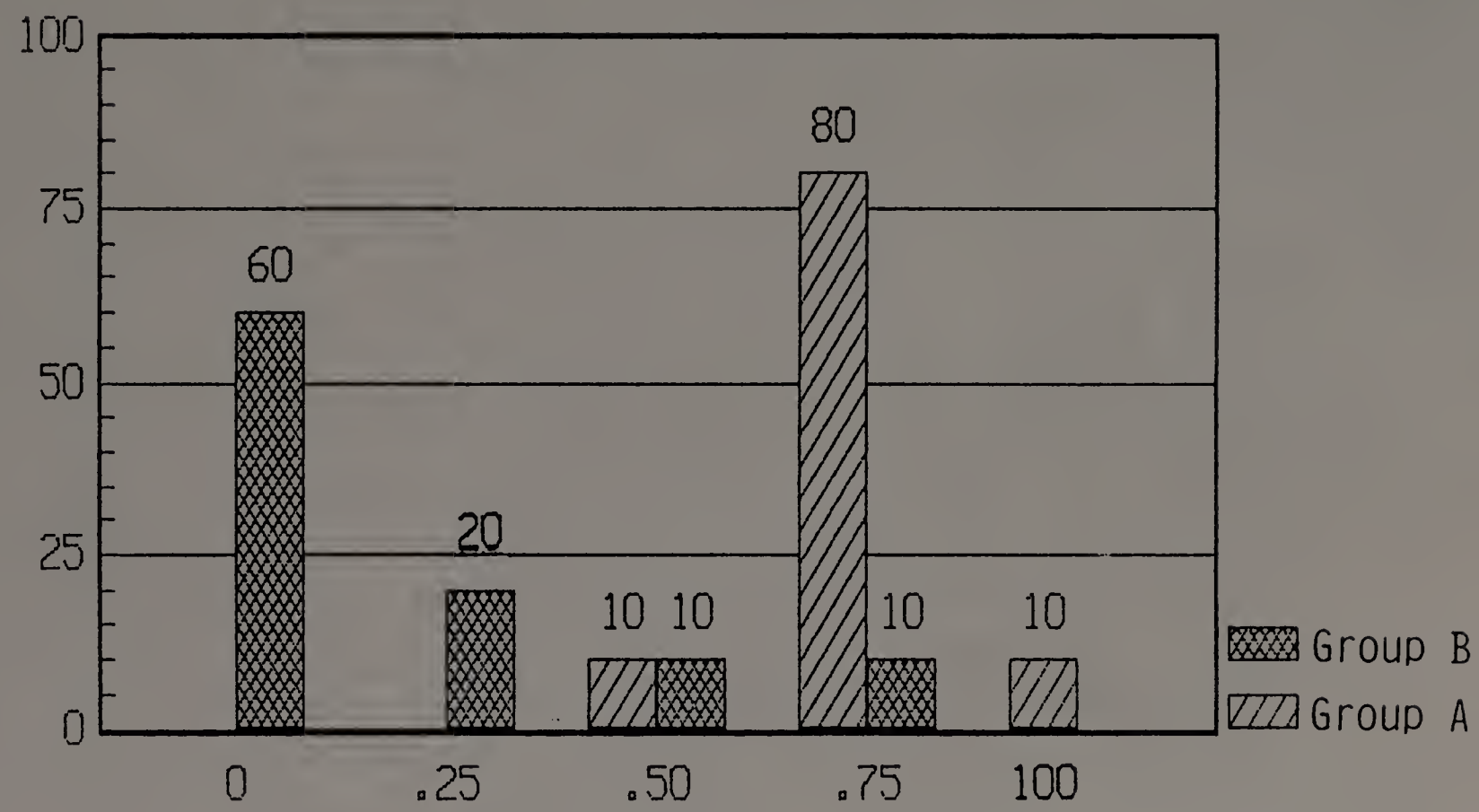


Figure 17. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

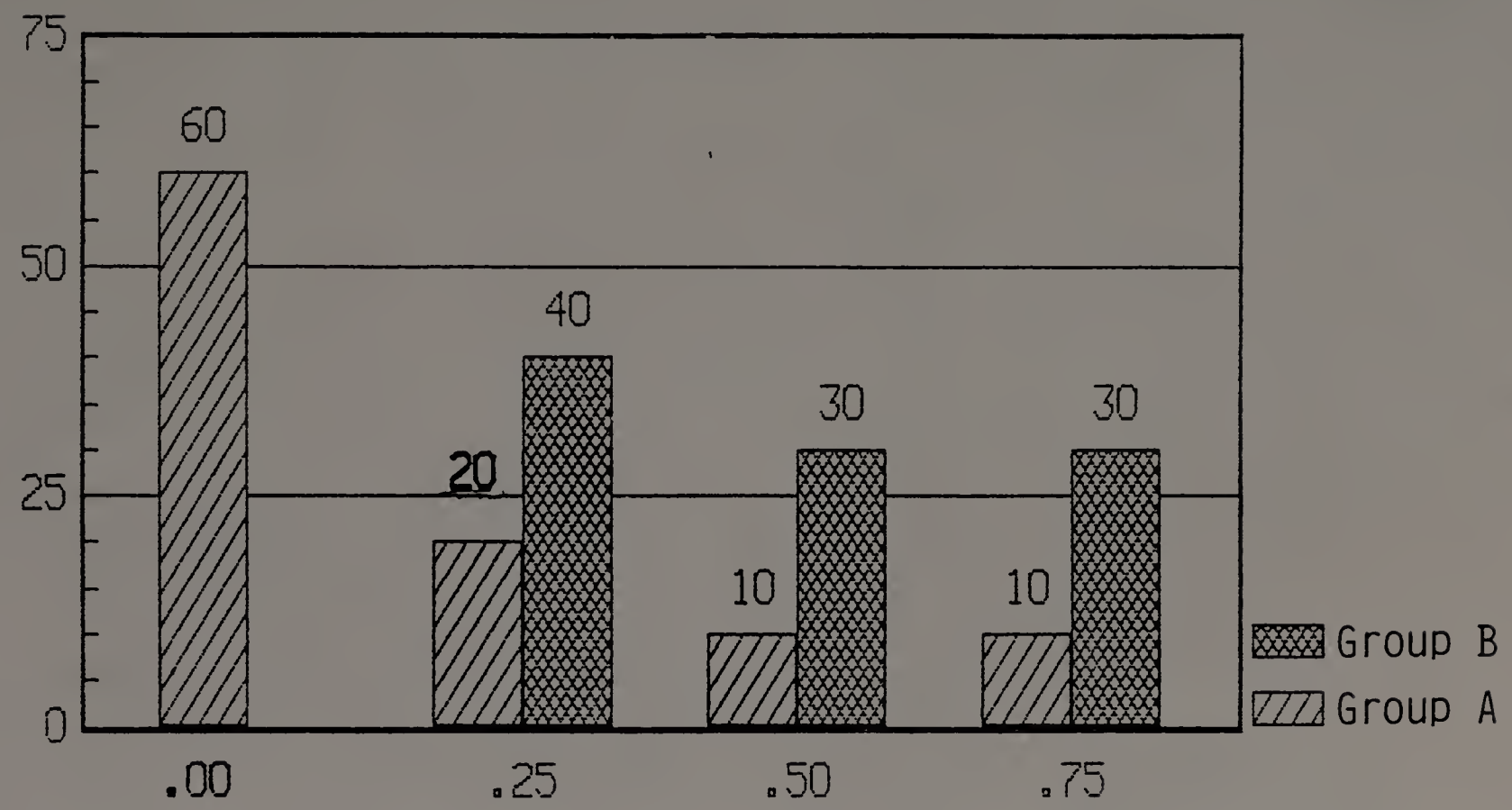


Figure 18. Distribution of the subject based on the pretest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

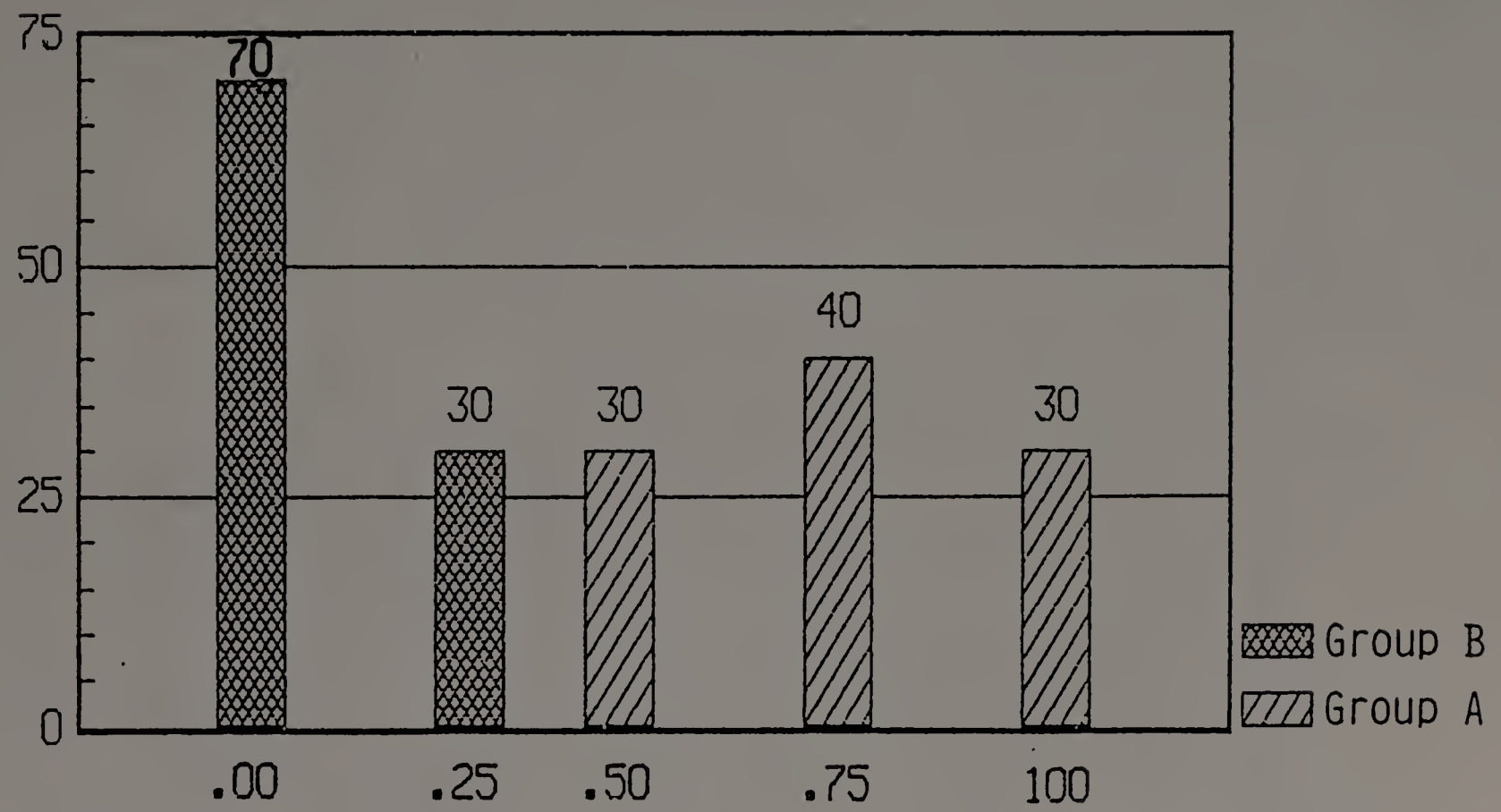


Figure 19. Distribution of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

One of the difficulties was the level of the materials used. When the teacher used simple material, the students were most interested. So the teacher had to use pictures, diagrams, charts, and everything to make the material easy for the students. The "Details" and "Main Idea" skills were not mastered because those skills needed assimilation and remembering. Some of the students could not read easily and most of the time the teacher had to read and re-read the material.

Another difficulty was one of curriculum. There was no specific curriculum used with these students. The teacher had to adapt it in order to make it easy for the children.

How Much Can a Teacher Provide Towards the Acquisition of Skills in the Simple and Complex Skills in the Thinking Process of Some Children?

If we look at the results of the study, we can see the teacher's impact with microteaching techniques in the development of thinking skills. The use of microteaching techniques by the teacher helped the students to master those complex thinking skills that otherwise could not have been mastered. The study showed that in the pretest, where no microteaching techniques were used, the mastery level of the skills was lower than in the pretest where microteaching techniques were used.

Figures 20 through 27 demonstrate the mastery level before and after the use of microteaching techniques.

In What Way Will the Diagnostic Test Help in the Development of Simple and Complex Skills in the Thinking Process?

The diagnostic test is a great vehicle in the development of simple and complex thinking skills. It helps the teacher in the placement of the students and helps to clarify the level in which the skill should begin to be developed. With the diagnostic test, the students show how much they know about the skills. It helps identify which ones need to be practiced or developed. The teacher should be fully informed when one starts teaching and developing the thinking skills. The diagnostic test also helps to compare the students' achievement during the process.

Figures 28 through 31 illustrate a comparison of the mastery level of skills before and after the use of microteaching techniques.

How Will Inducement of Teaching Help in the Development of Simple and Complex Skills in the Thinking Process of Children With Specific Learning Problems?

As we know, the inducement is one of the most important parts in any learning-teaching process. In teaching Group A, different stategies were used, but the inducement was the most important microteaching technique.

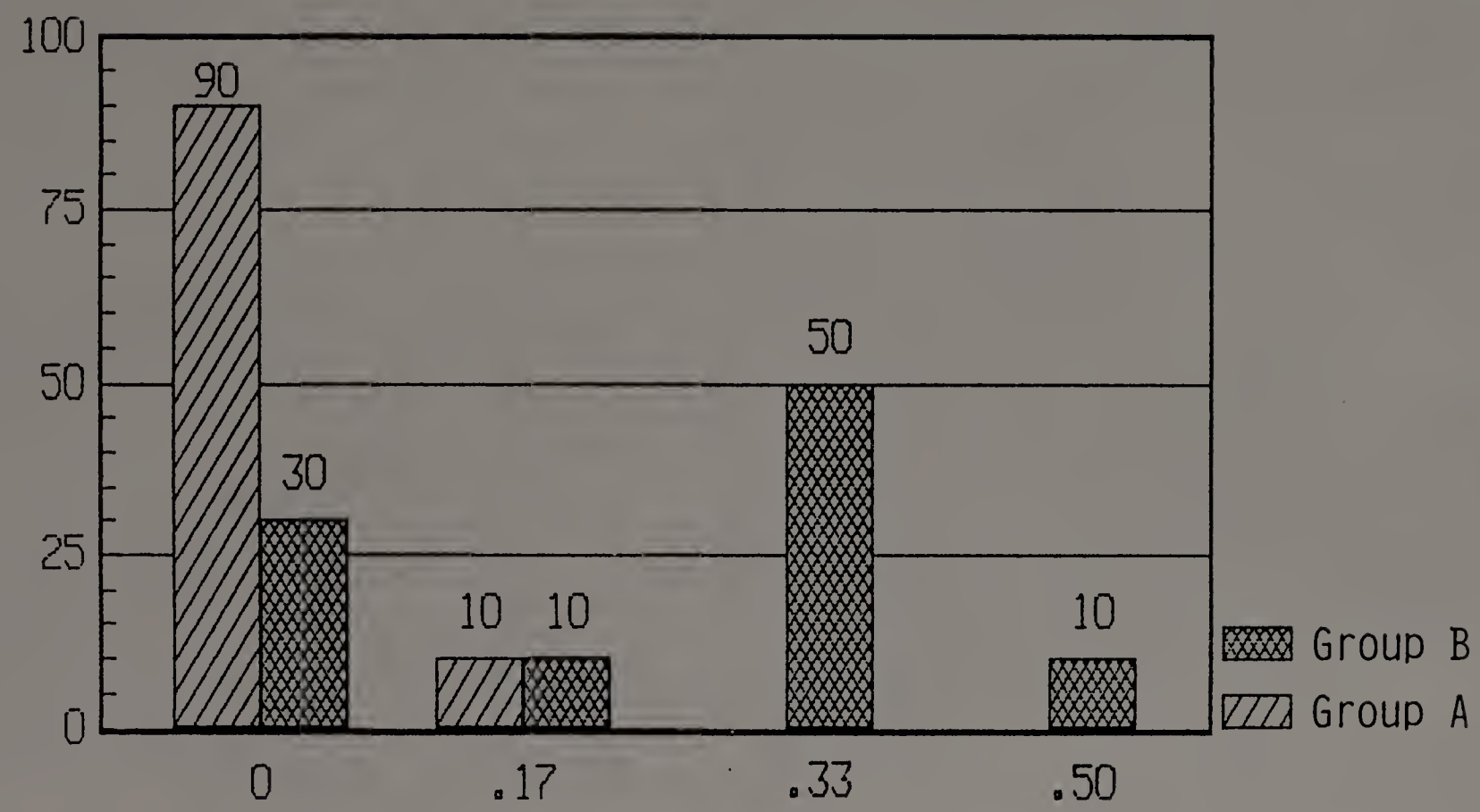


Figure 20. Distribution of the subject based on the pretests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

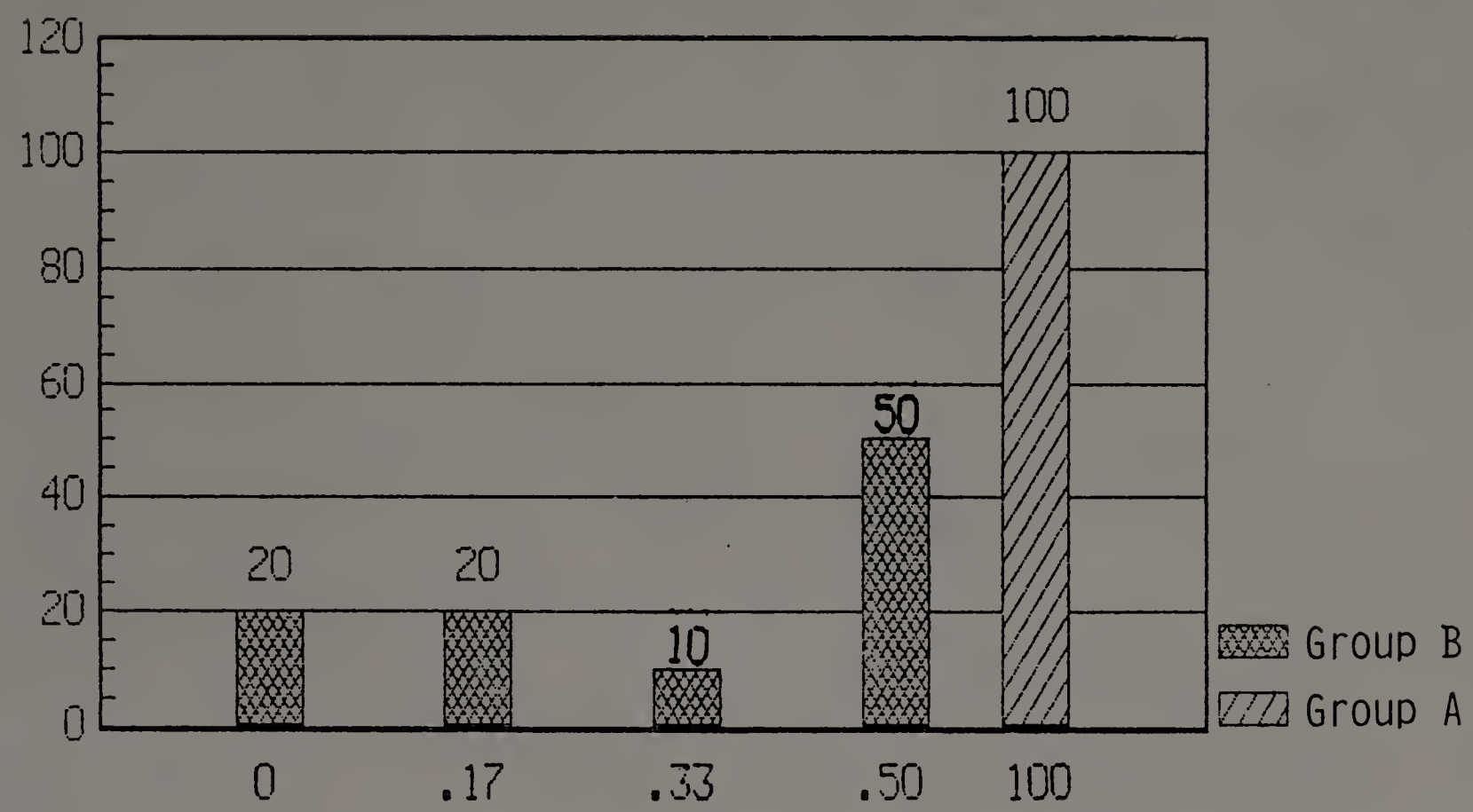


Figure 21. Distribution of the subject based on the posttests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

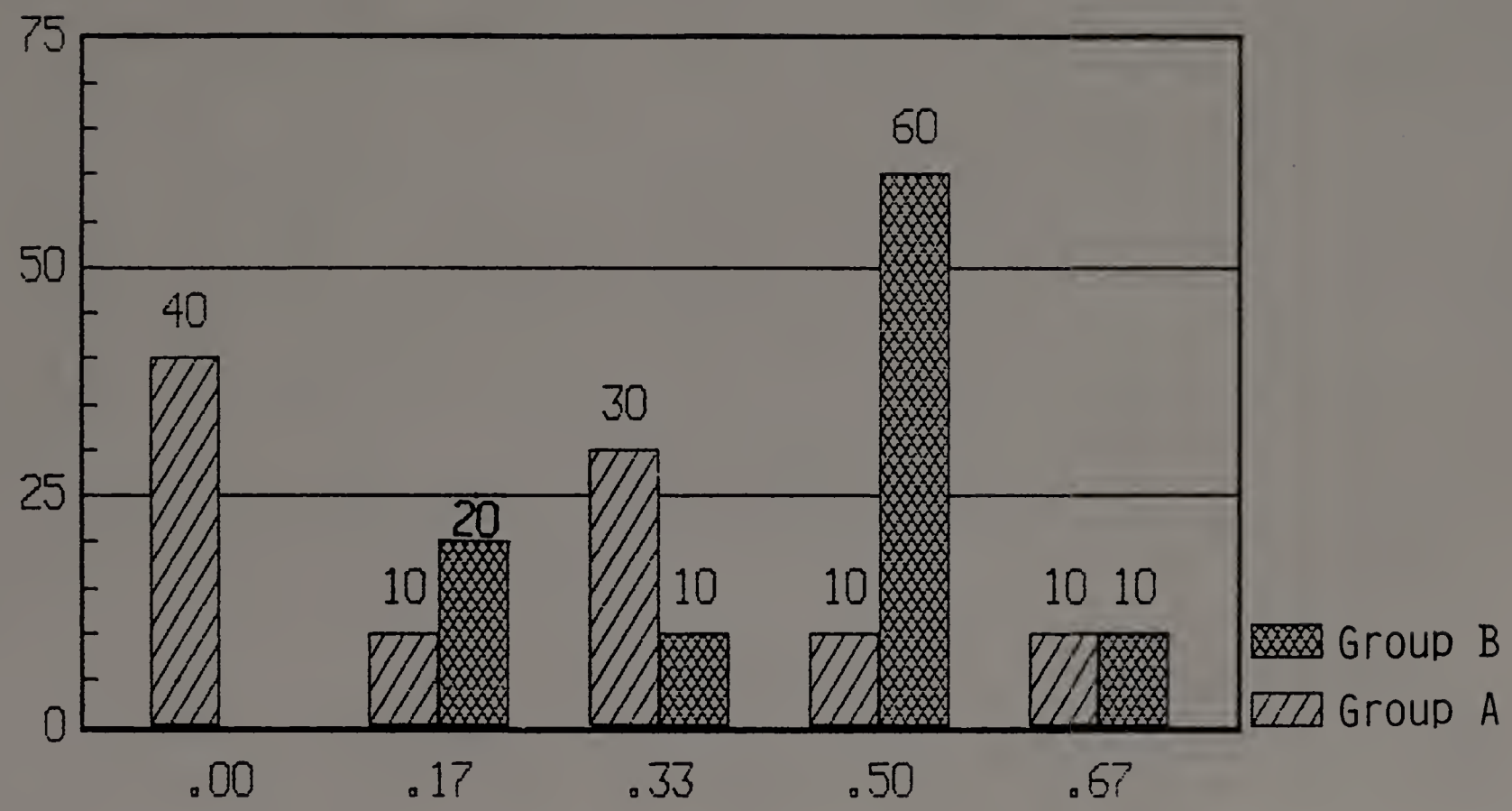


Figure 22. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

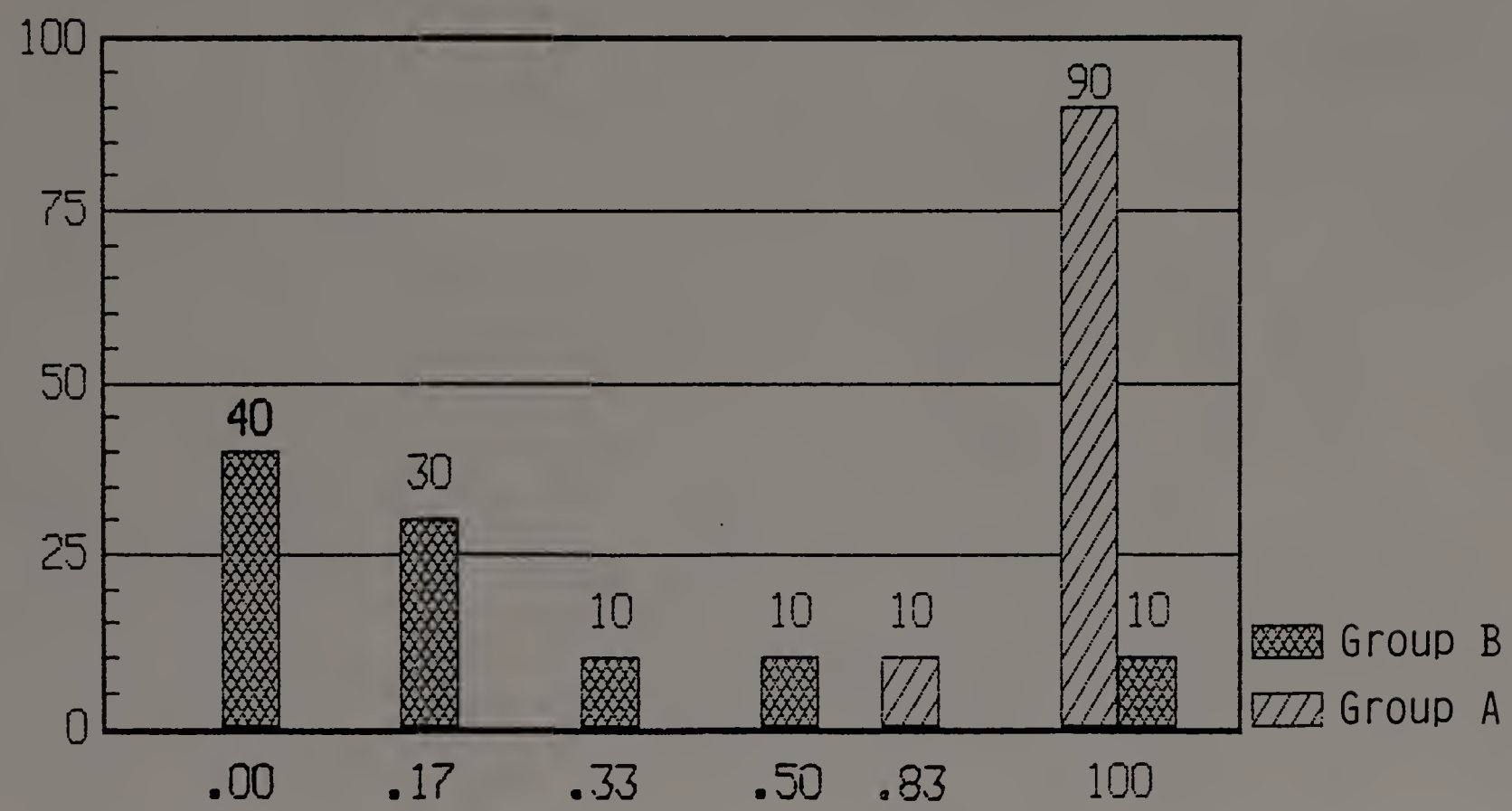


Figure 23. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

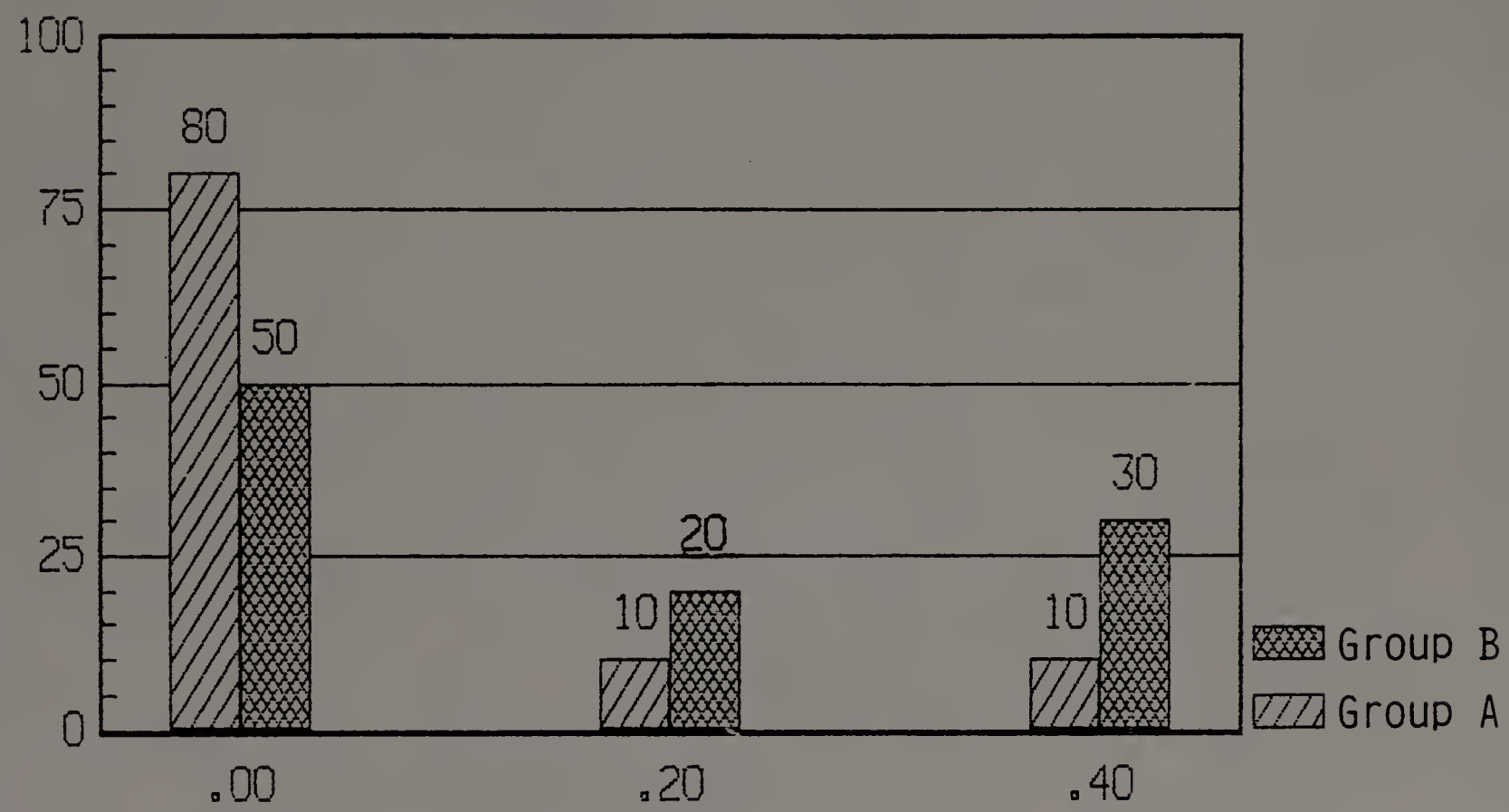


Figure 24. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

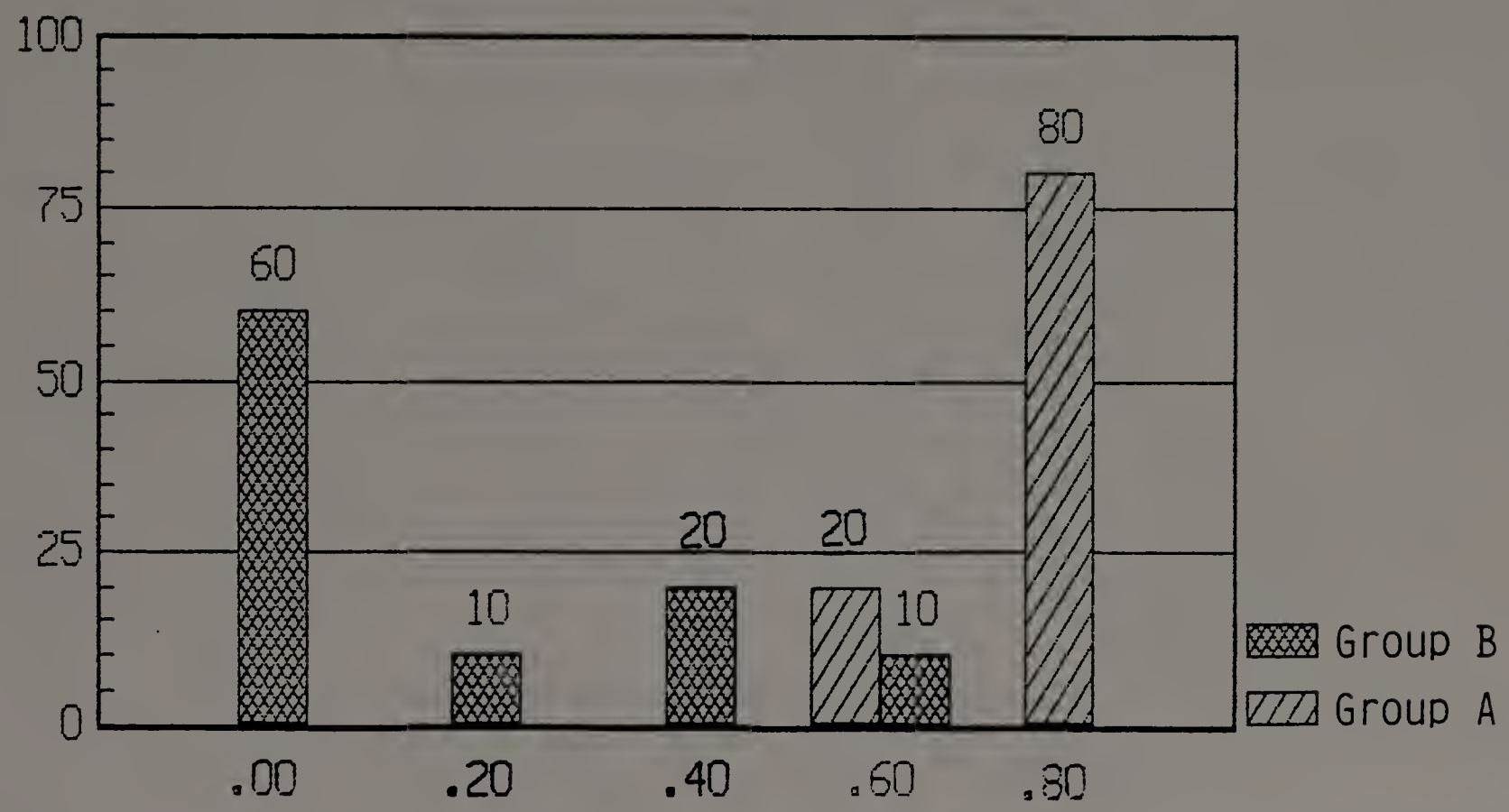


Figure 25. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

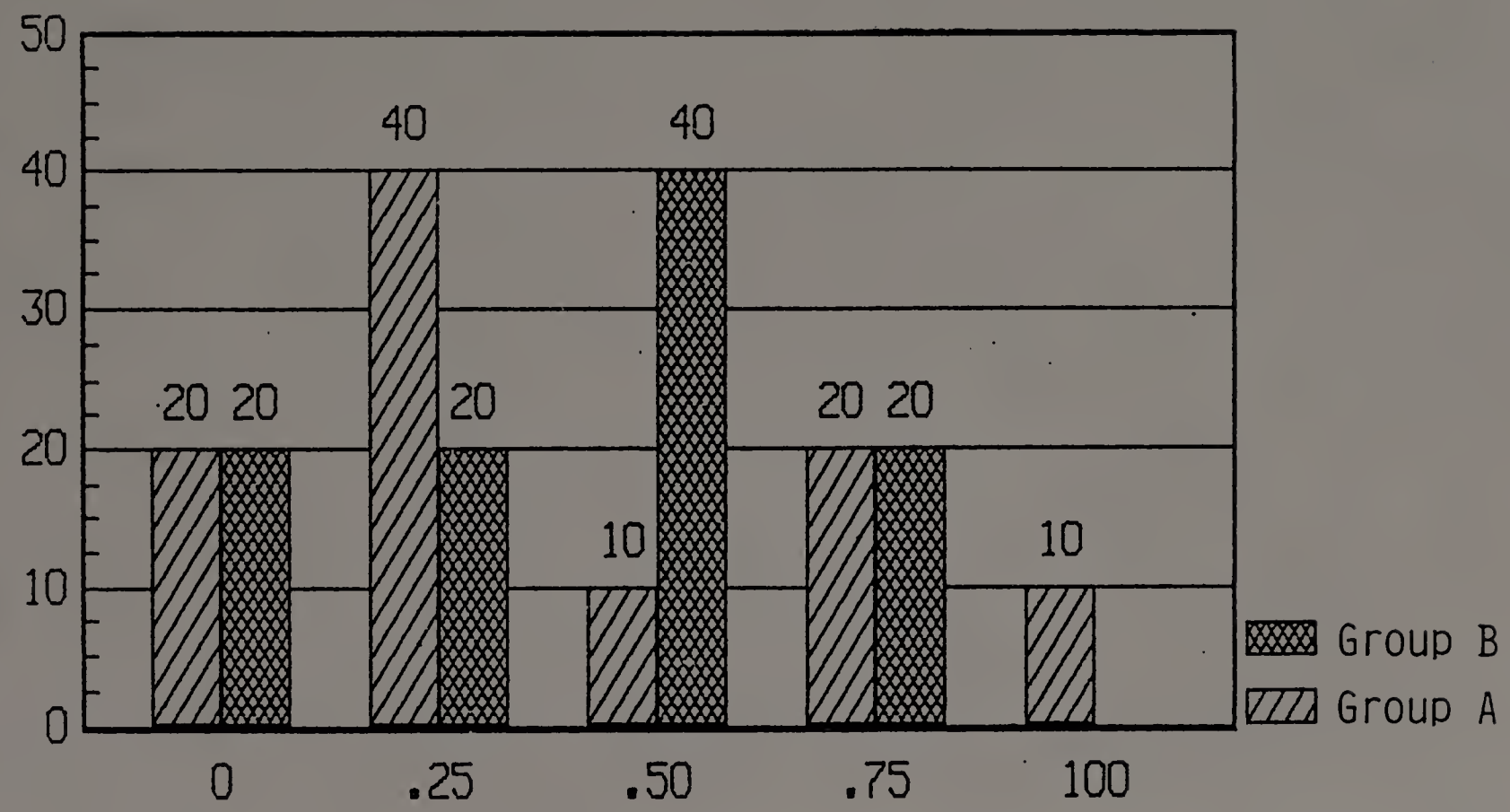


Figure 26. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

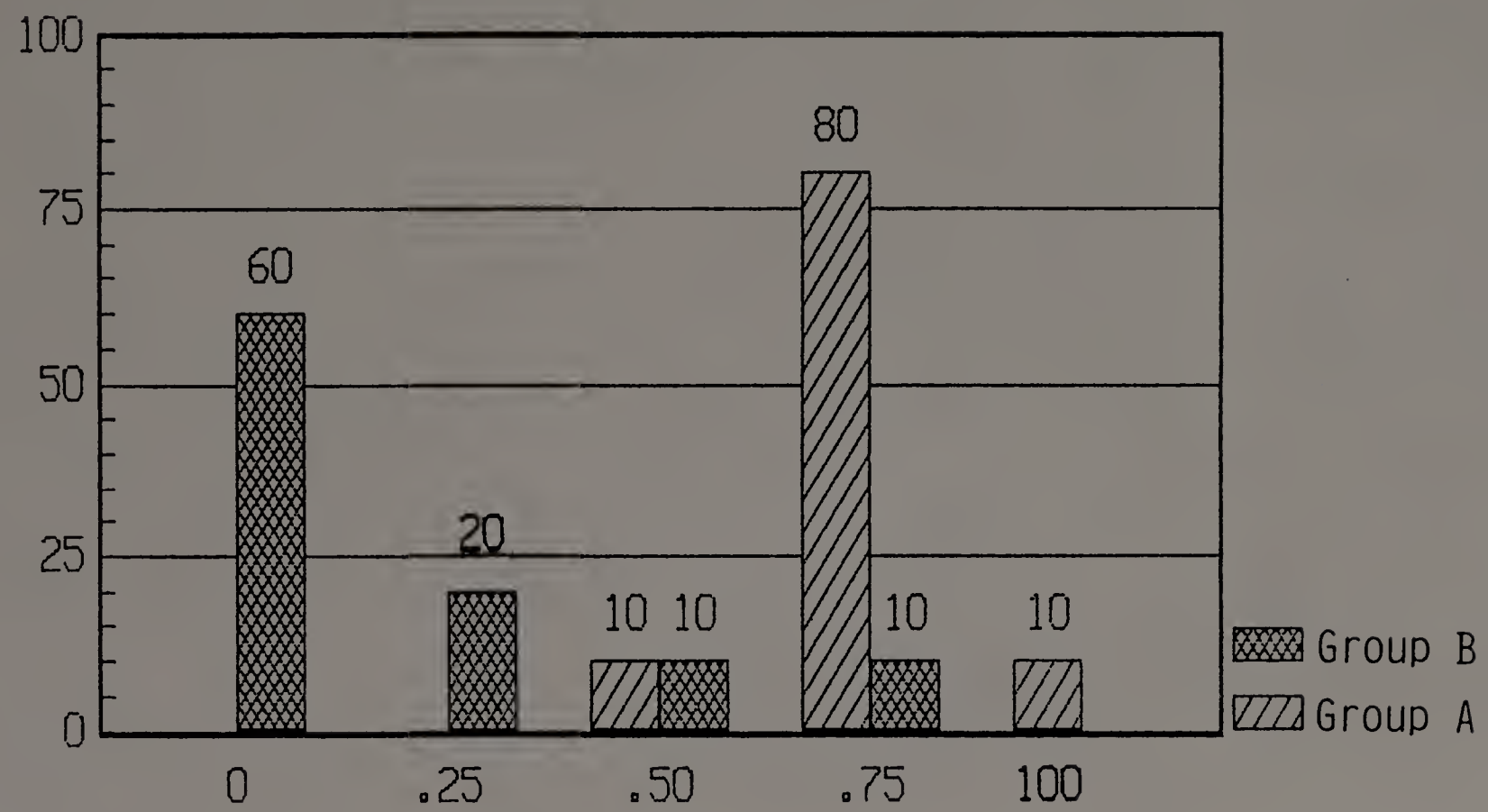


Figure 27. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short Story "The Wave That Wanted to Travel".

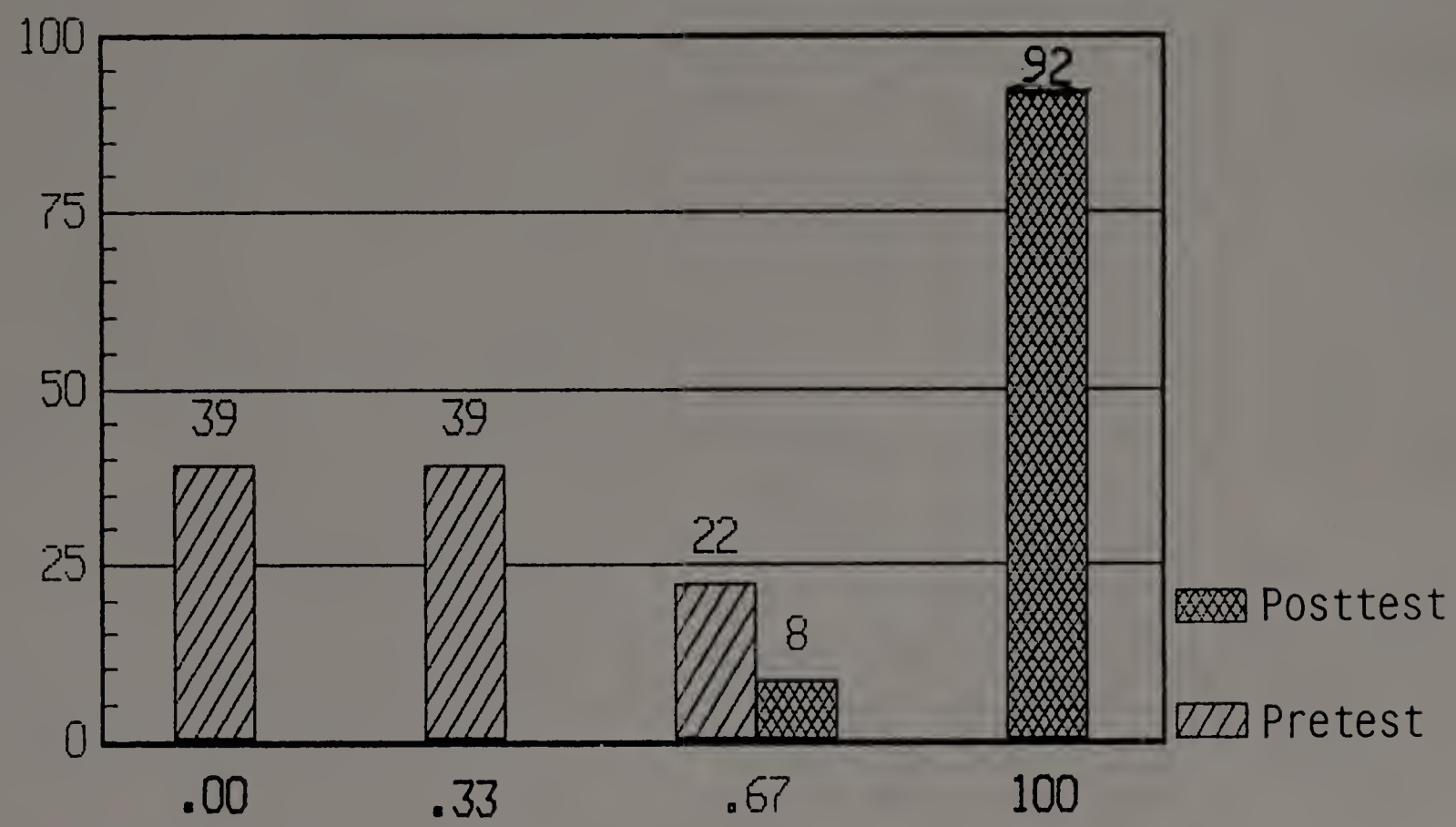


Figure 28. Distribution of the subject based on the percentage of pretests/posttests in the skills to "Imply Cause and Effect" in the short story "The Greedy Bear".

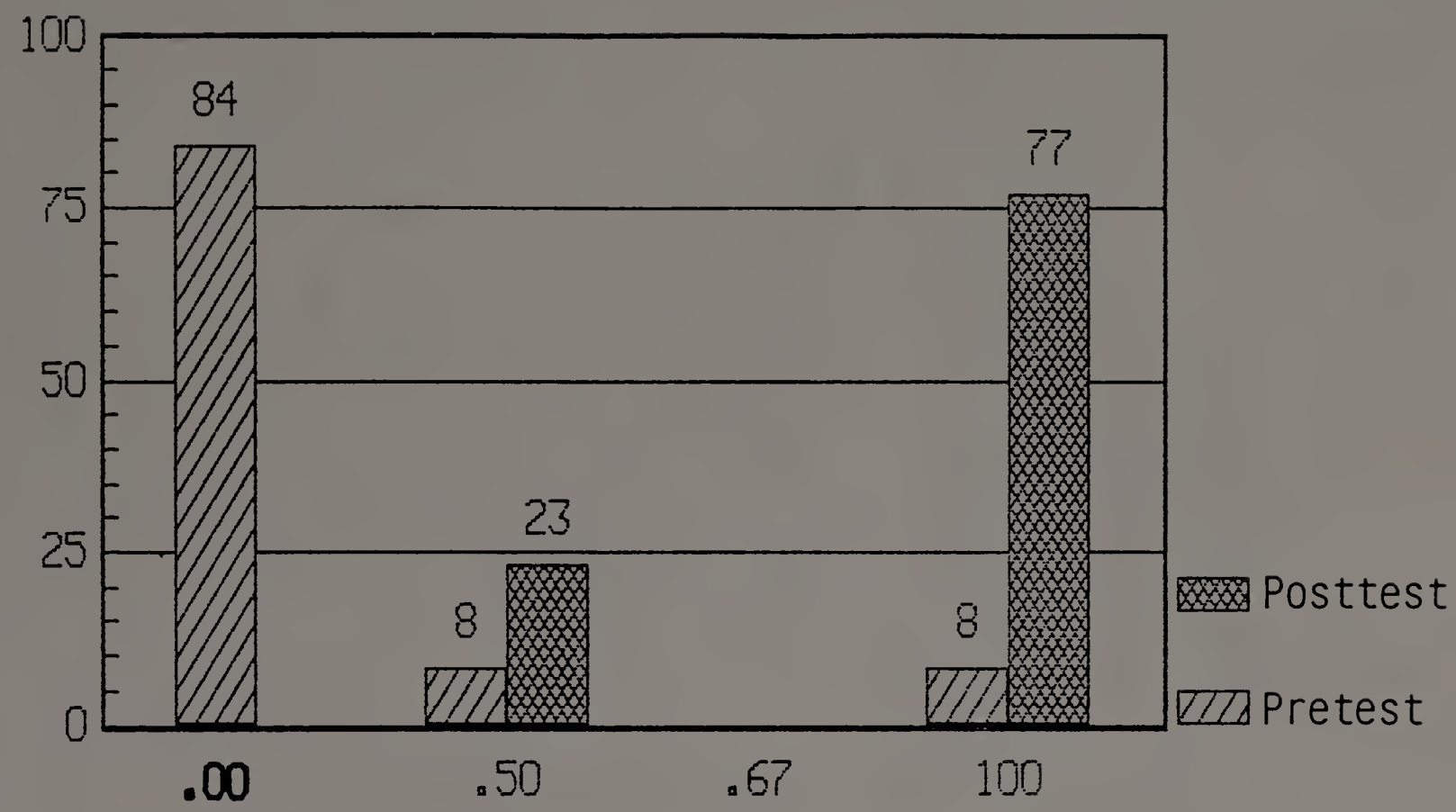


Figure 29. Distribution of the subject based on the percentage of the pretests/posttests in the "Details" skills in the short story "The Greedy Bear".

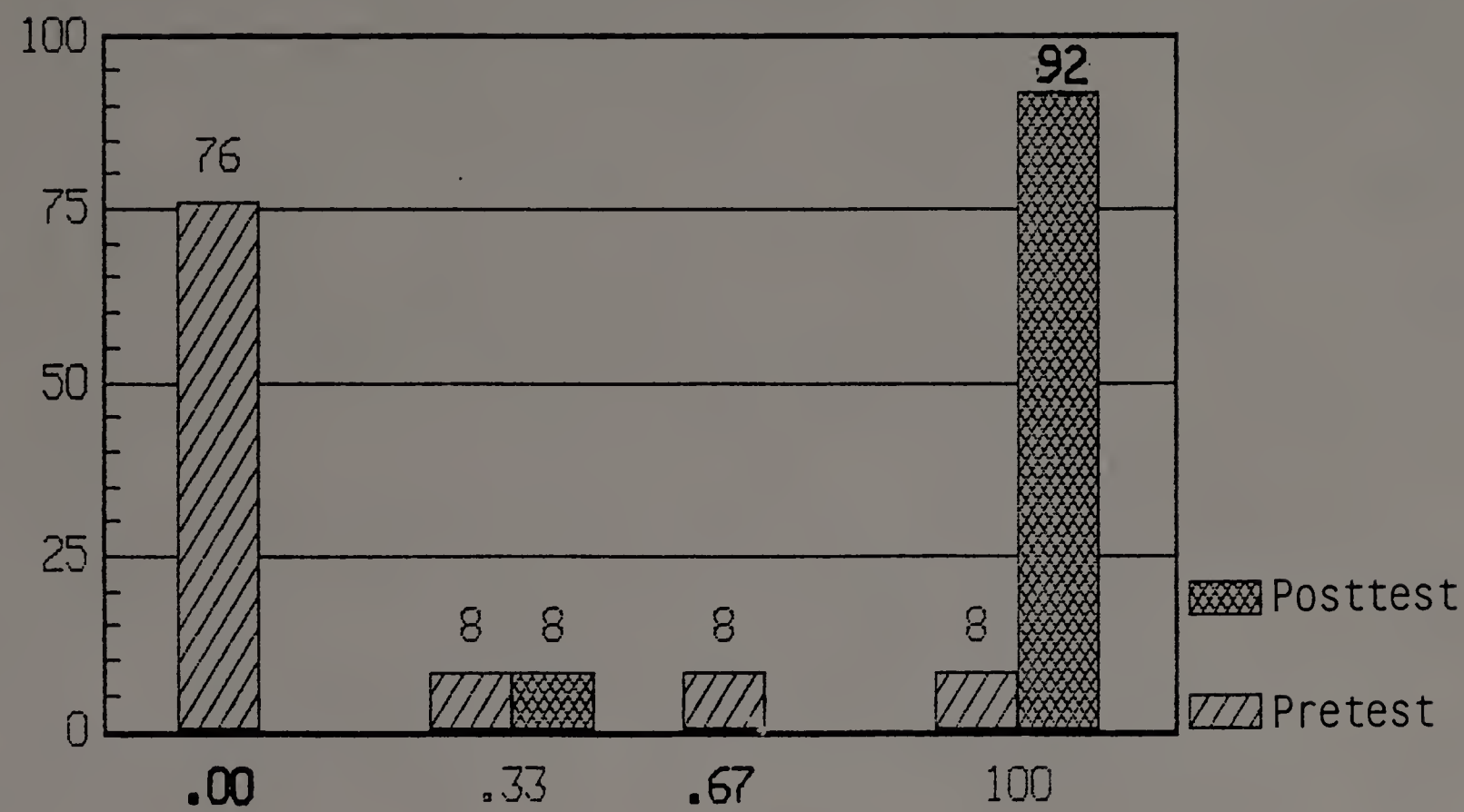


Figure 30. Distribution of the subject based on the percentage of the pretests/posttests in the "Main Idea" skills in the short story "The Greedy Bear".

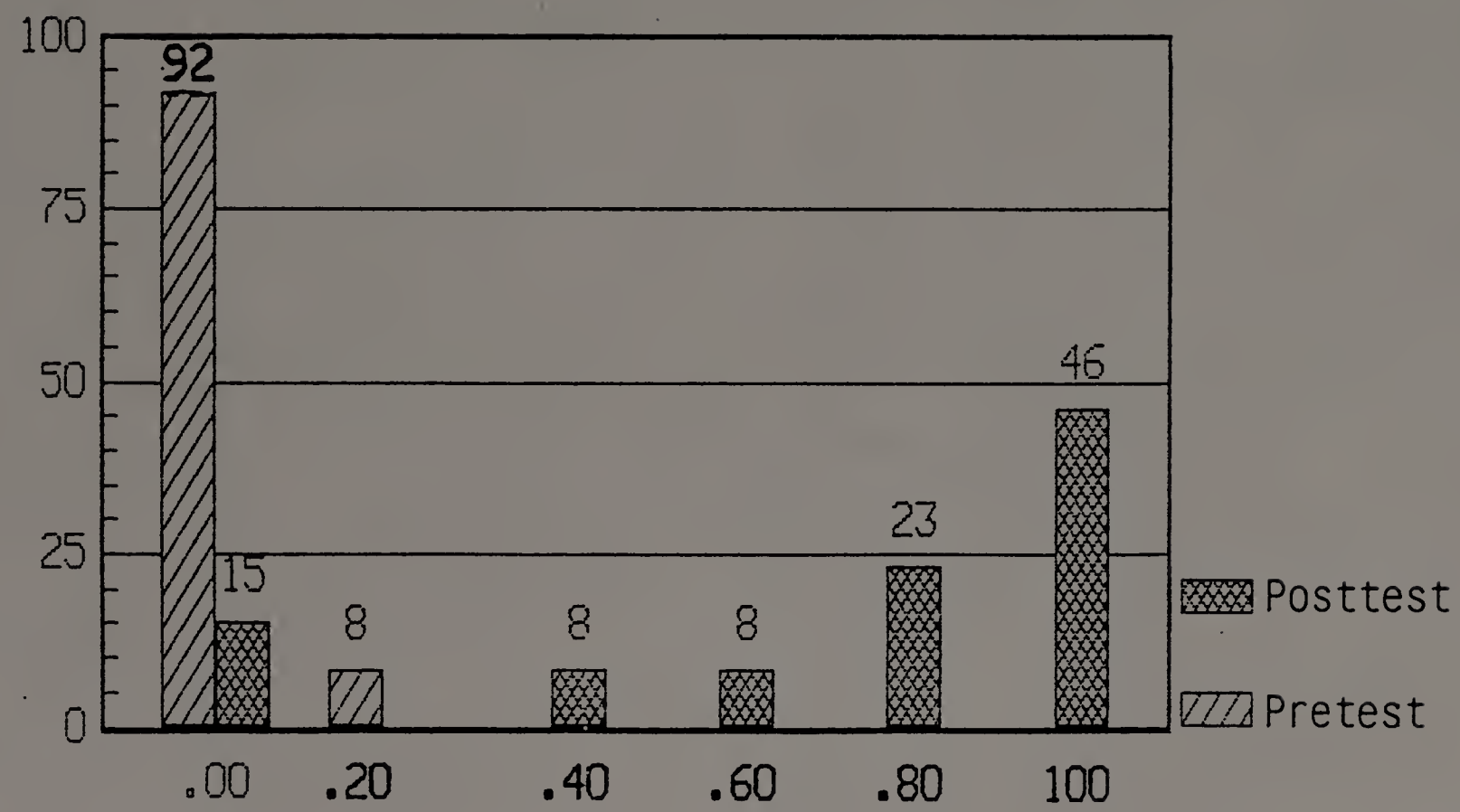


Figure 31. Distribution of the subject (Group A) based on the percentage of the pretest/posttest of the "Characteristics" skills in the short story "The Greedy Bear".

Group A, which was treated with microteaching strategies, seemed to be stimulated to learn thinking skills better.

Concrete experiences were used by the teacher to realize that these students have different ways of learning. They have different limitations and their receptive abilities differ. Being familiar with each of these limitations will help to determine the best strategy and the most effective way to teach these Spanish-speaking students with their specific learning problems.

Figures 32 through 45 show the mastery level of the students before and after the treatment. It is clearly seen that in the pretest (no treatment with microteaching given), the mastery level was lower than in the posttest (treatment with microteaching given).

How Can the Multiple Use of References Contribute to the Development of Simple and Complex Skills in the Thinking Process of Children With Specific Learning Problems?

The third microteaching skill used during the study was "Multiple Reference Markers". The purpose of these skills was to satisfy the needs of the students. The following activities were used to prove its effectiveness:

(a) Observation of Objects; Transparencies

(b) Drawings

(c) Oral Expression

(d) Drama

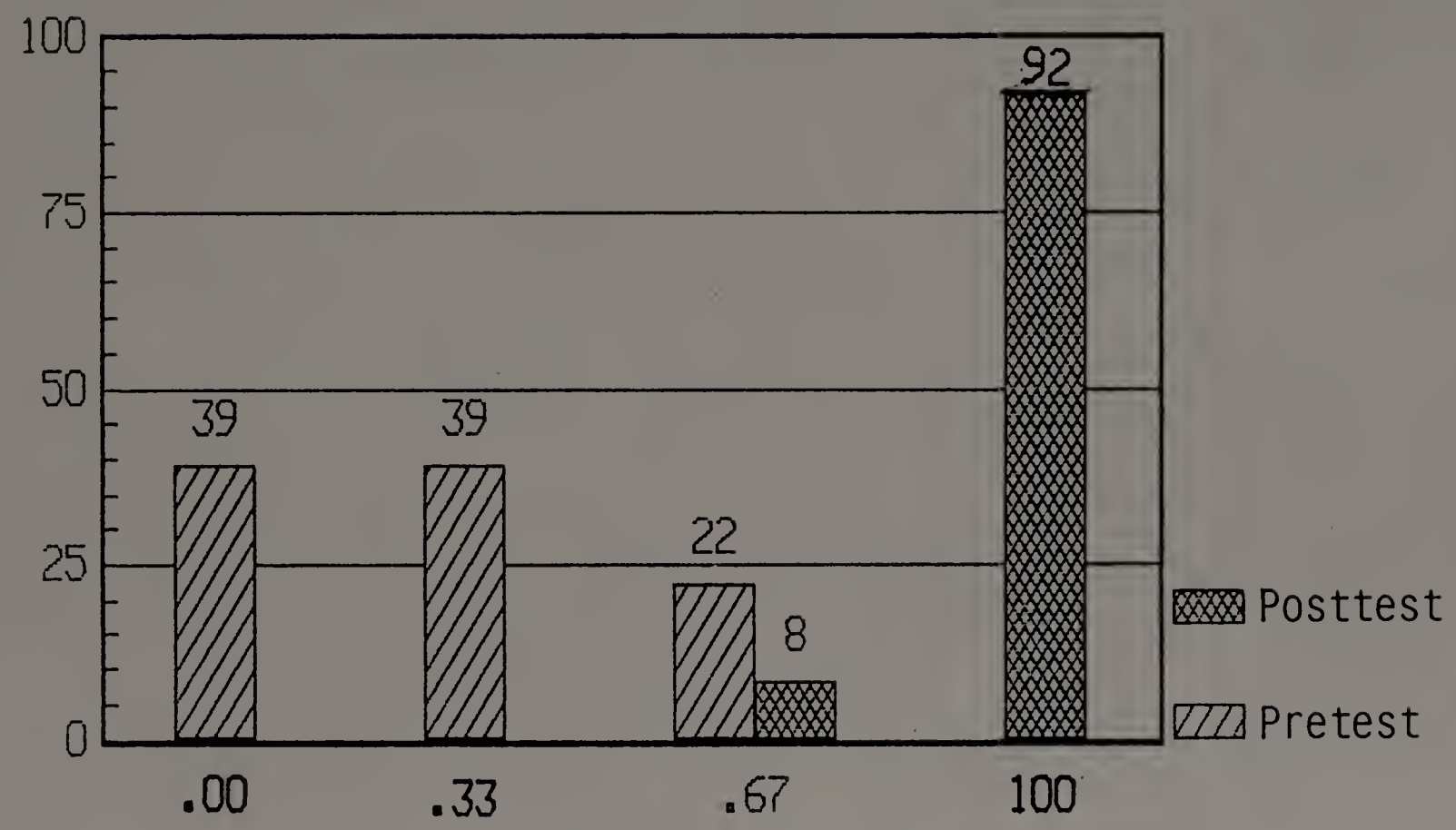


Figure 32. Distribution of the subject based on the percentage of pretests/posttests in the skills to "Imply Cause and Effect" in the short story "The Greedy Bear".

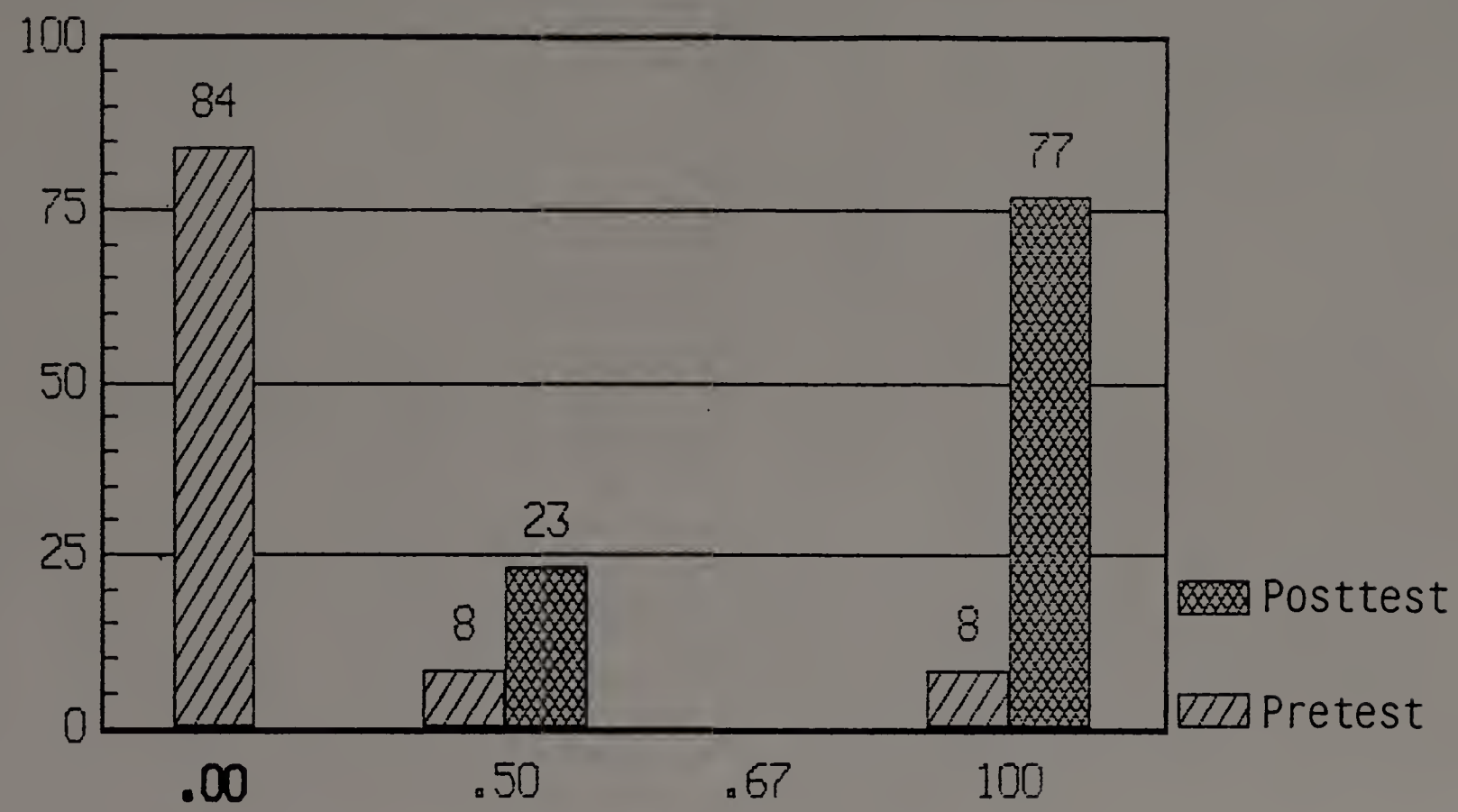


Figure 33. Distribution of the subject based on the percentage of the pretests/posttests in the "Details" skills in the short story "The Greedy Bear".

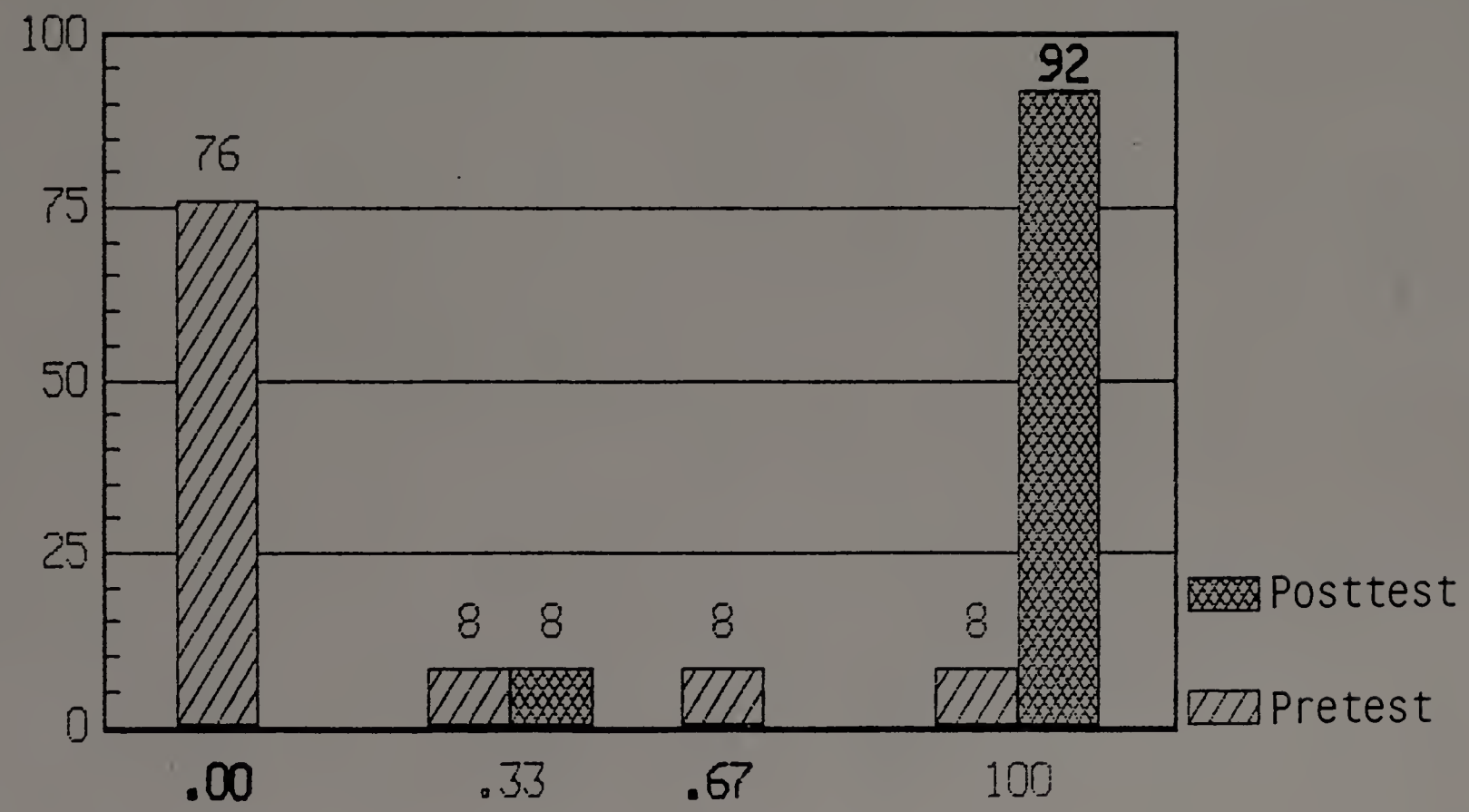


Figure 34. Distribution of the subject based on the percentage of the pretests/posttests in the "Main Idea" skills in the short story "The Greedy Bear".

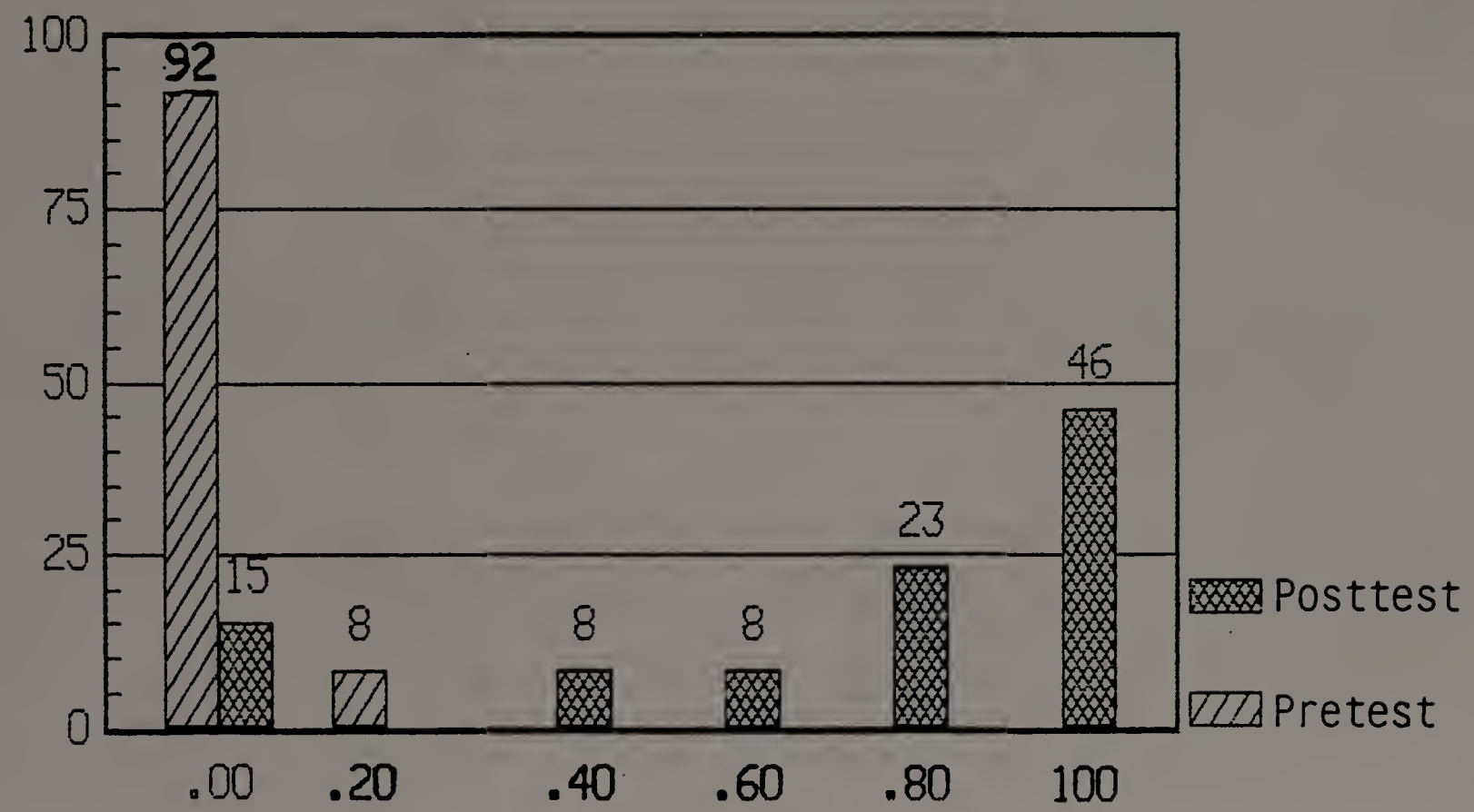


Figure 35. Distribution of the subject based on the percentage of the pretests/posttests of the "Characteristics" skills in the short story "The Greedy Bear".

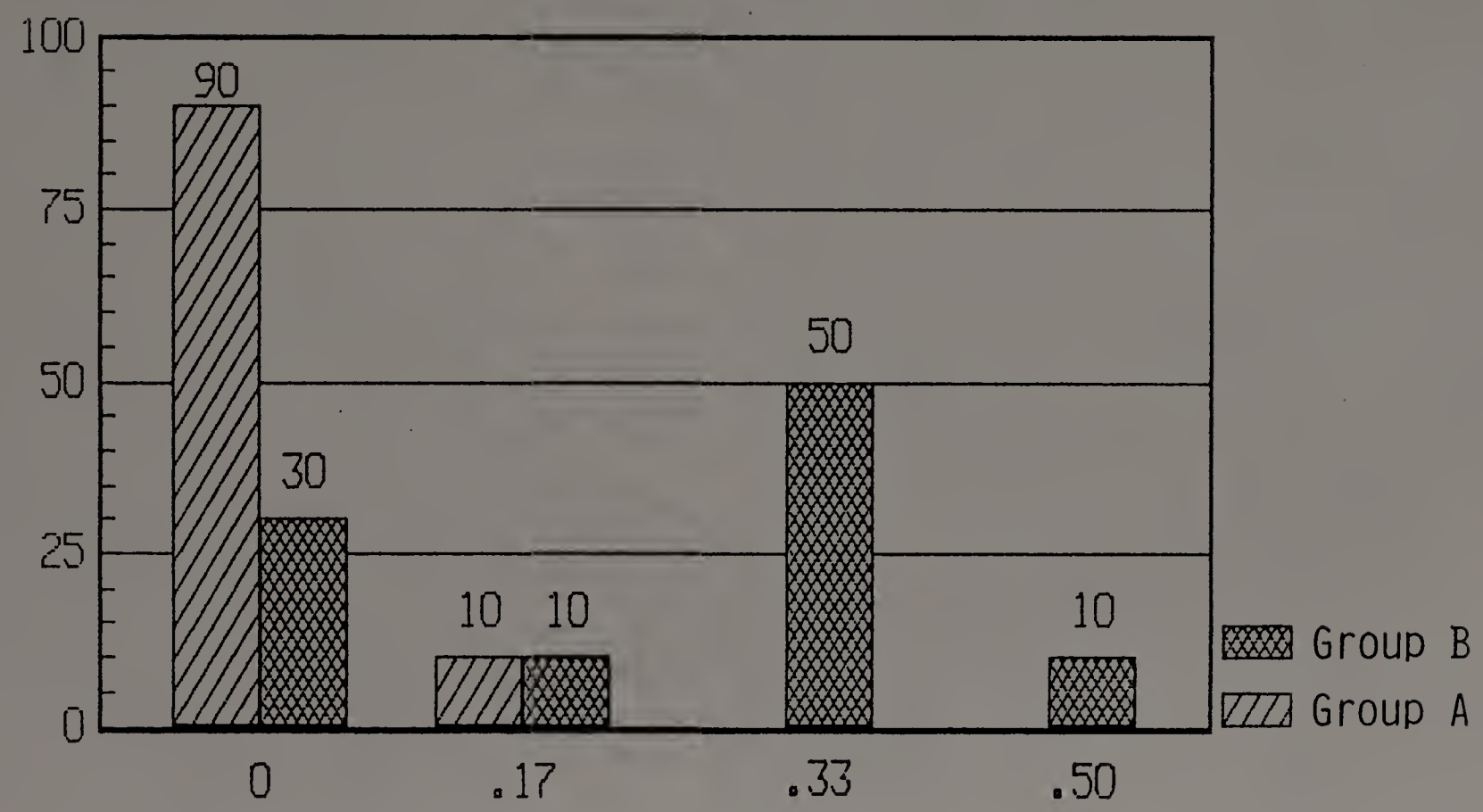


Figure 36. Distribution of the subject based on the pretests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

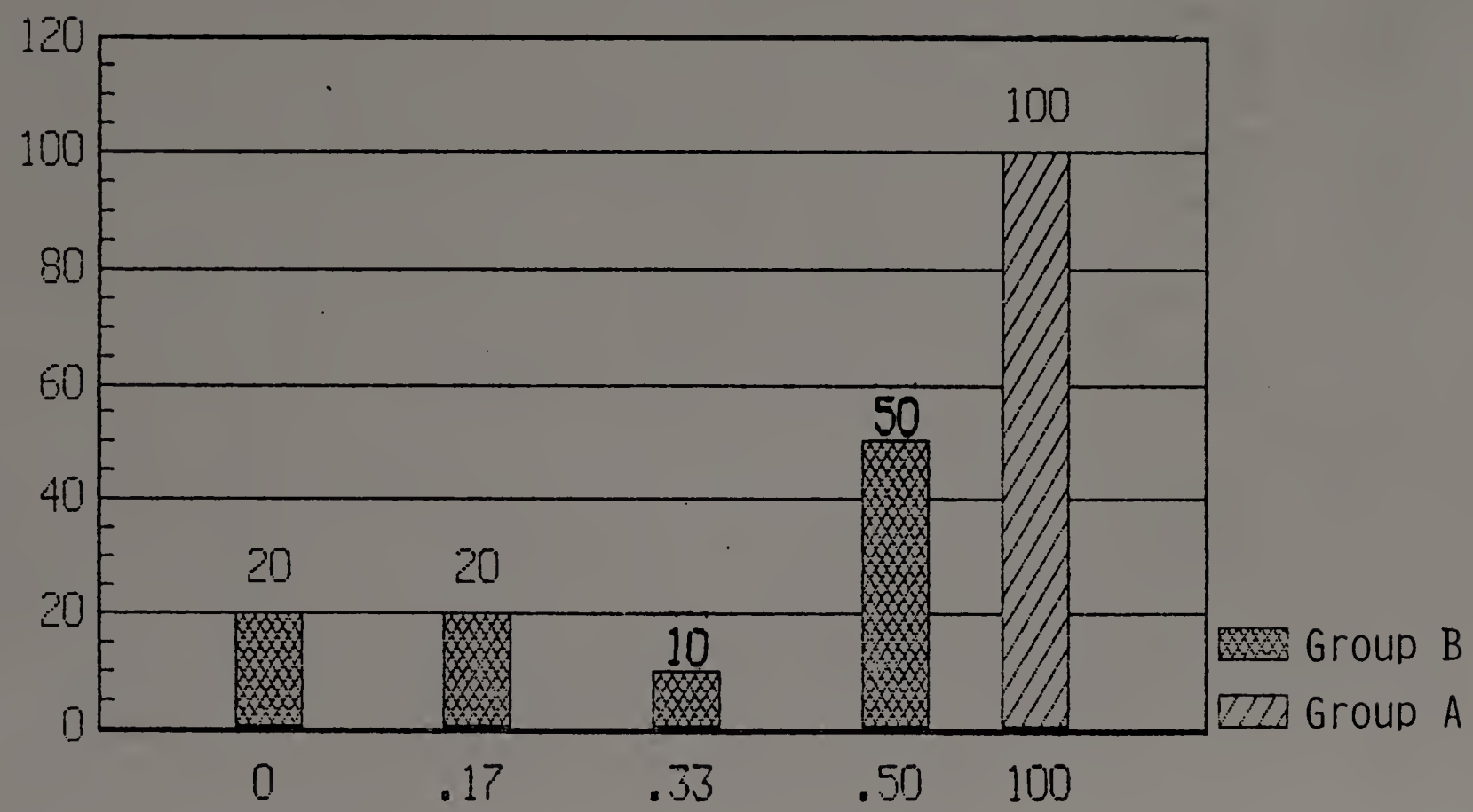


Figure 37. Distribution of the subject based on the posttests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

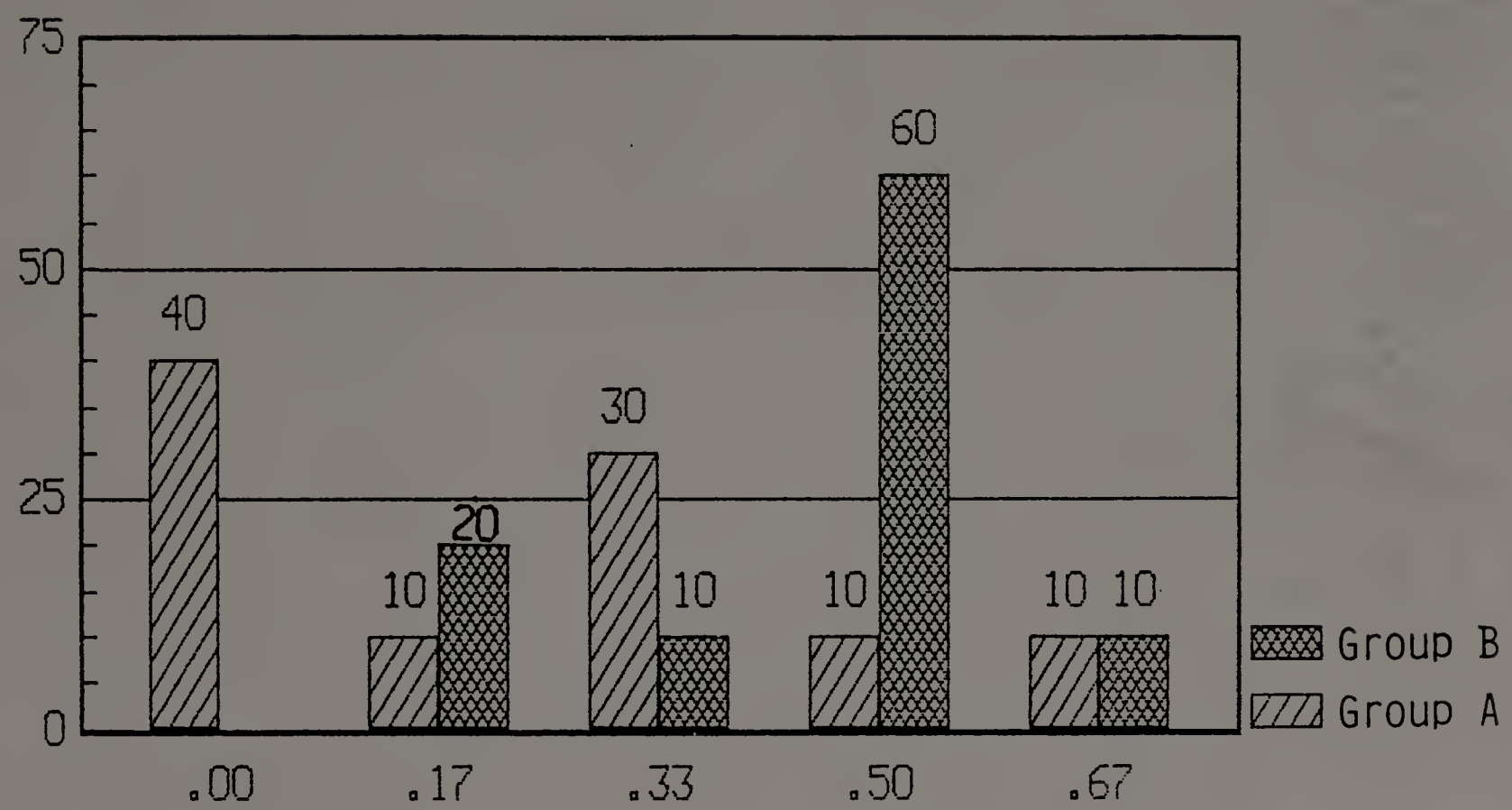


Figure 38. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

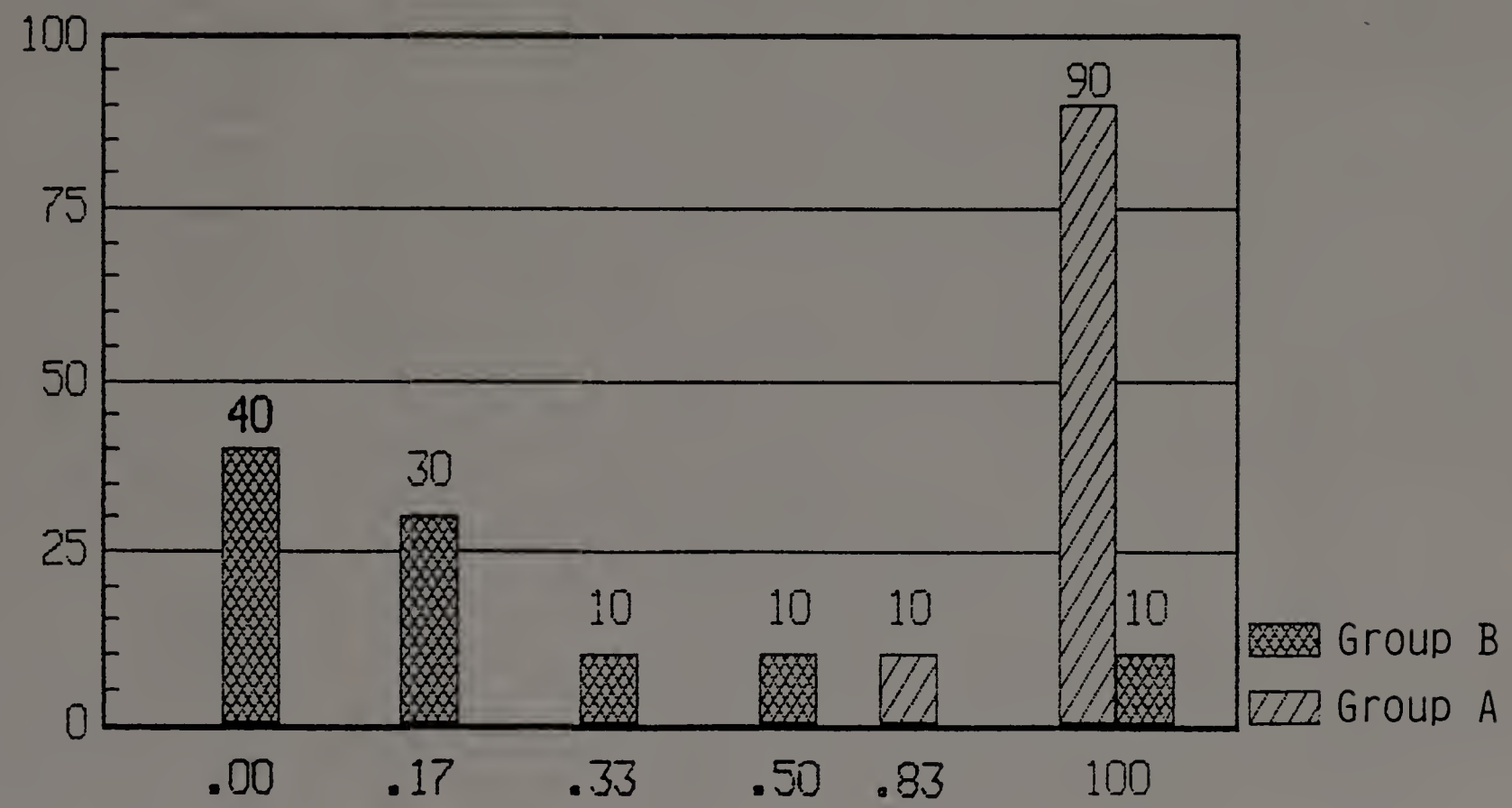


Figure 39. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

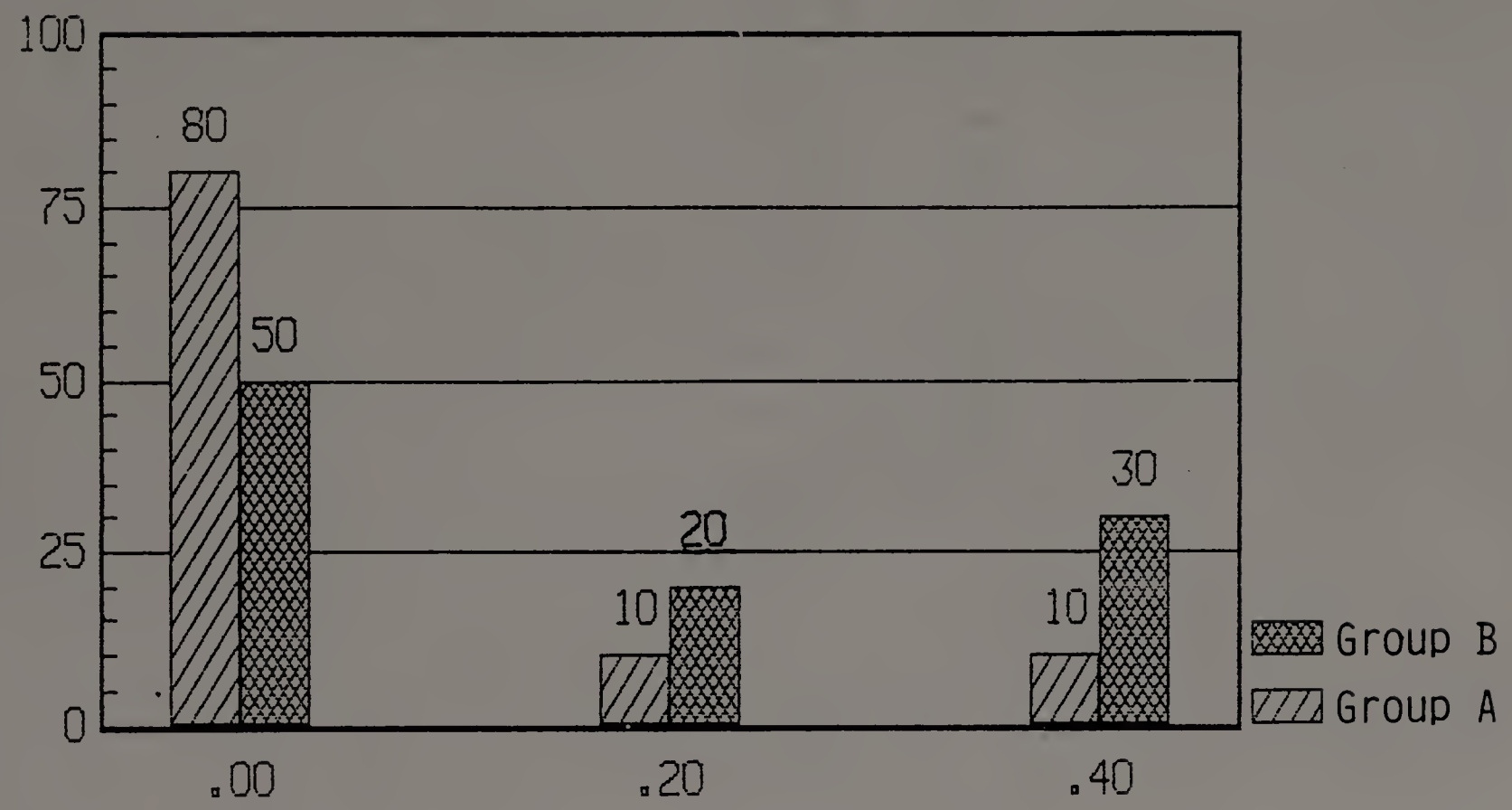


Figure 40. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

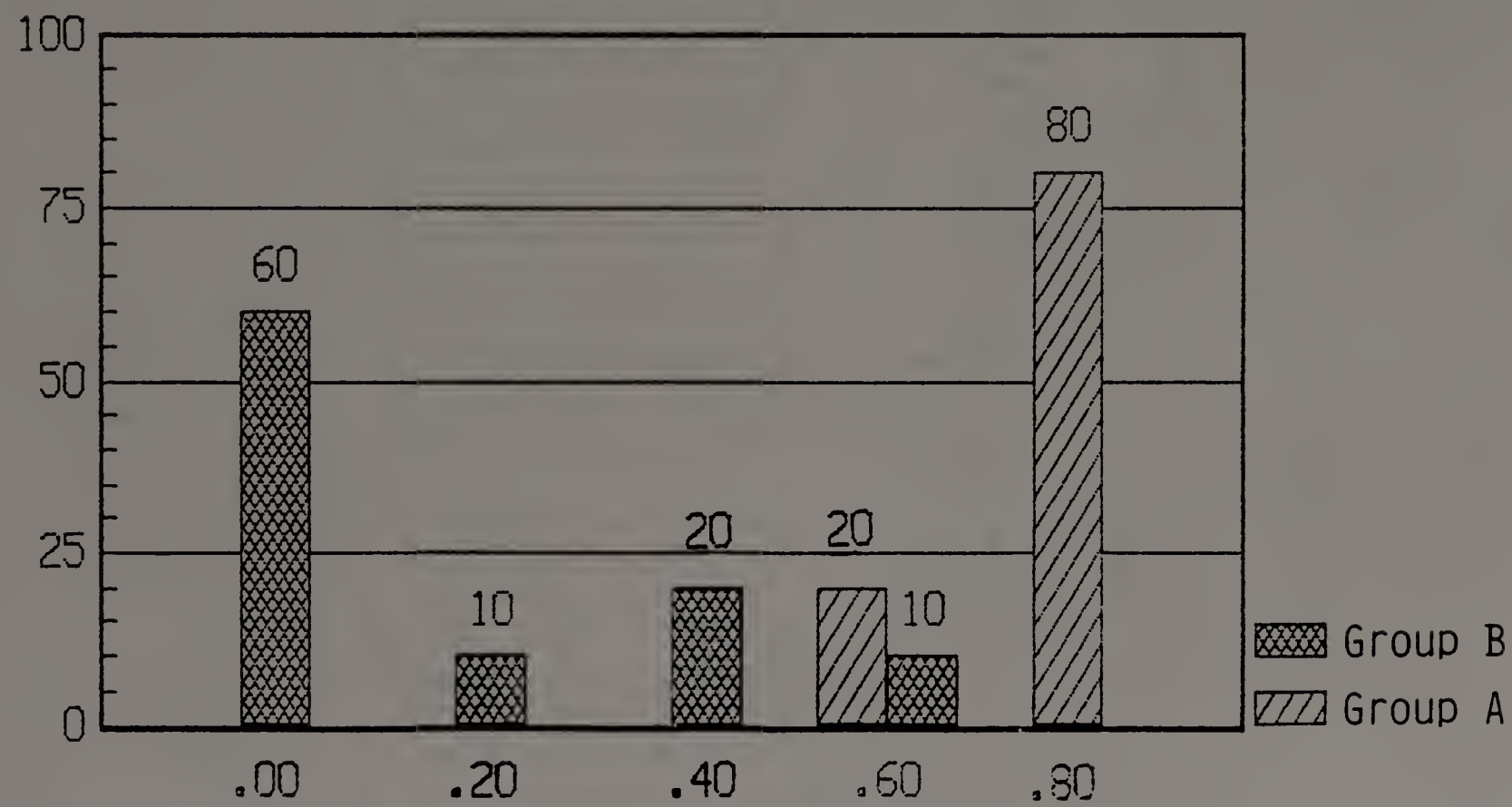


Figure 41. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

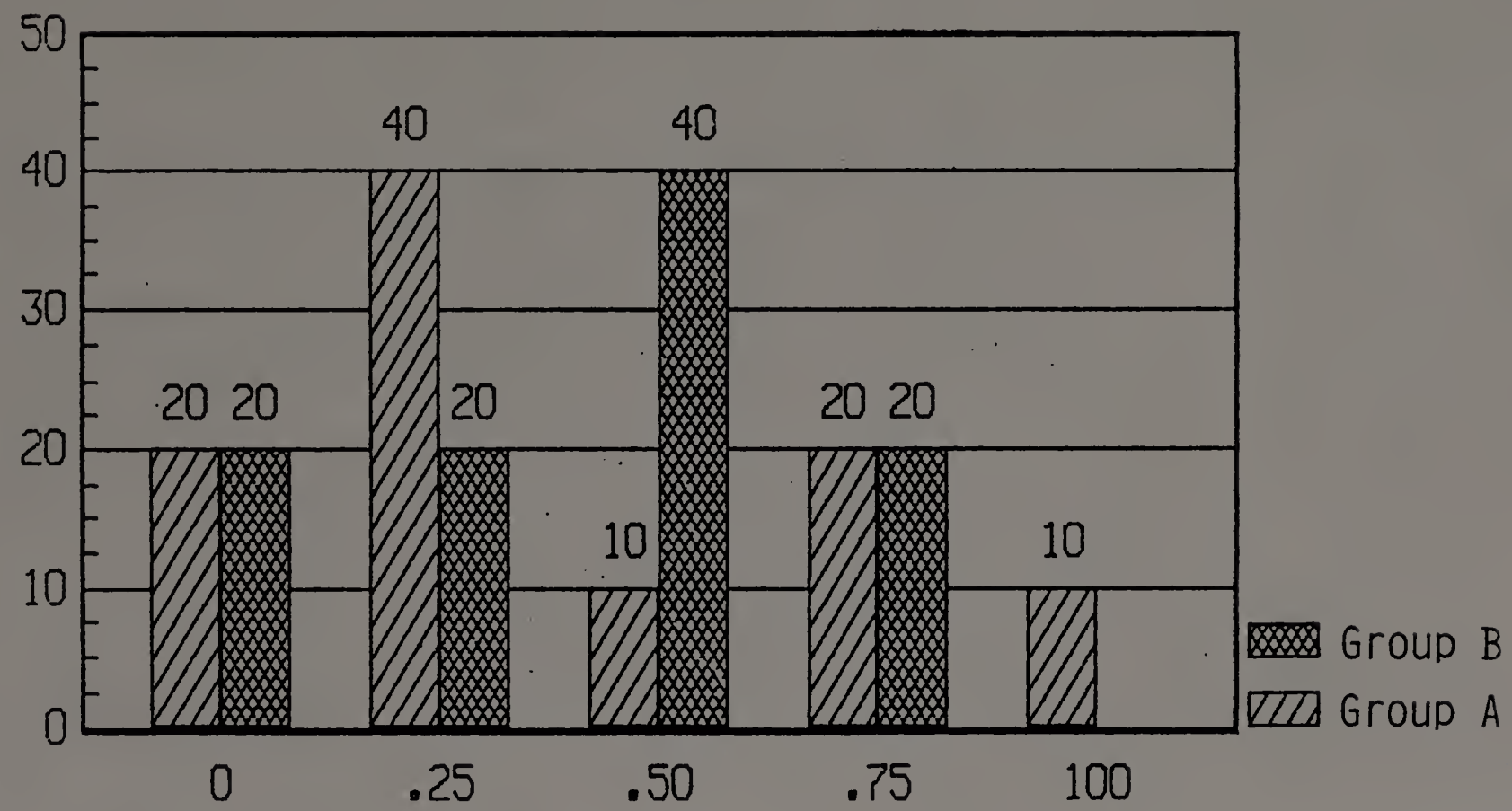


Figure 42. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

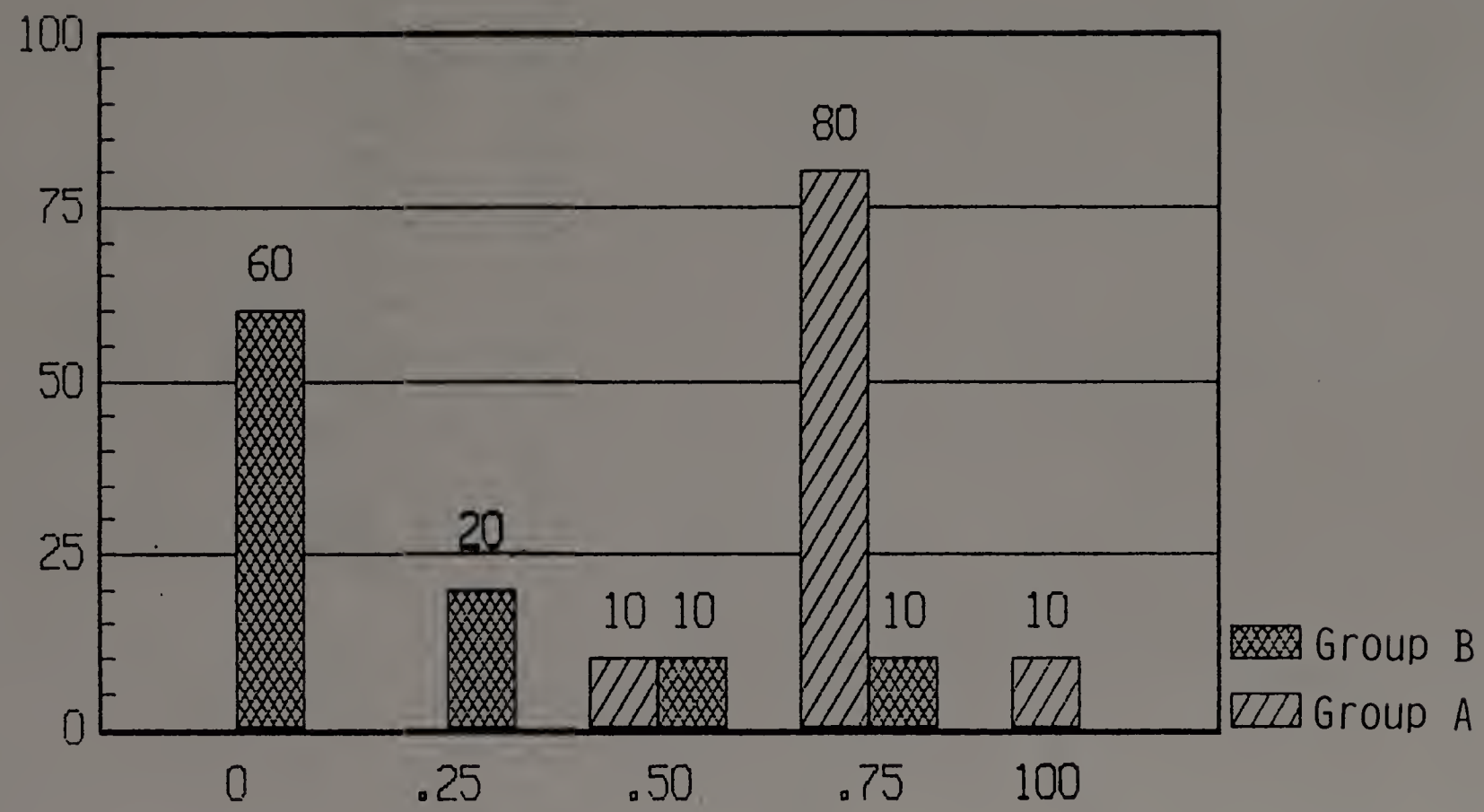


Figure 43. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

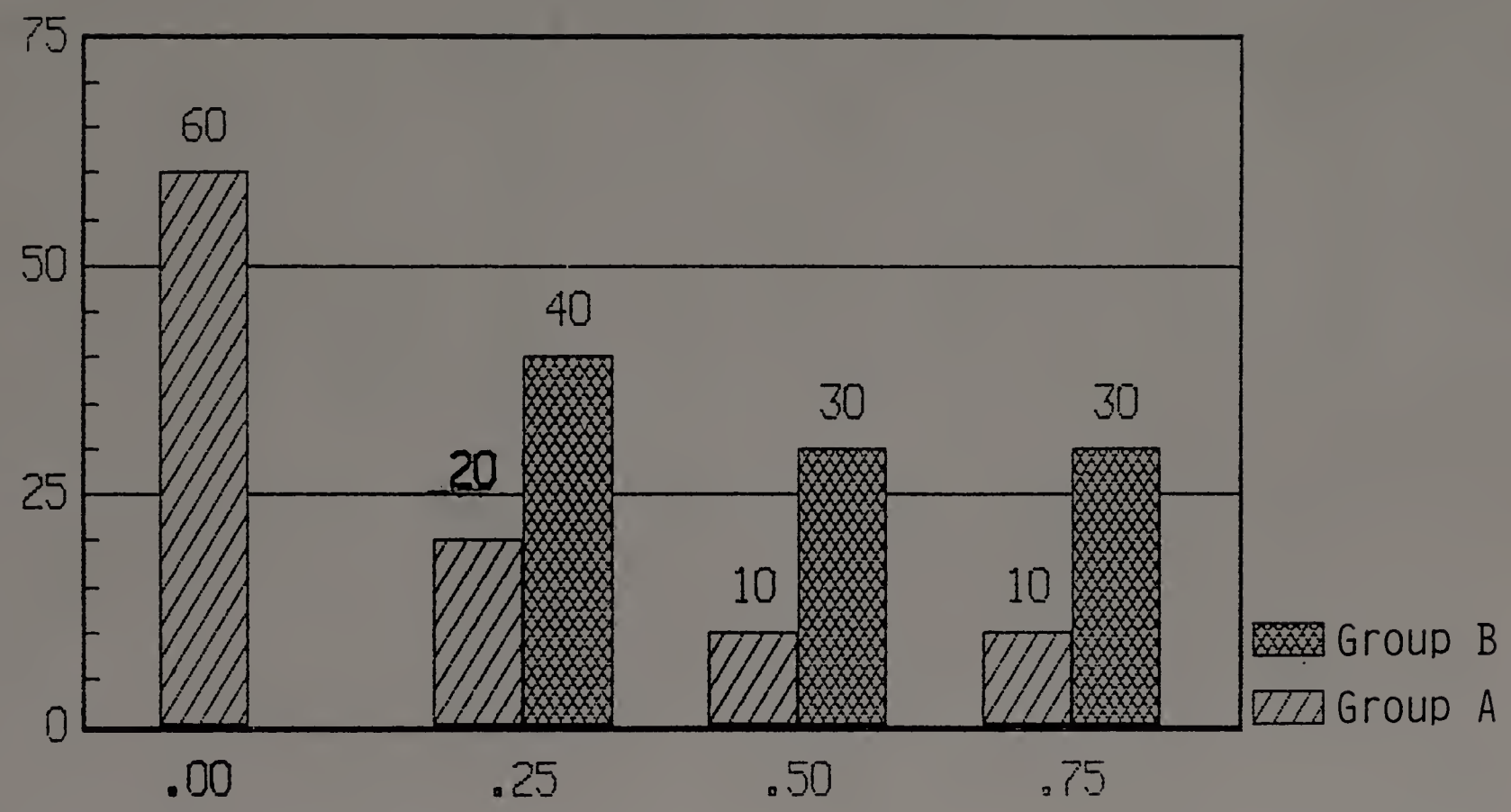


Figure 44. Distribution of the subject based on the pretest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

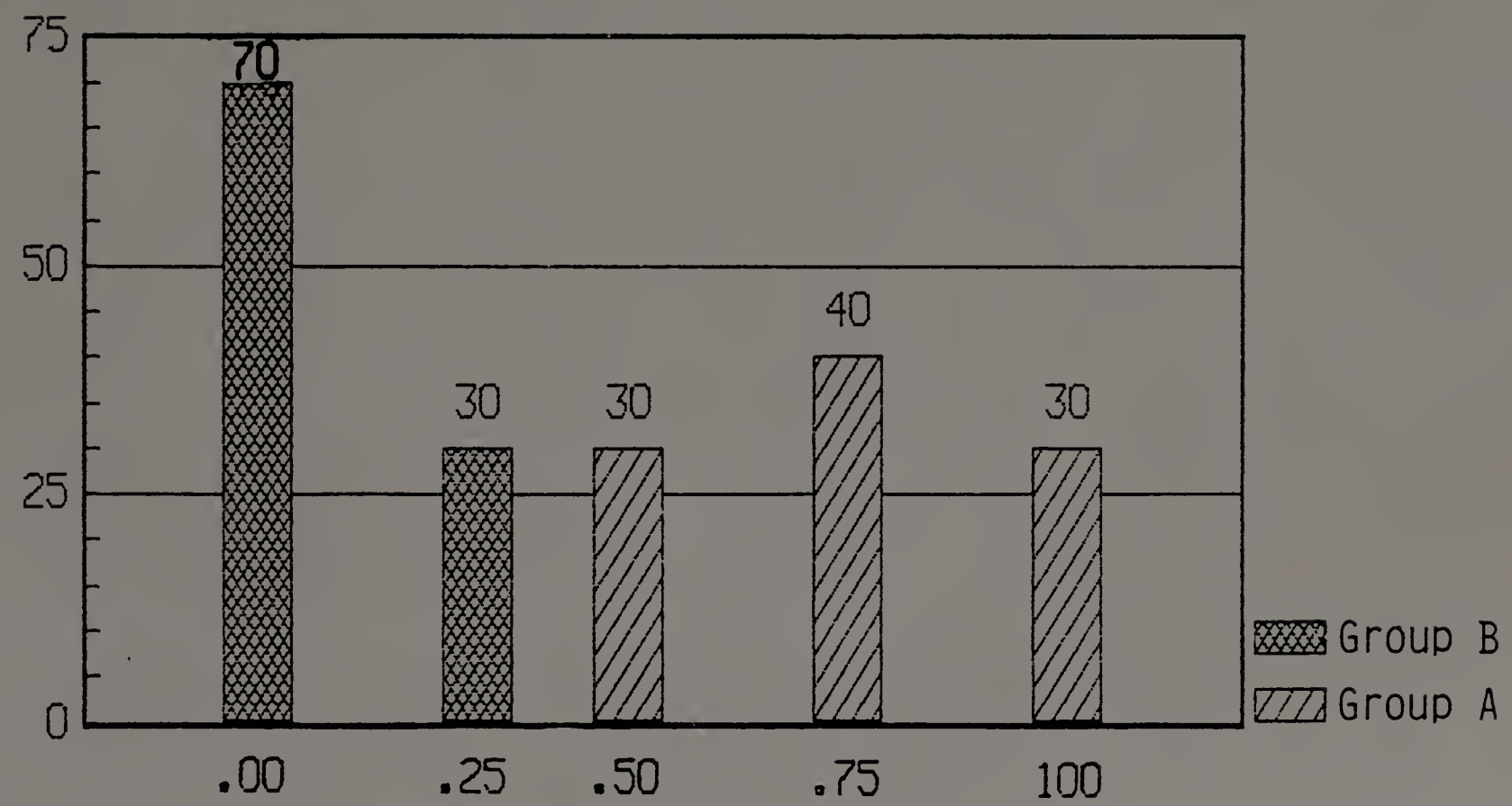


Figure 45. Distribution of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

(e) Situation Analysis

(f) Movies

(g) Recordings

(h) Work Done in Groups

(i) Silent Lectures

(j) Oral Lectures

(k) Laboratory (Experiments)

(l) Use of Computers

The findings of the study showed the effectiveness of these techniques in the development of simple and complex thinking skills in Spanish-speaking students with specific learning problems. After these references were used, the mastery level of the skills was higher. As the use of multiple references is a microteaching technique, it can be said that these techniques are effective in teaching children with specific learning problems.

Figures 46 through 55 show the mastery level of the students before and after the treatment. It is clearly seen that in the posttest (treatment with microteaching given), there was a higher mastery level of the skills.

How Can the Use of Questions Exert Influence in the Development of Simple and Complex Skills in the Thinking Process of Children With Specific Learning Problems?

As part of the study, "The Art of Formulating Questions" was used to aid in the development of thinking skills. According to Freire (1985), the pedagogy of the

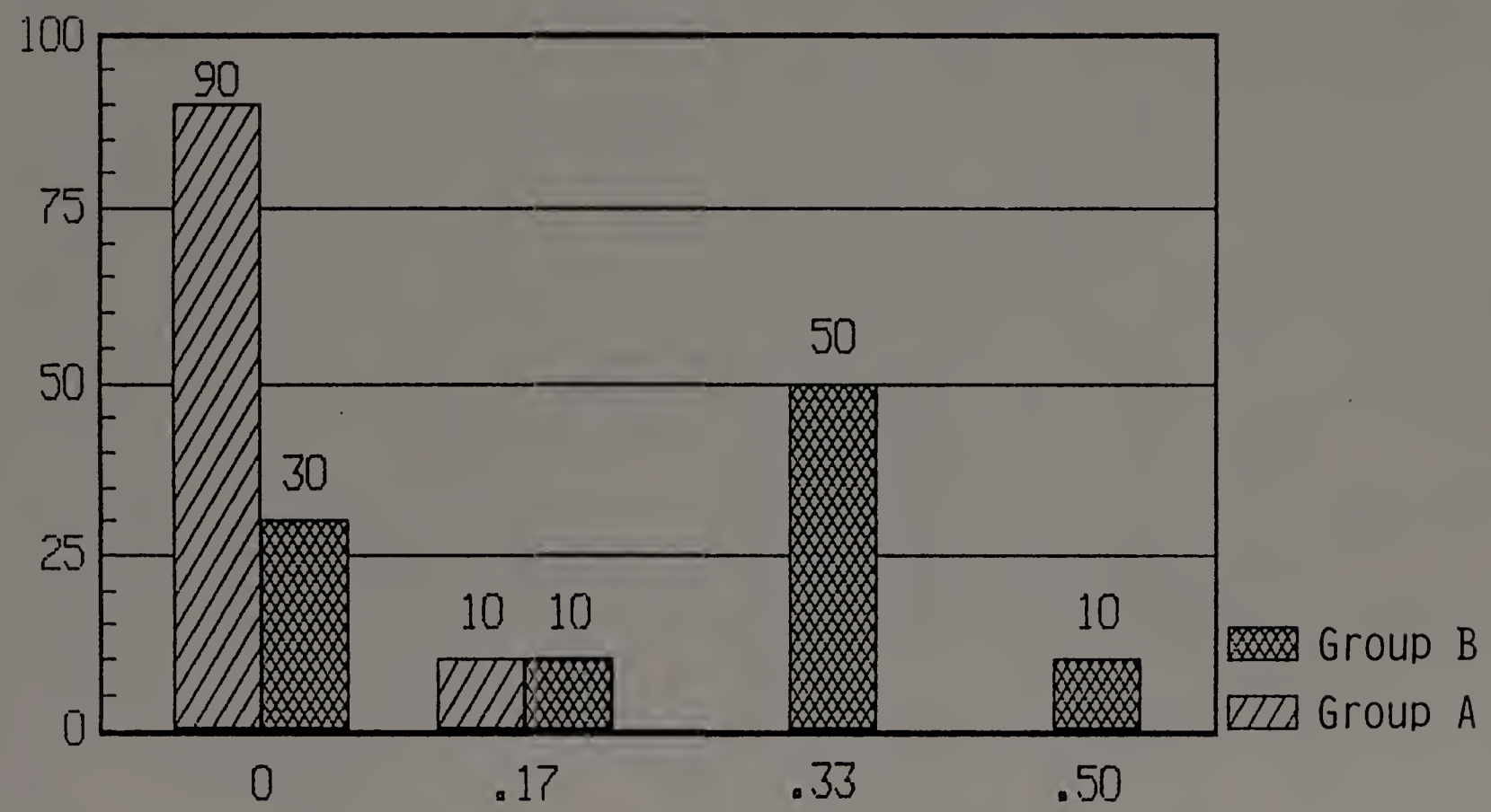


Figure 46. Distribution of the subject based on the pretests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

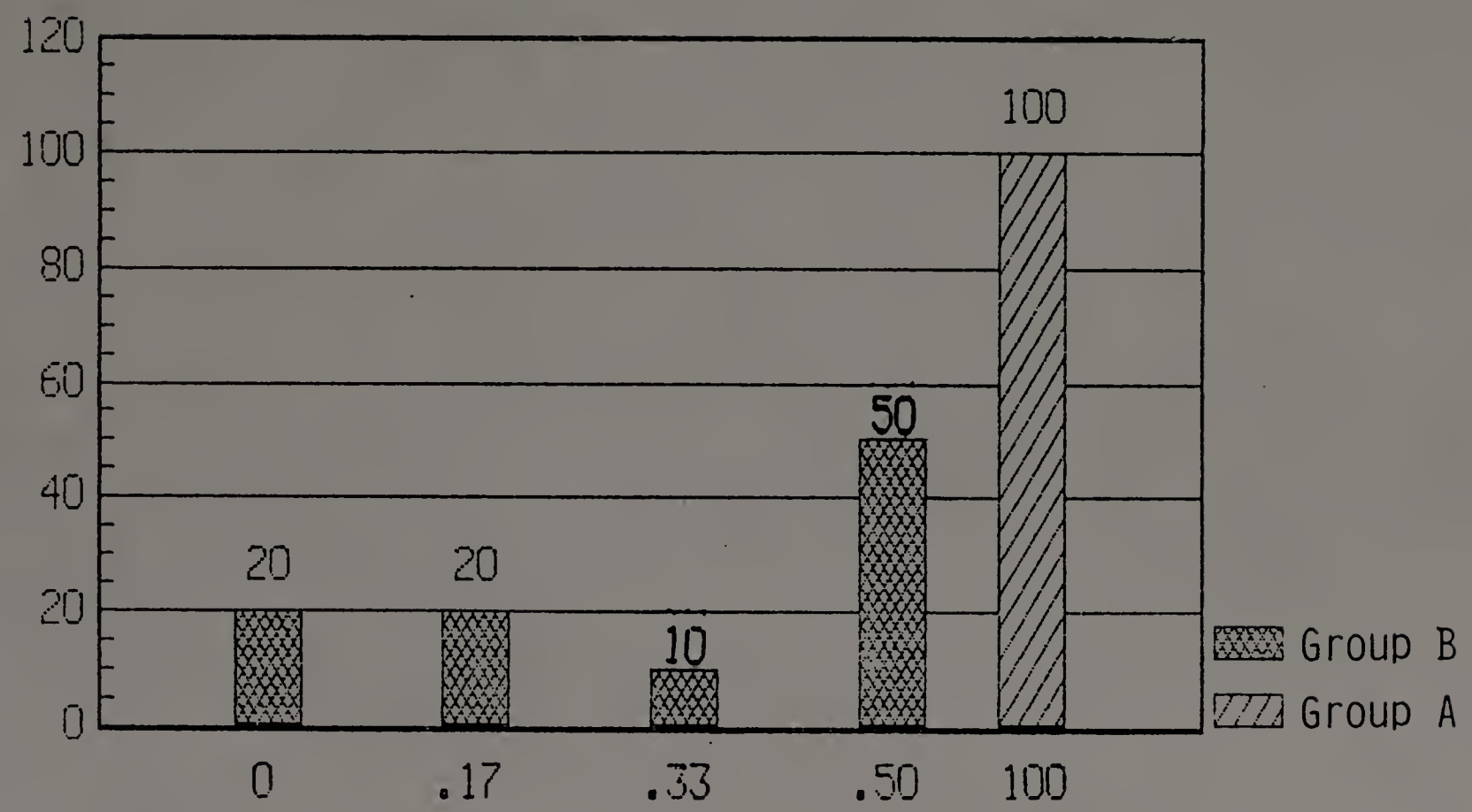


Figure 47. Distribution of the subject based on the posttests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

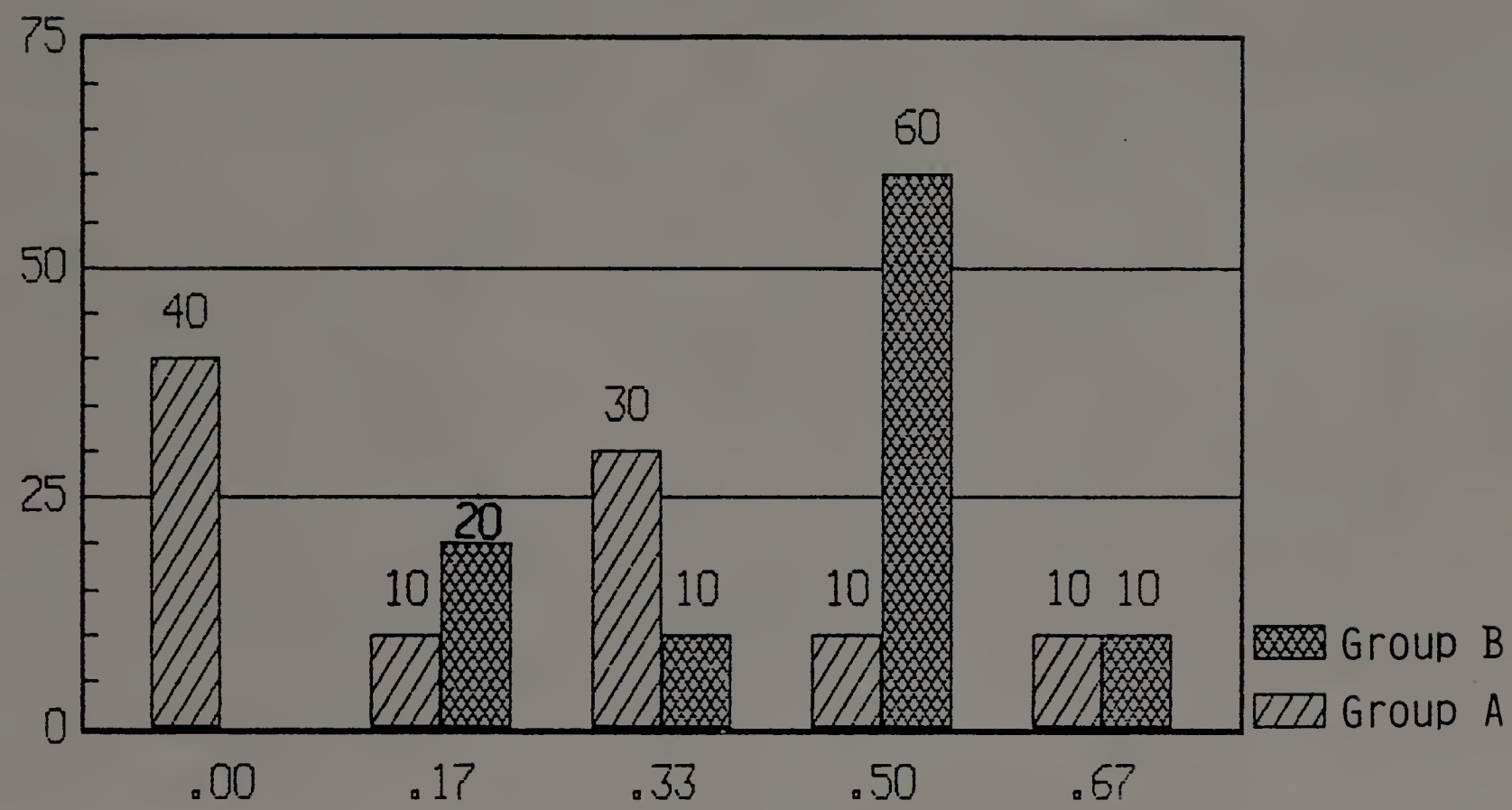


Figure 48. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

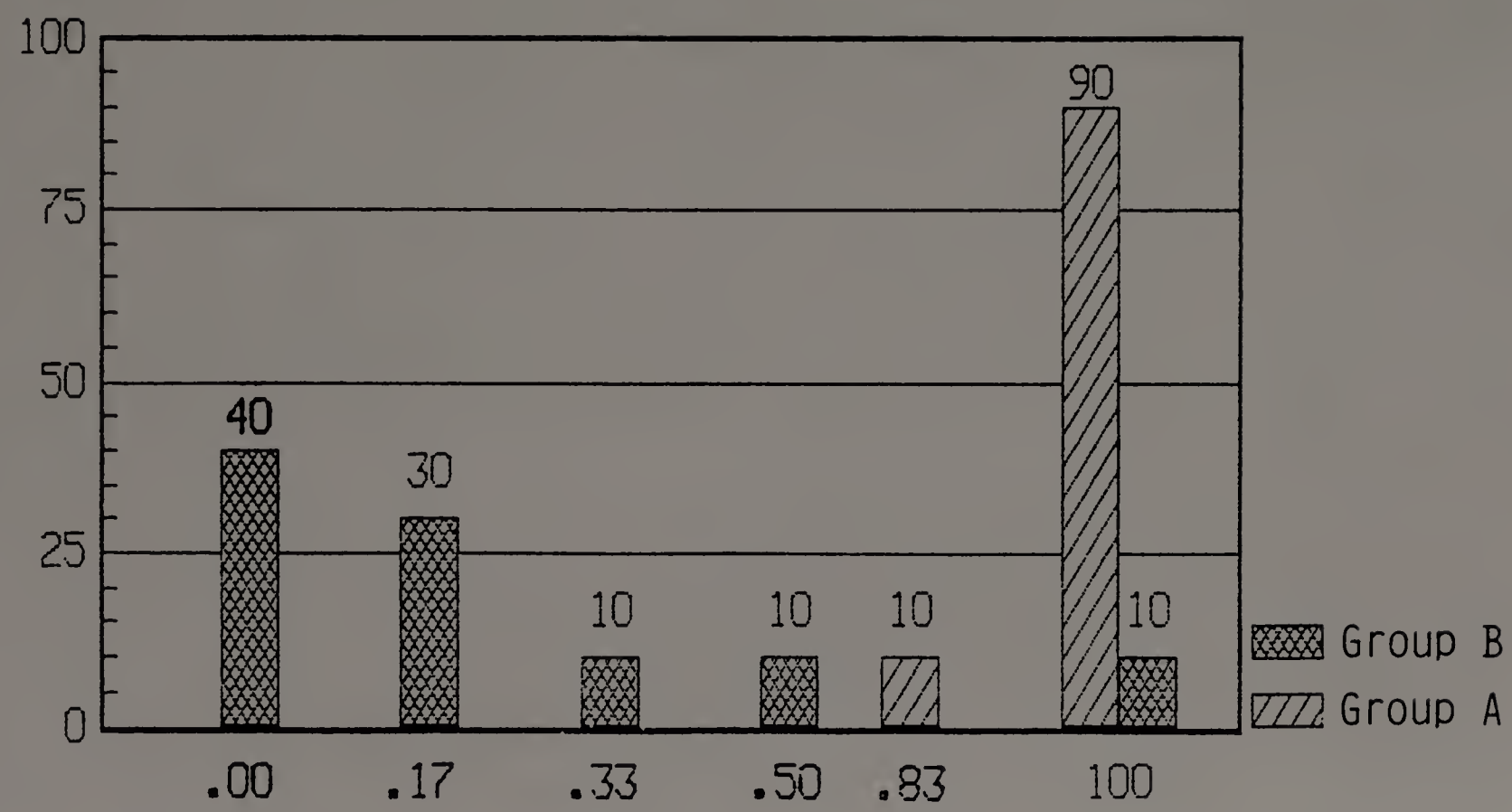


Figure 49. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

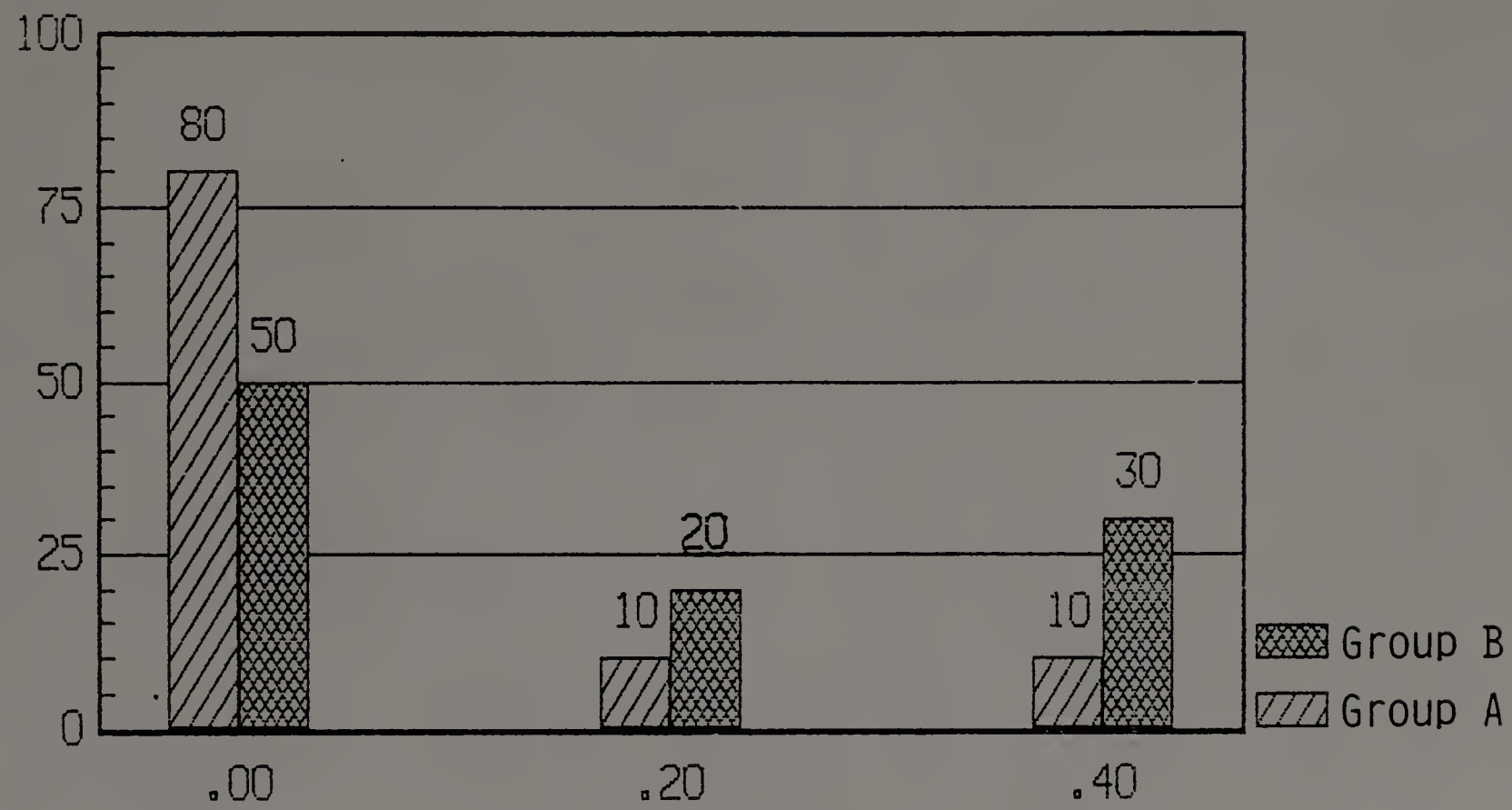


Figure 50. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

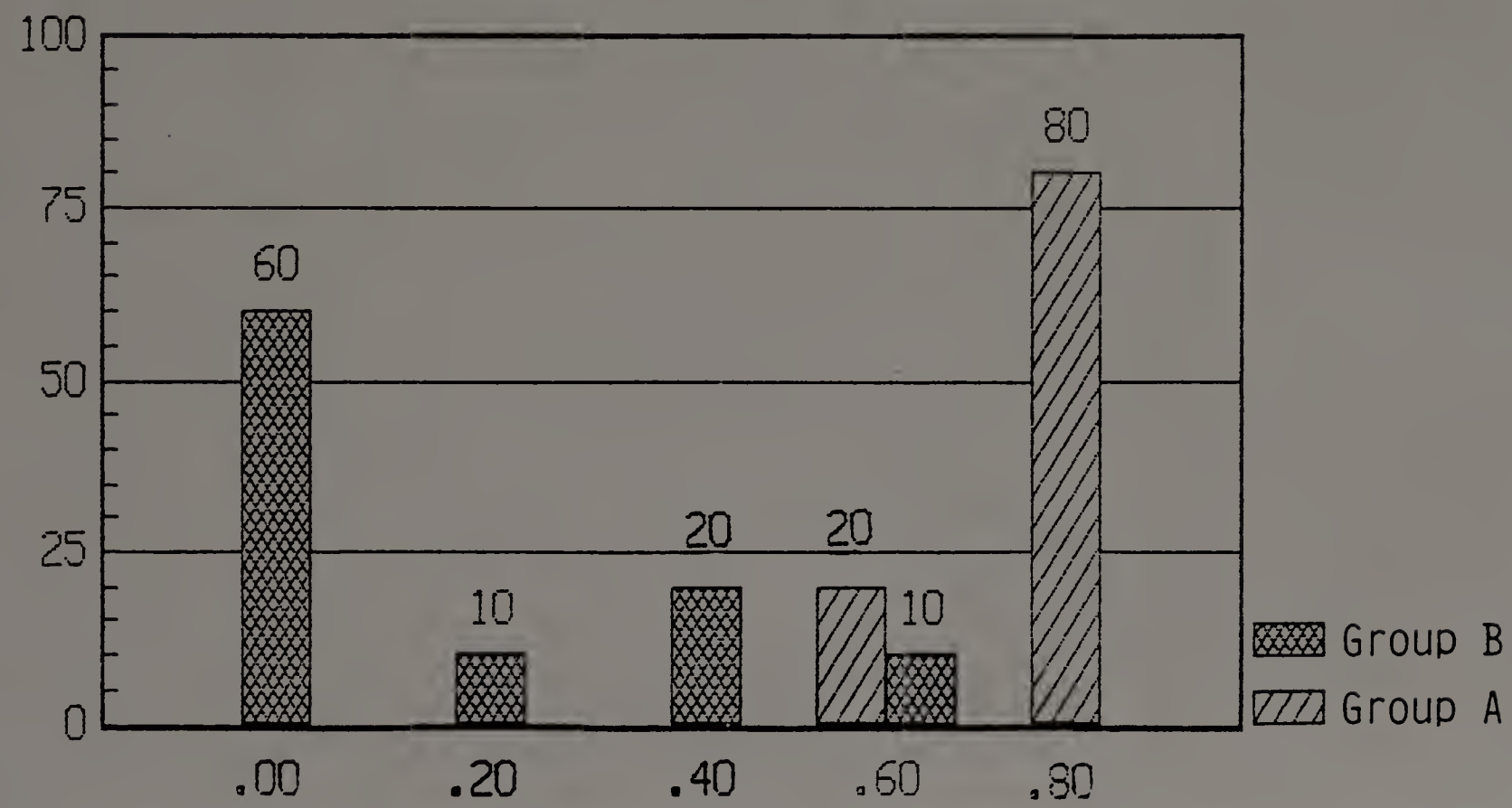


Figure 51. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

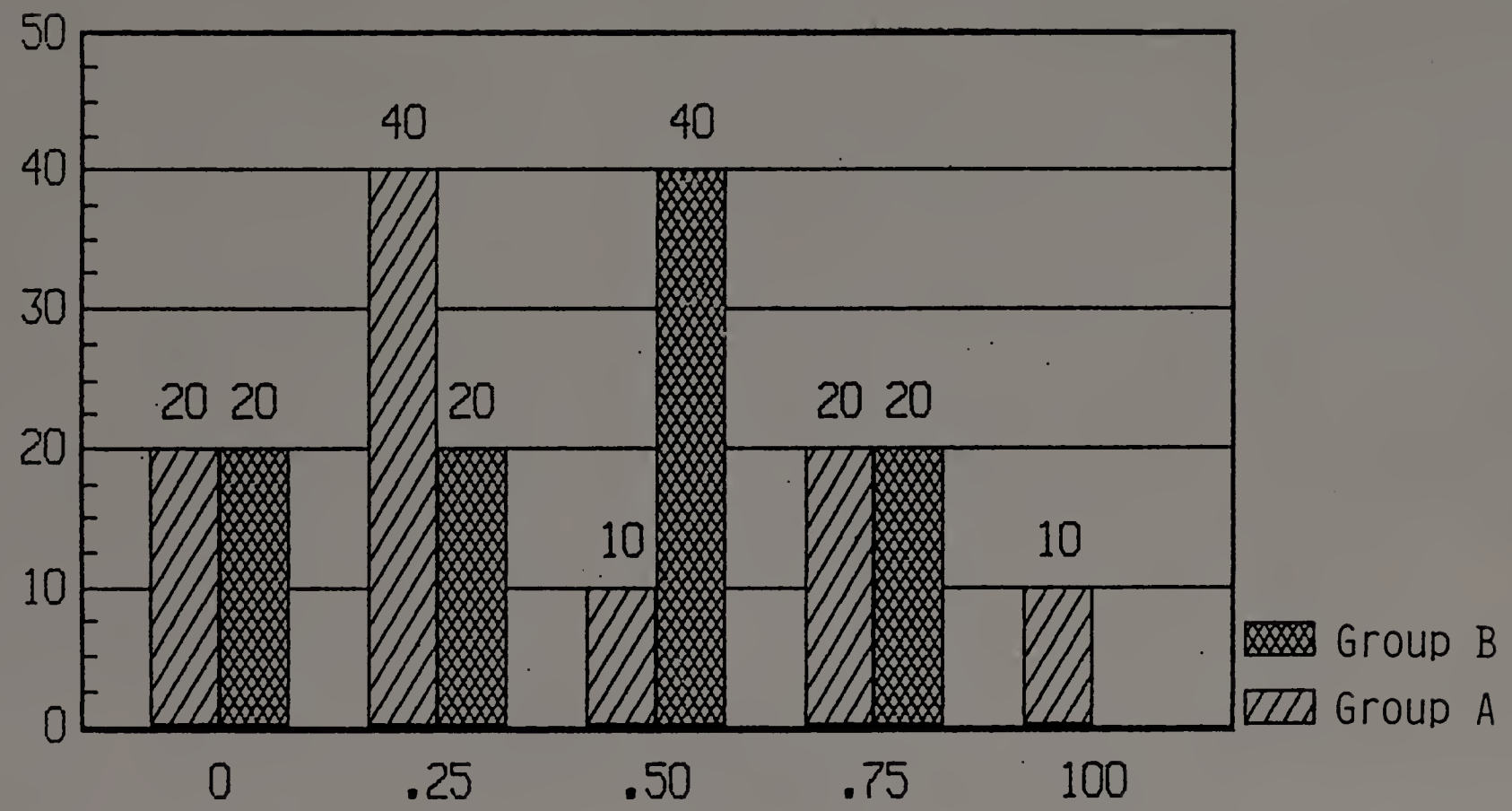


Figure 52. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

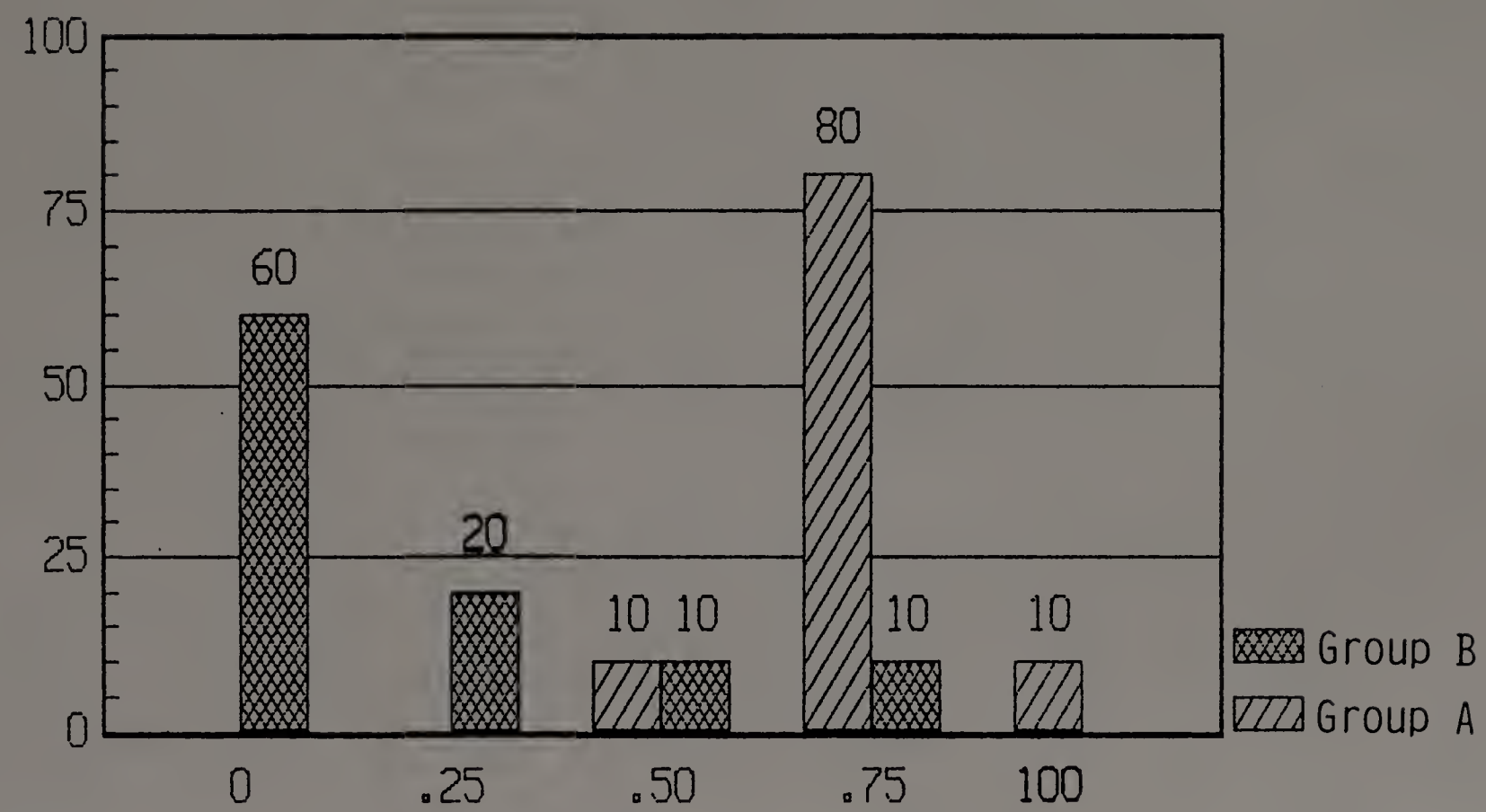


Figure 53. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

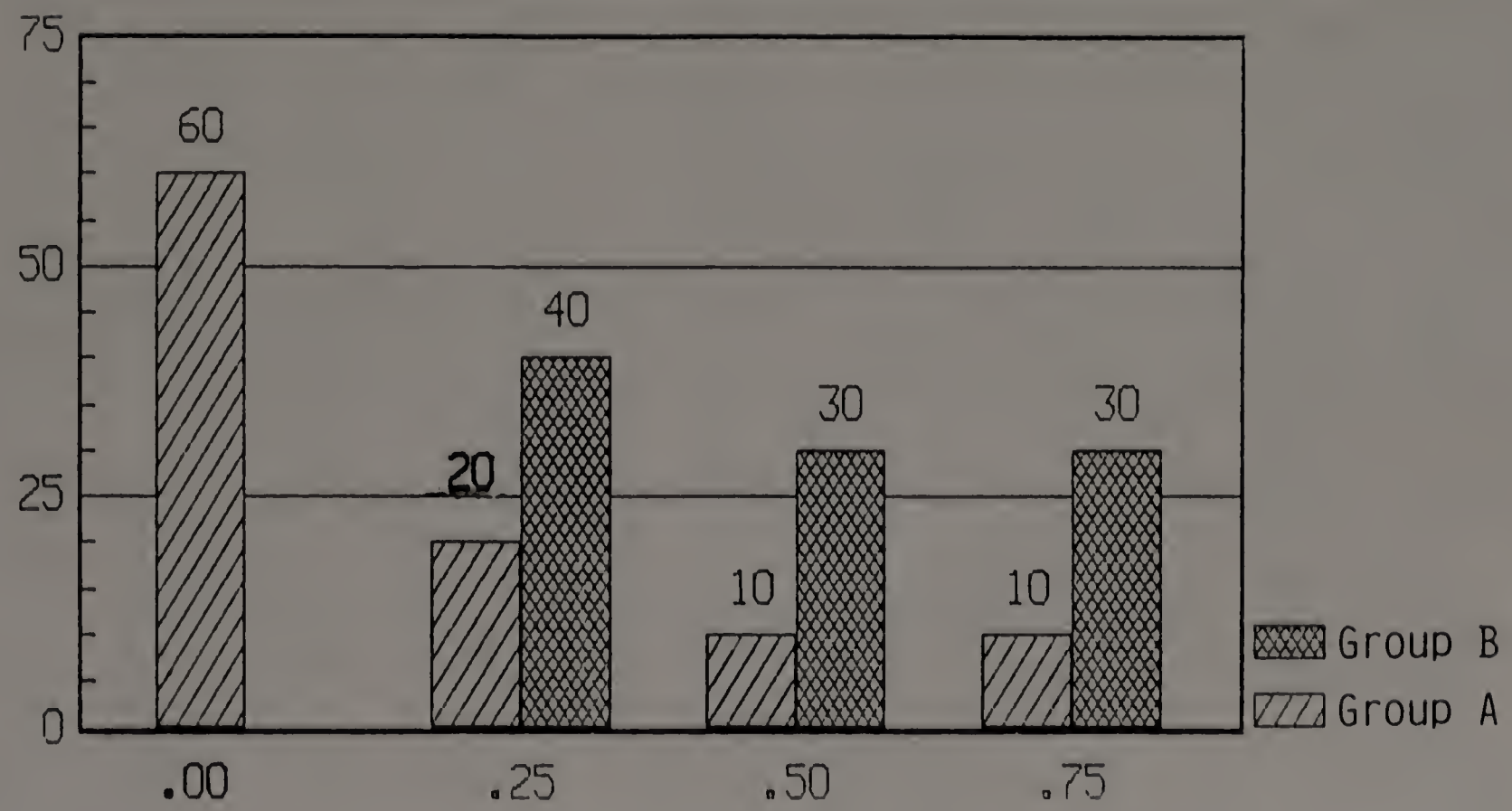


Figure 54. Distribution of the subject based on the pretest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

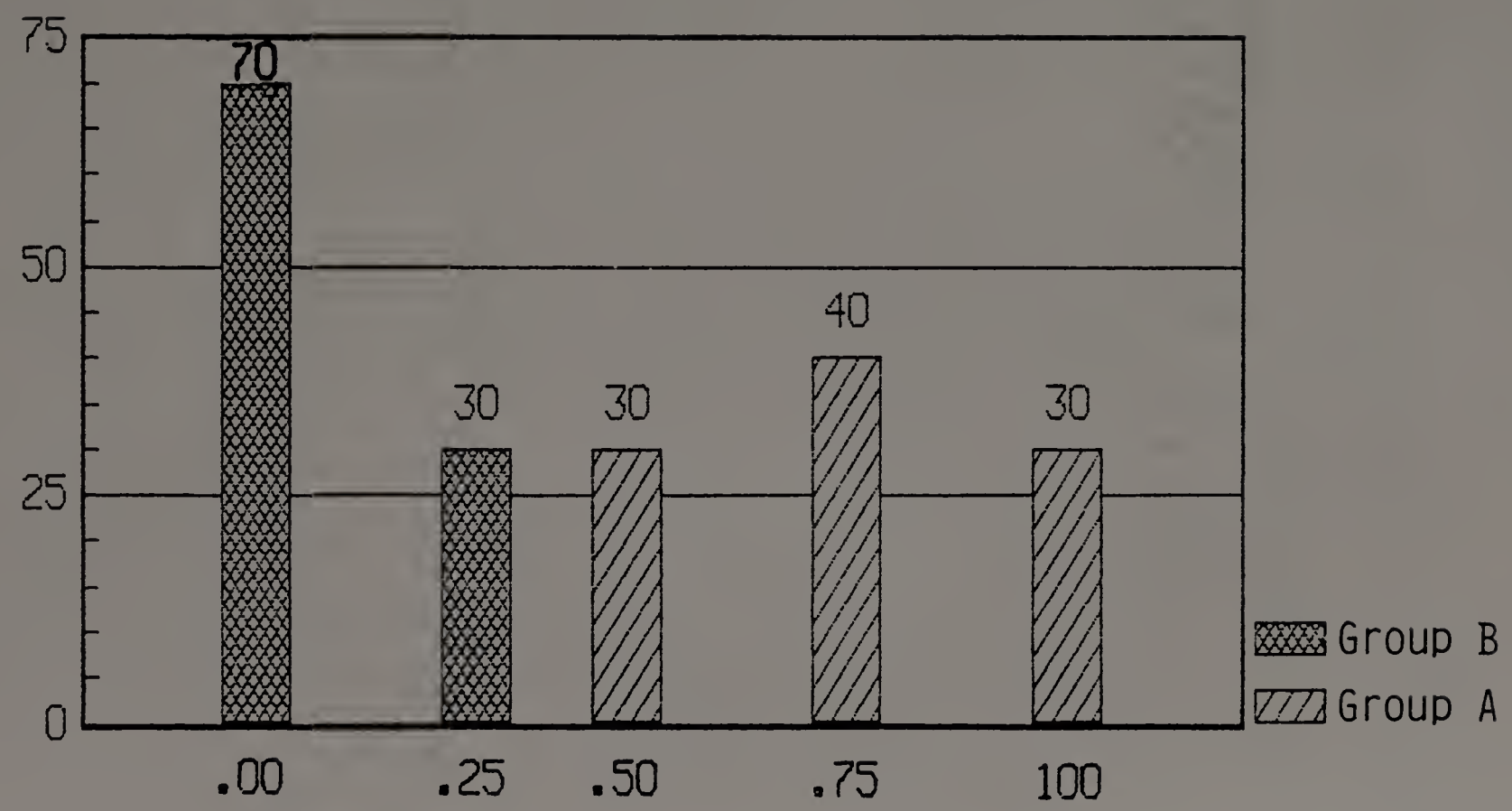


Figure 55. Distribution of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

answers is a pedagogy of the bureaucratic question. It hinders human growth and the transformation of the world.

"We should insist on the necessity to continuously stimulate the curiosity; the act of asking and answering instead of reprimanding. The schools reprimand the questions, or bureaucratize the act of asking. It is not just a matter of simply introducing them into the curriculum at the time to answer questions, but to use them in context. Our purpose is not to bureaucratize questions, but to be aware of their existence as an act of asking. Bureaucratization implies adaptation, with a minimum of risks, with surprises, and without question. Then, the pedagogy of the answer is a pedagogy in the adaptation and the creativity."

"The questions are an essential tool in human growth. Freire shows that one of the obstacles for pedagogy in questions, as an act of thinking, is the same mentality of the educator that has interiorized the oppression and the authority he has imposed. There are two processes that are closely related with the 'Art of Formulating Questions': educate and think. Both are complex processes; to imagine or discuss one thing, reflect, examine with caution something before passing judgment, exercising the faculty and the spirit of conceiving, thinking, implying and educating in broad terms the life-long process of acquiring new knowledge and skills through

both formal and informal exposure to information, ideas and experiences. In other terms, systematic planned instruction that takes place in school."

During the study, this skill was aimed towards the students, to widen and broaden the answers through various activities, such as dialogue, working in groups, situation analysis, and others mentioned in Appendix C (see activities used in the process of the study). In these activities, the students' experiences in diverse situations were as follows: understanding, application, analysis, and evaluation. During the study, "The Art of Formulating Questions" skills shown in the Teacher's Handbook (Appendix C) were used to develop thinking skills. Through the findings of the posttest of "The Wave That Wanted to Travel" and "The Greedy Bear", results are seen in using questions as instruments in the effectiveness of the development of simple and complex thinking skills in Spanish-speaking students with specific learning problems.

Figures 56 through 69 compare the mastery level of the skills before and after using microteaching techniques.

Distribution of the Mastery Level of Group A in Pretests/Posttests of "The Ant and the Grasshopper" and "The Greedy Bear"

Pretests/posttests of "The Ant and the Grasshopper" and "The Greedy Bear" were administered to thirteen

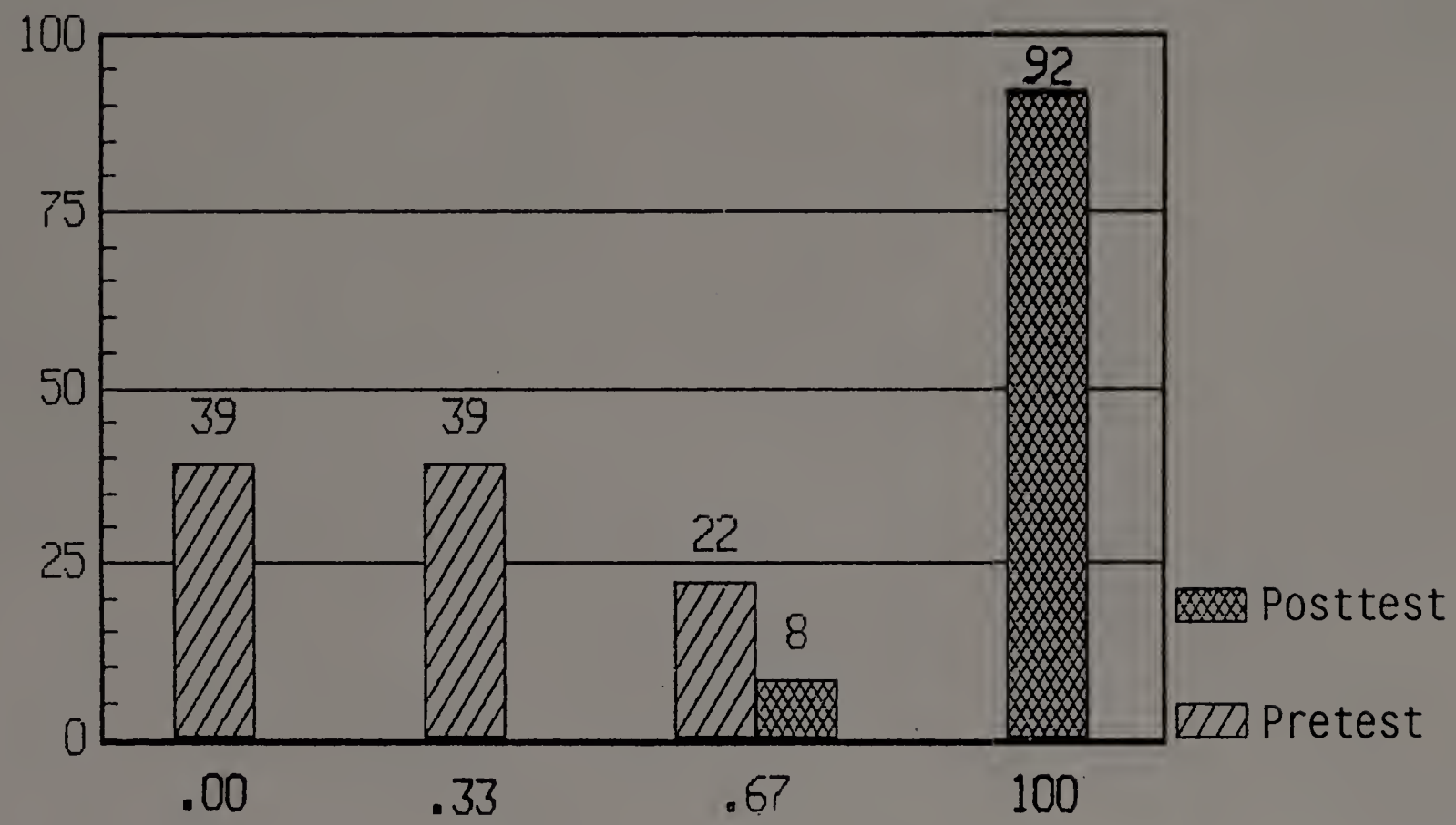


Figure 56. Distribution of the subject based on the percentage of the pretests/posttests in the skills to "Imply Cause and Effect" in the short story "The Greedy Bear".

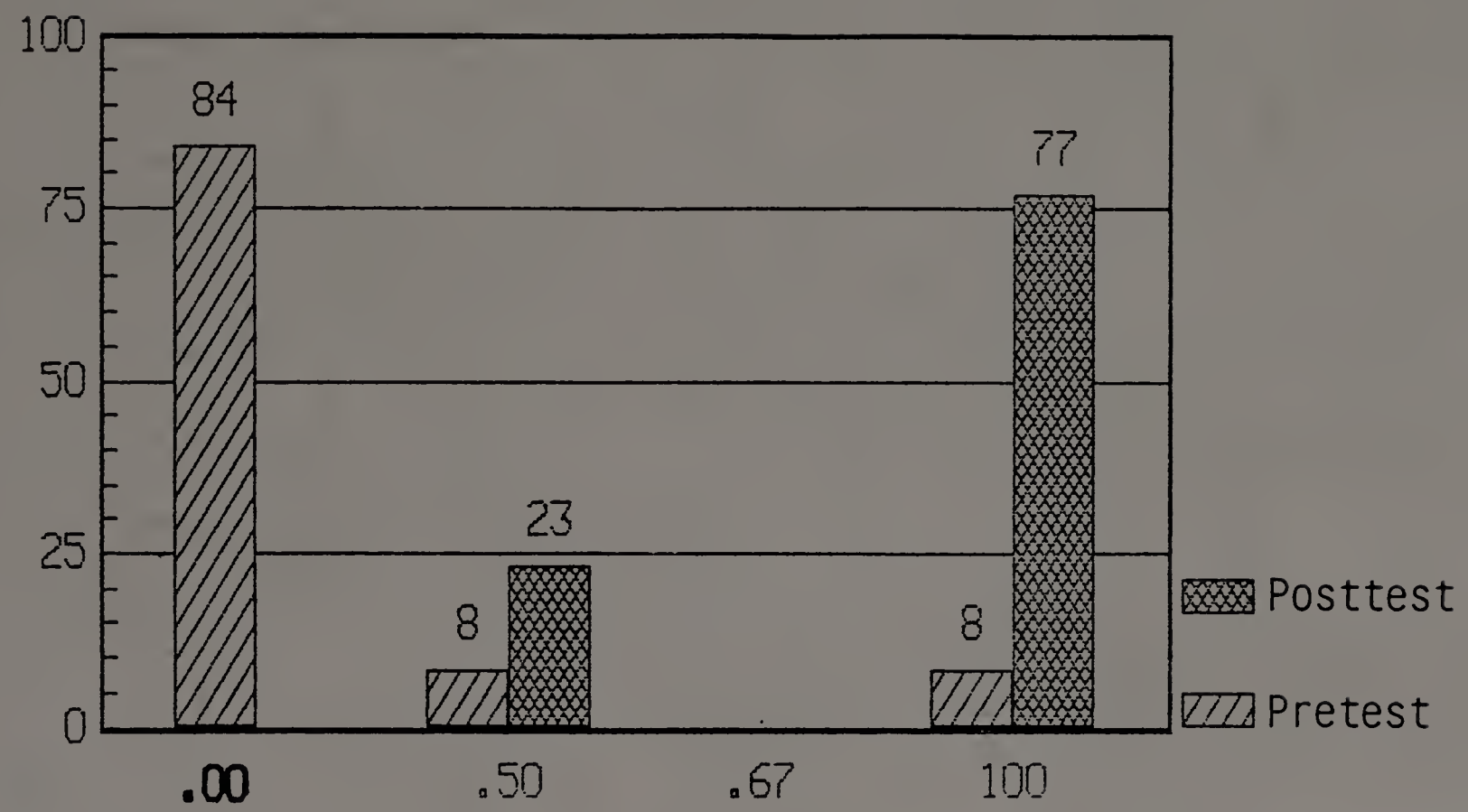


Figure 57. Distribution of the subject based on the percentage of the pretests/posttests in the "Details" skills in the short story "The Greedy Bear".

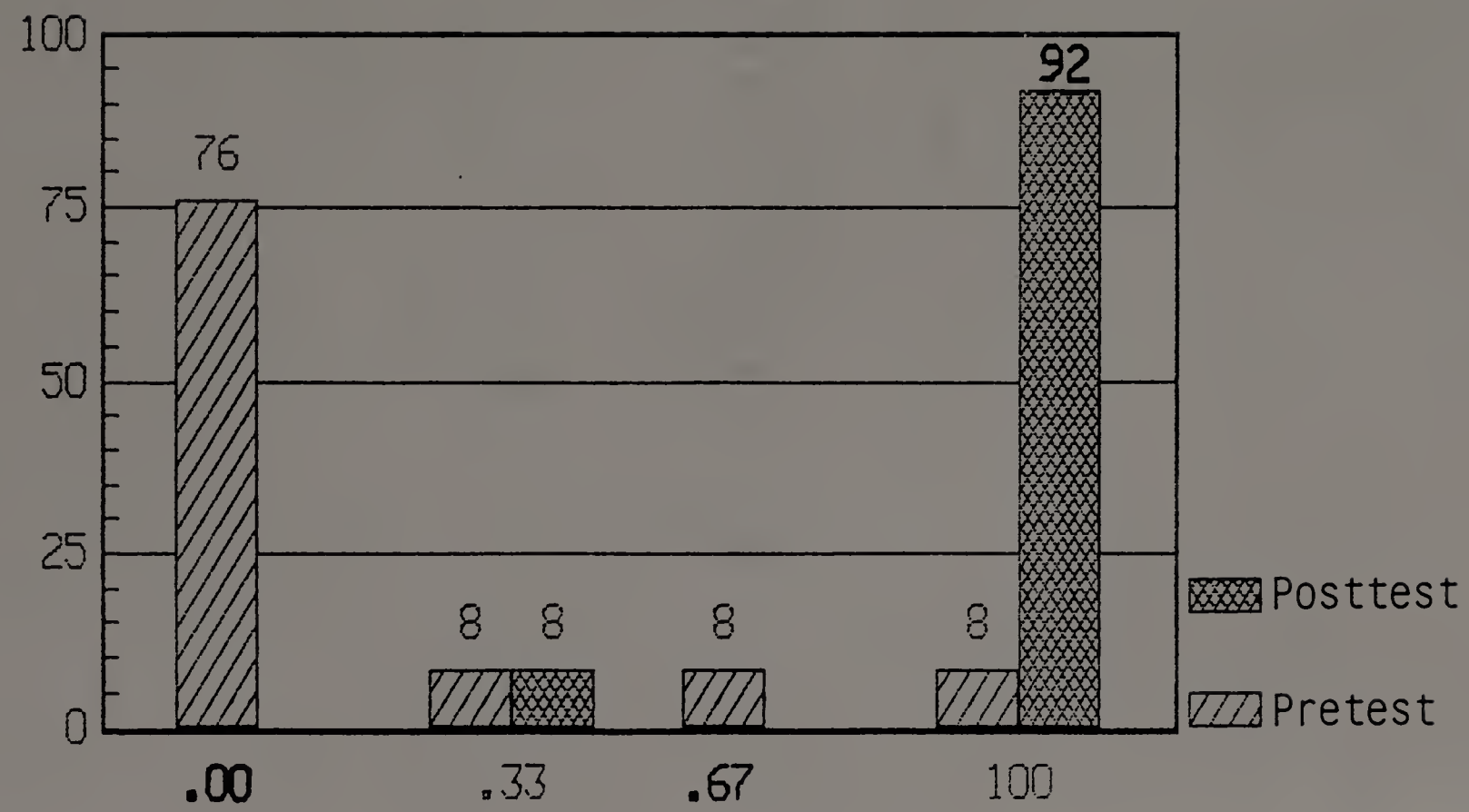


Figure 58. Distribution of the subject based on the percentage of the pretests/posttests of the "Main Idea" skills in the short story "The Greedy Bear".

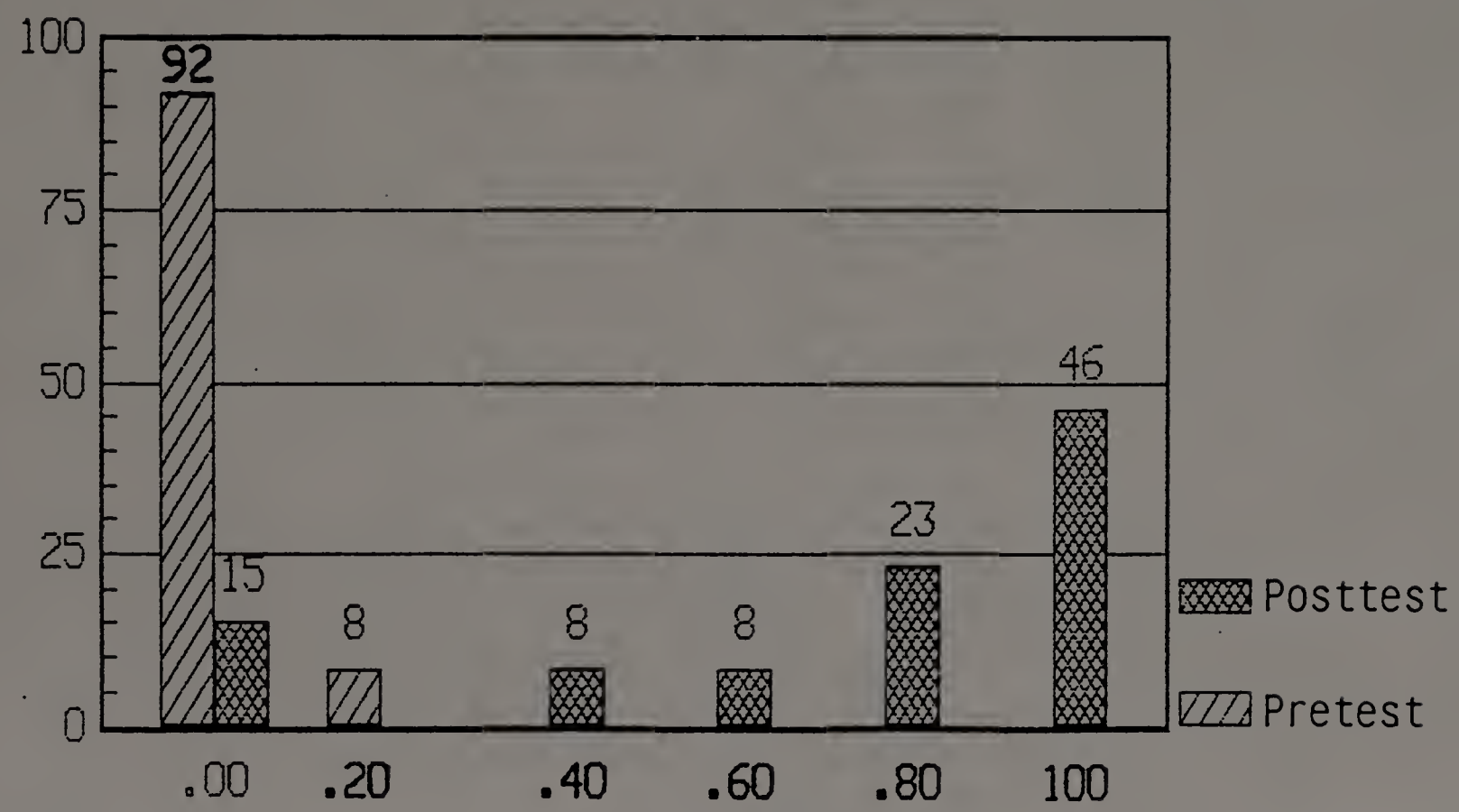


Figure 59. Distribution of the subject based on the percentage of the pretests/posttests of the "Characteristics" skills in the short story "The Greedy Bear".

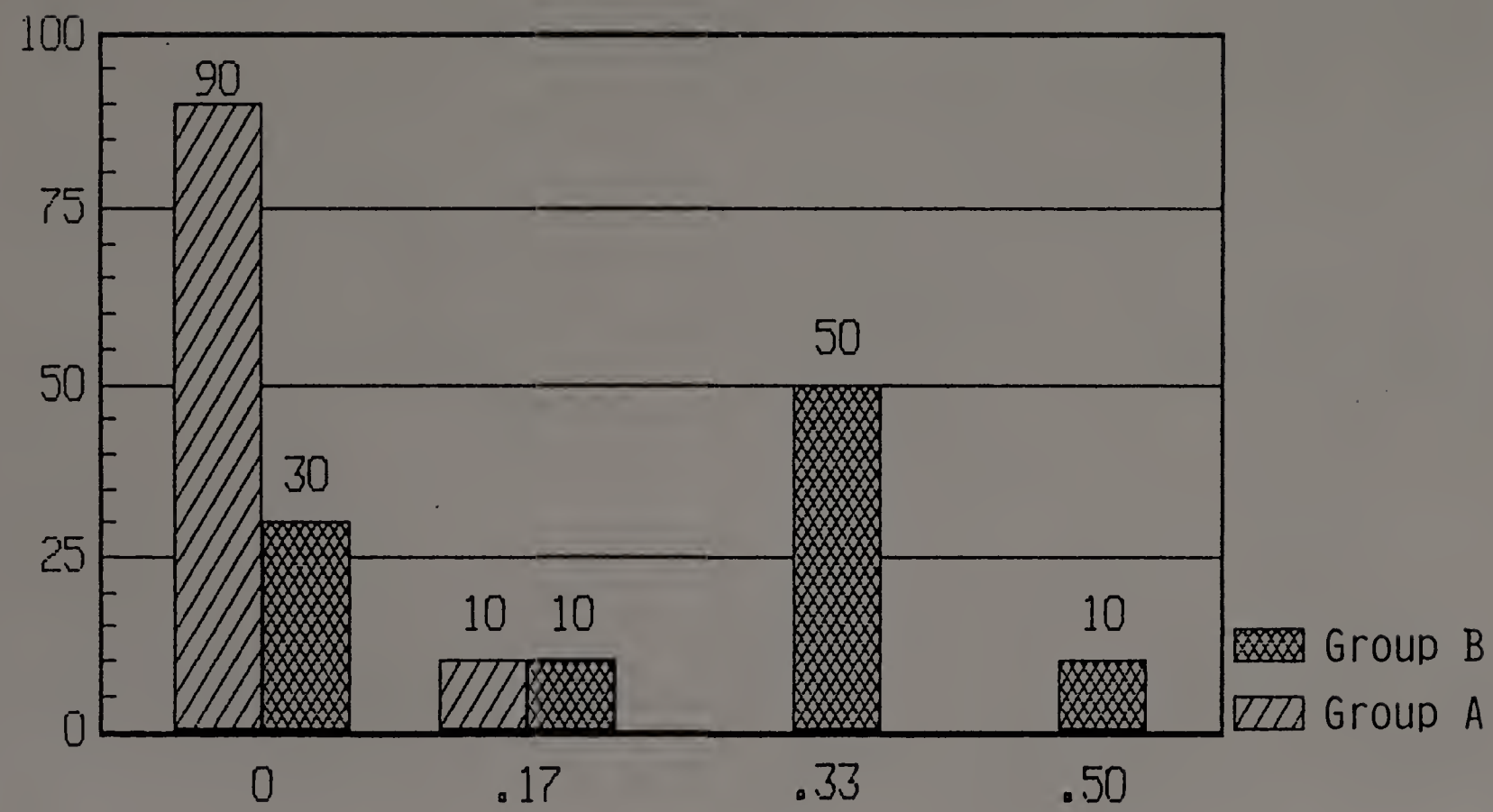


Figure 60. Distribution of the subject based on the pretests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

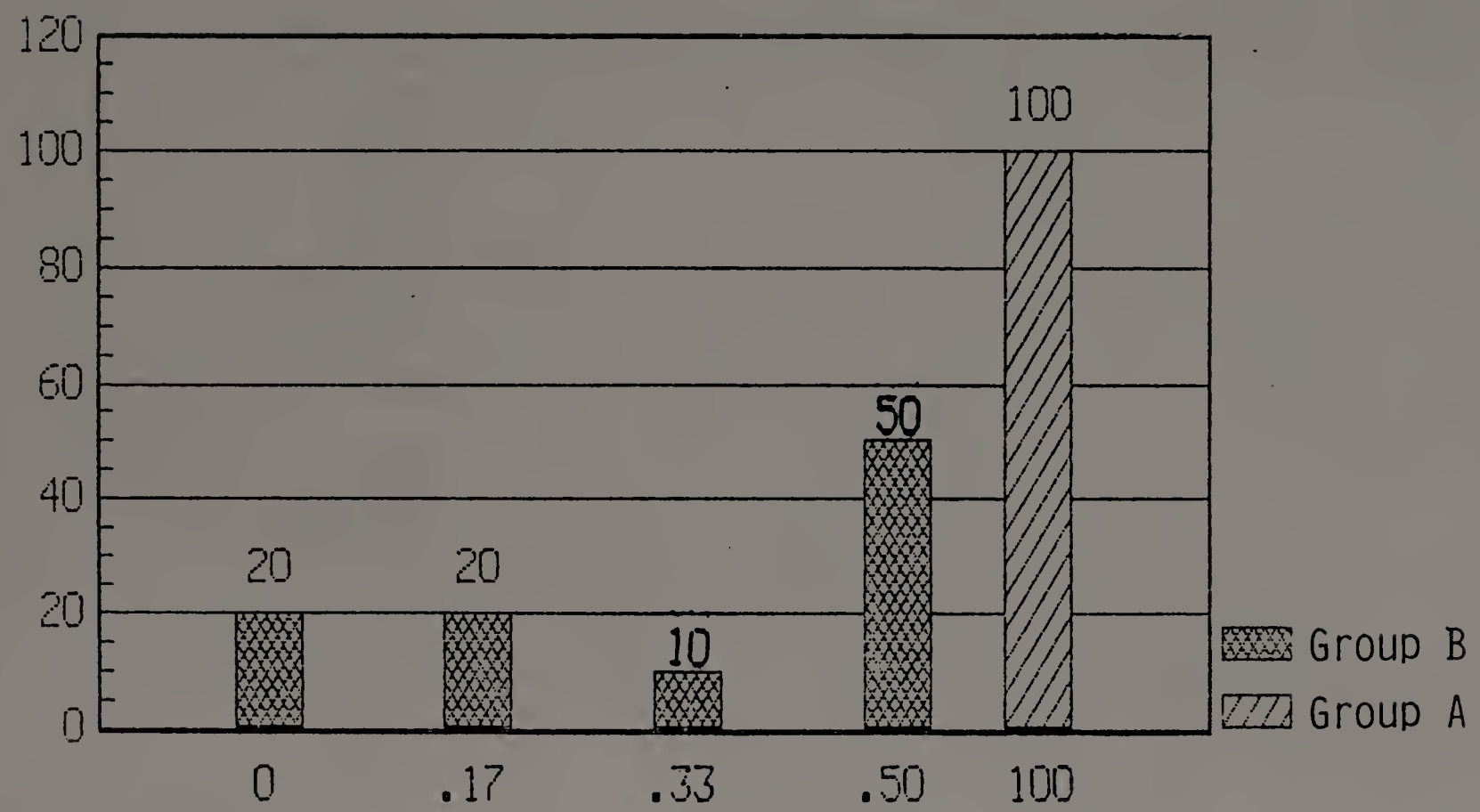


Figure 61. Distribution of the subject based on the posttest of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

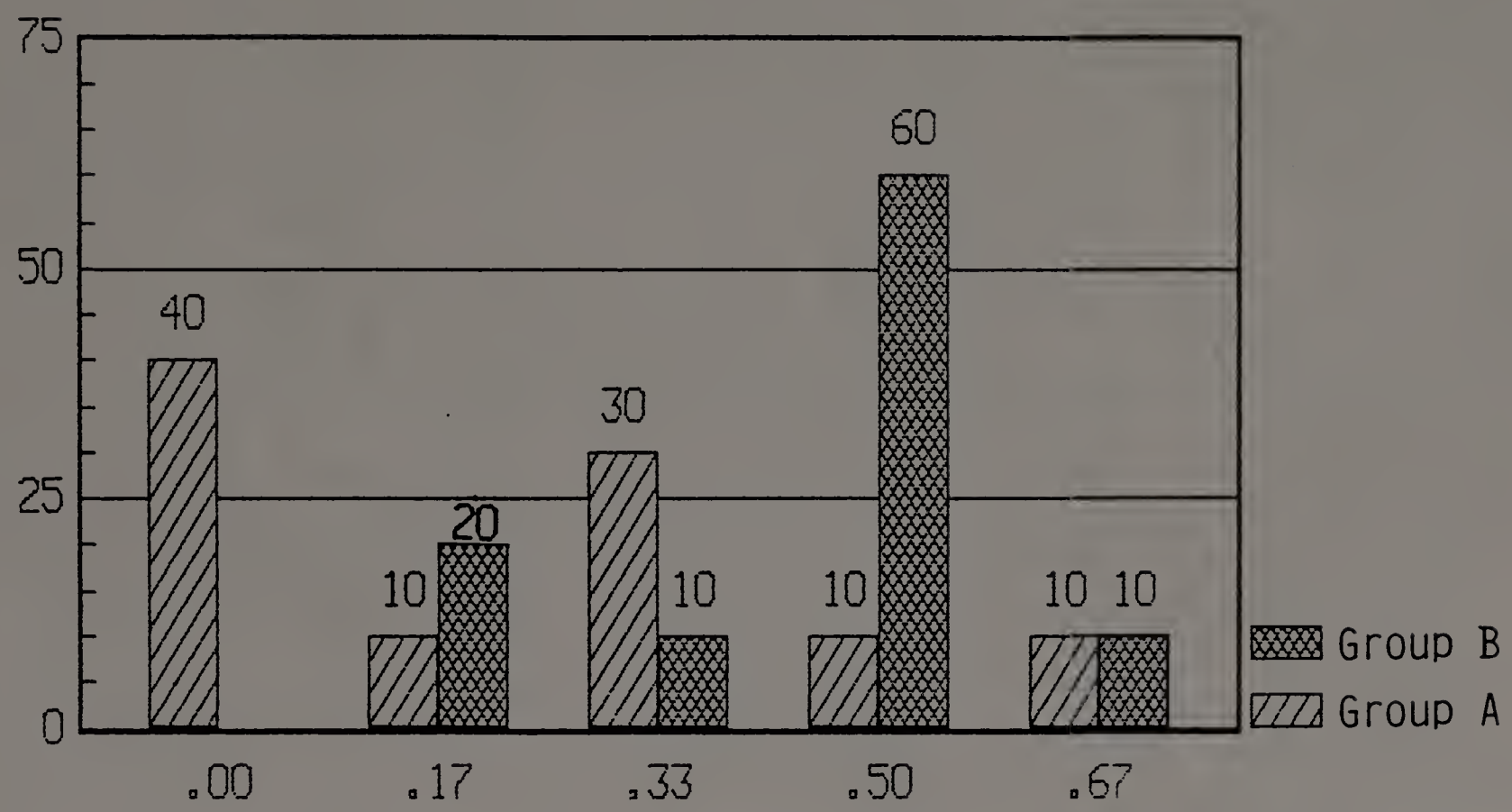


Figure 62. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

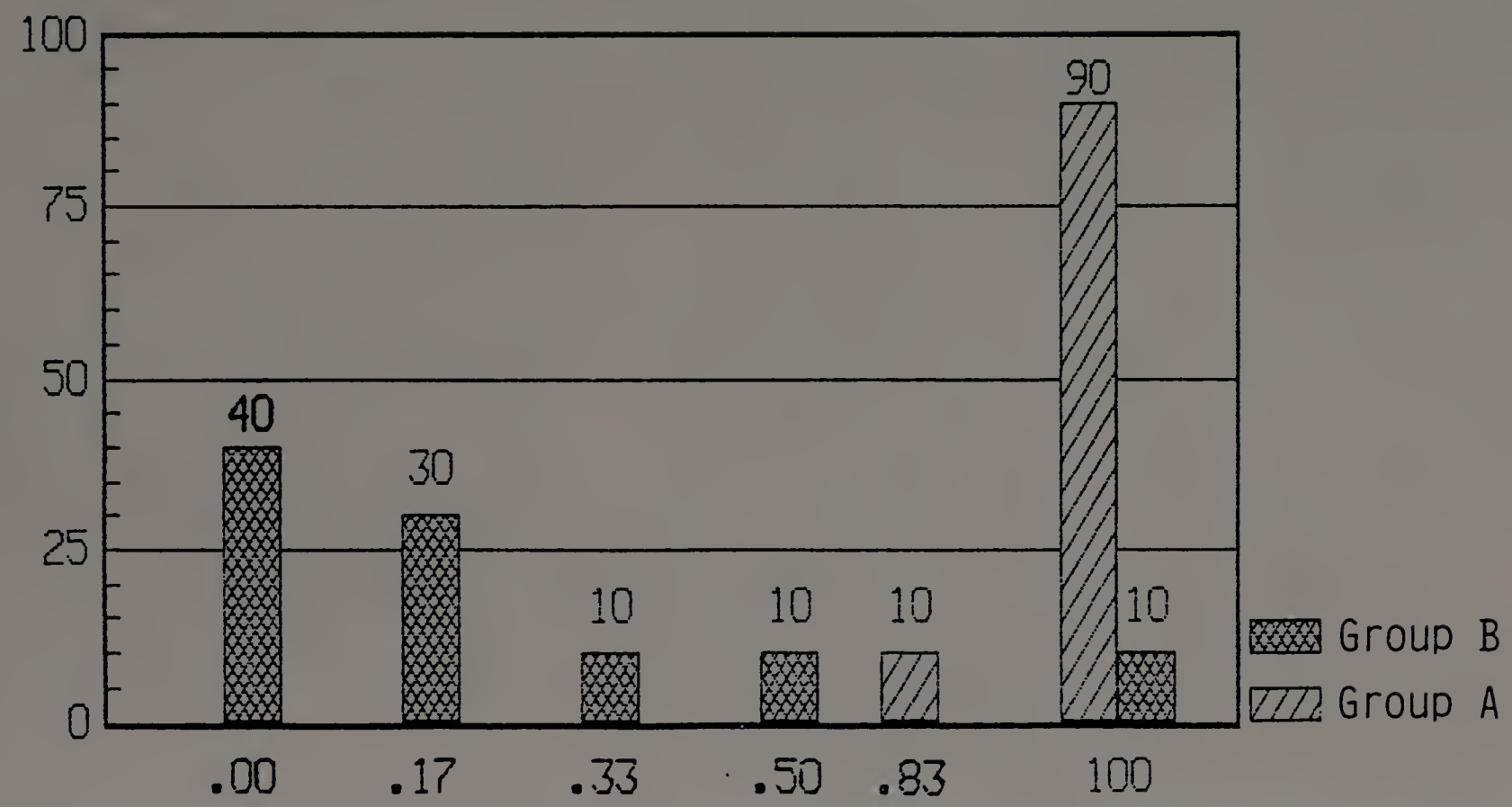


Figure 63. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

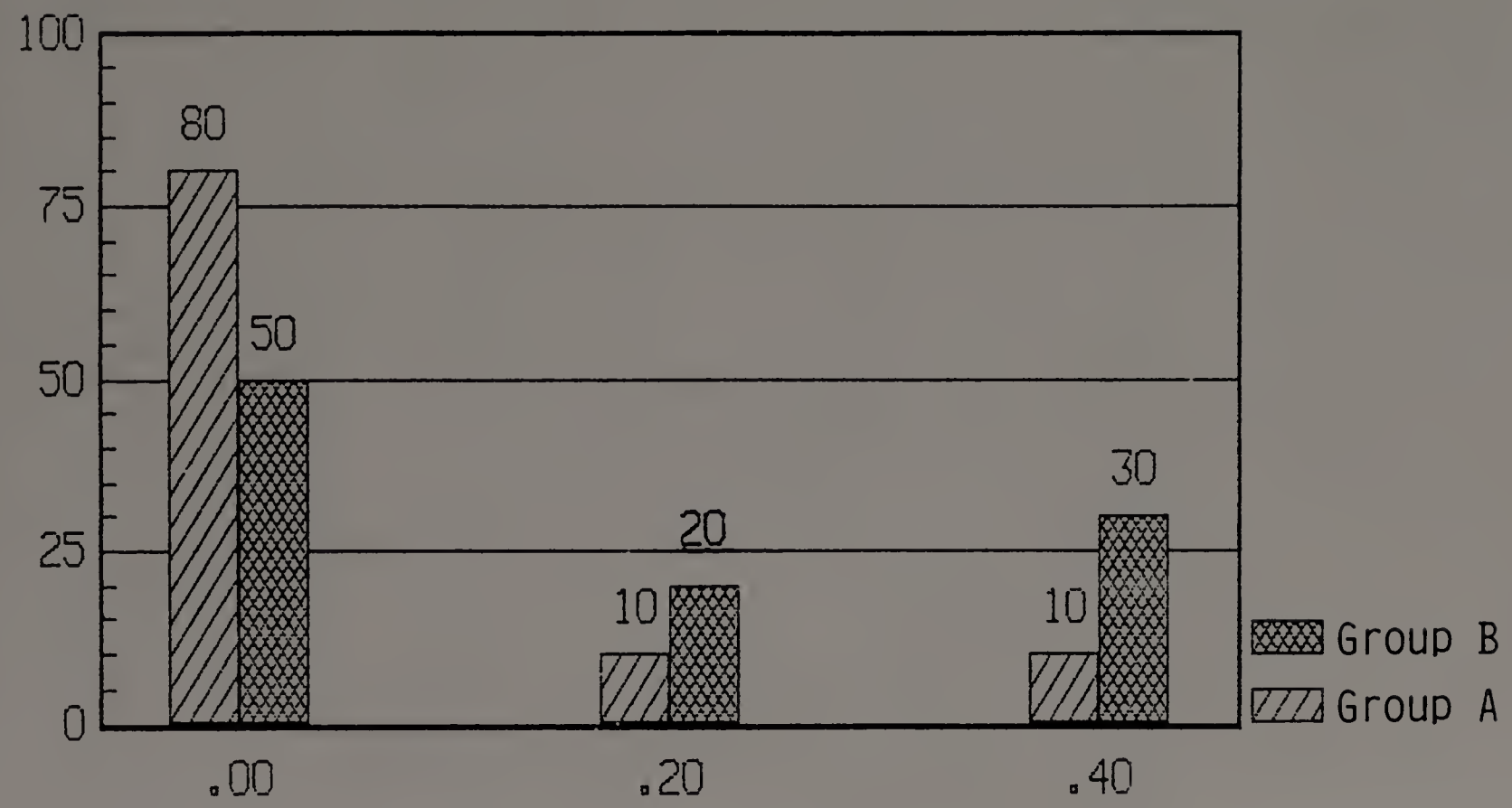


Figure 64. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

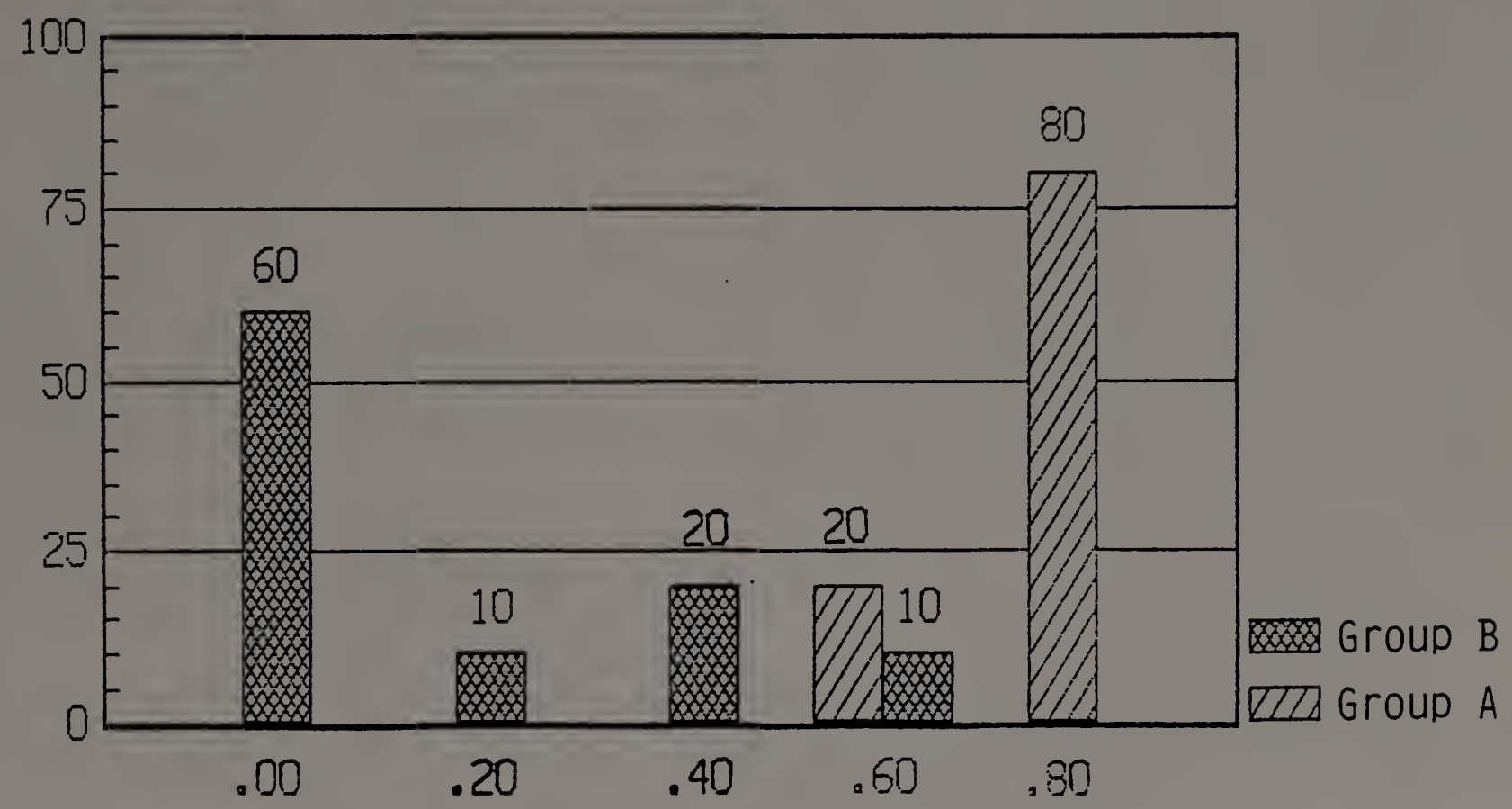


Figure 65. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

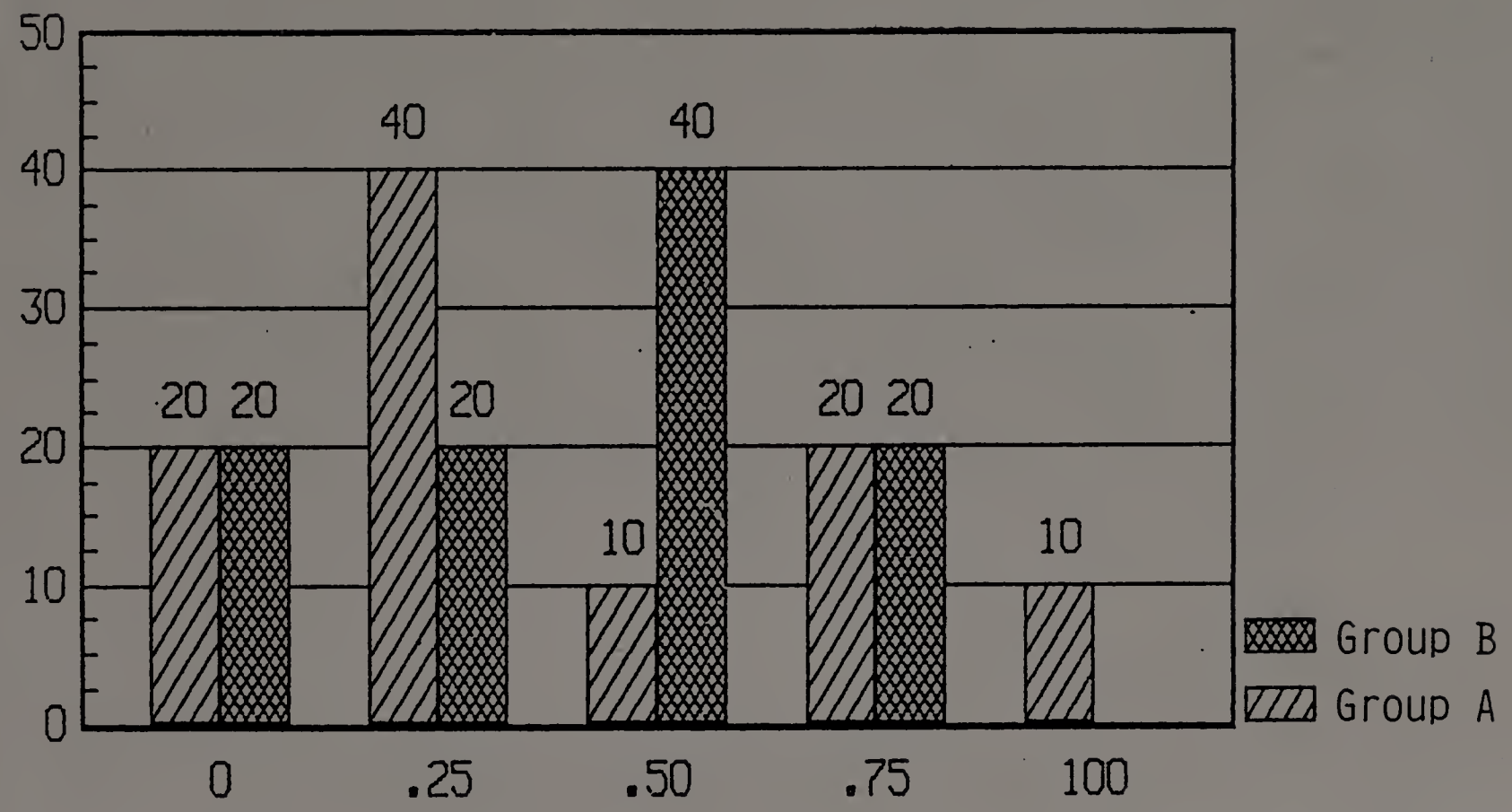


Figure 66. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

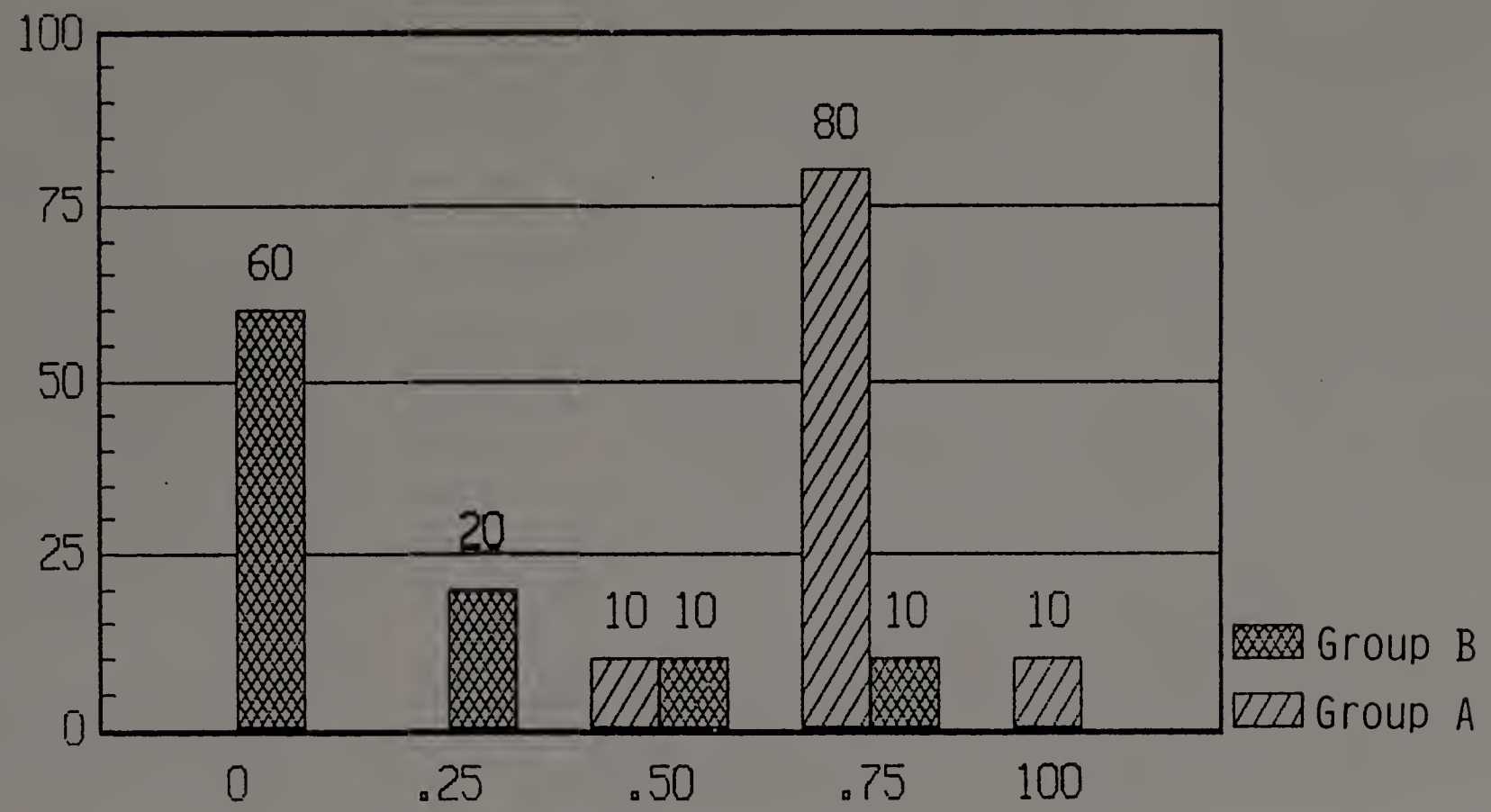


Figure 67. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

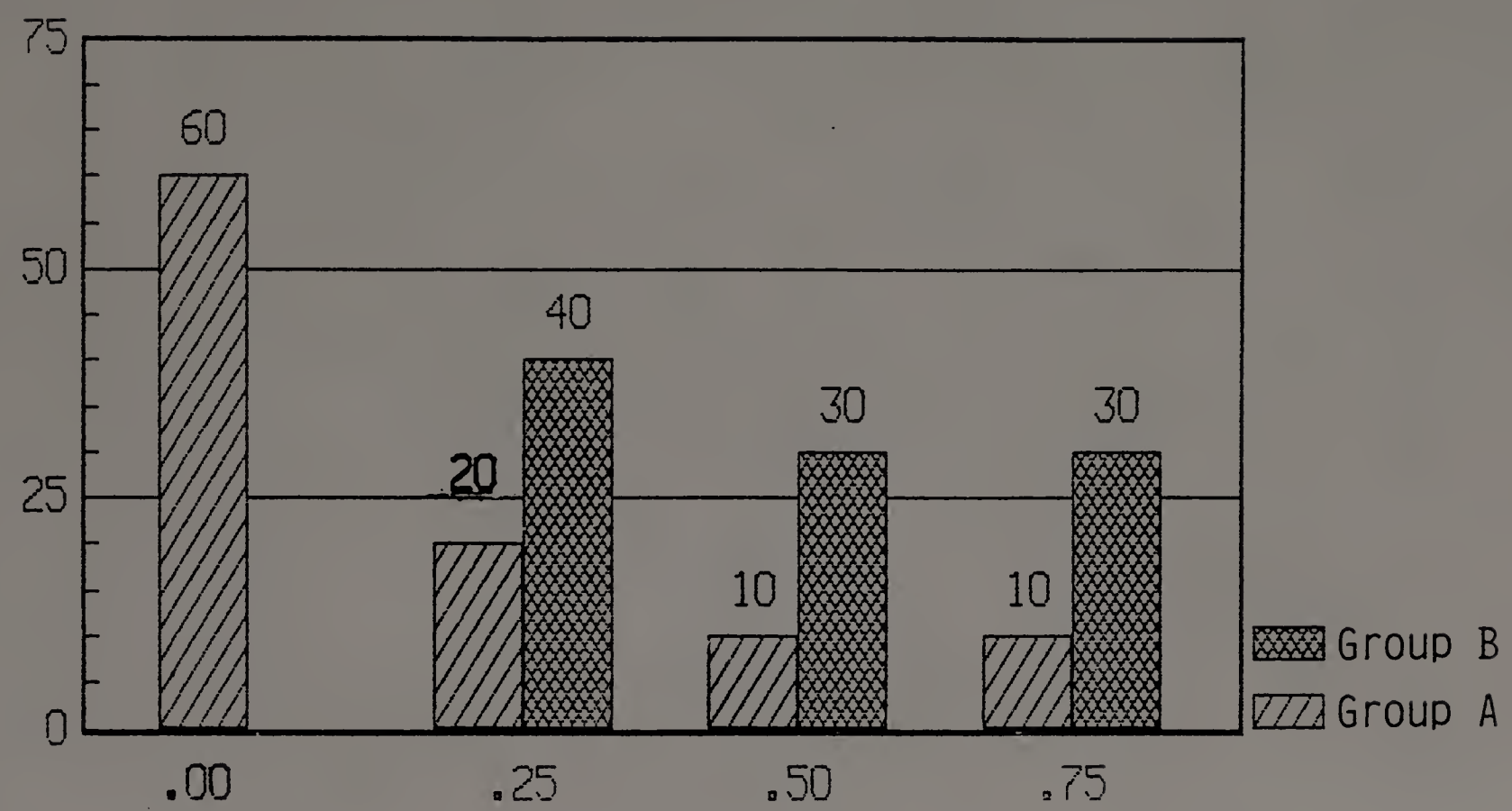


Figure 68. Distribution of the subject based on the pretest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

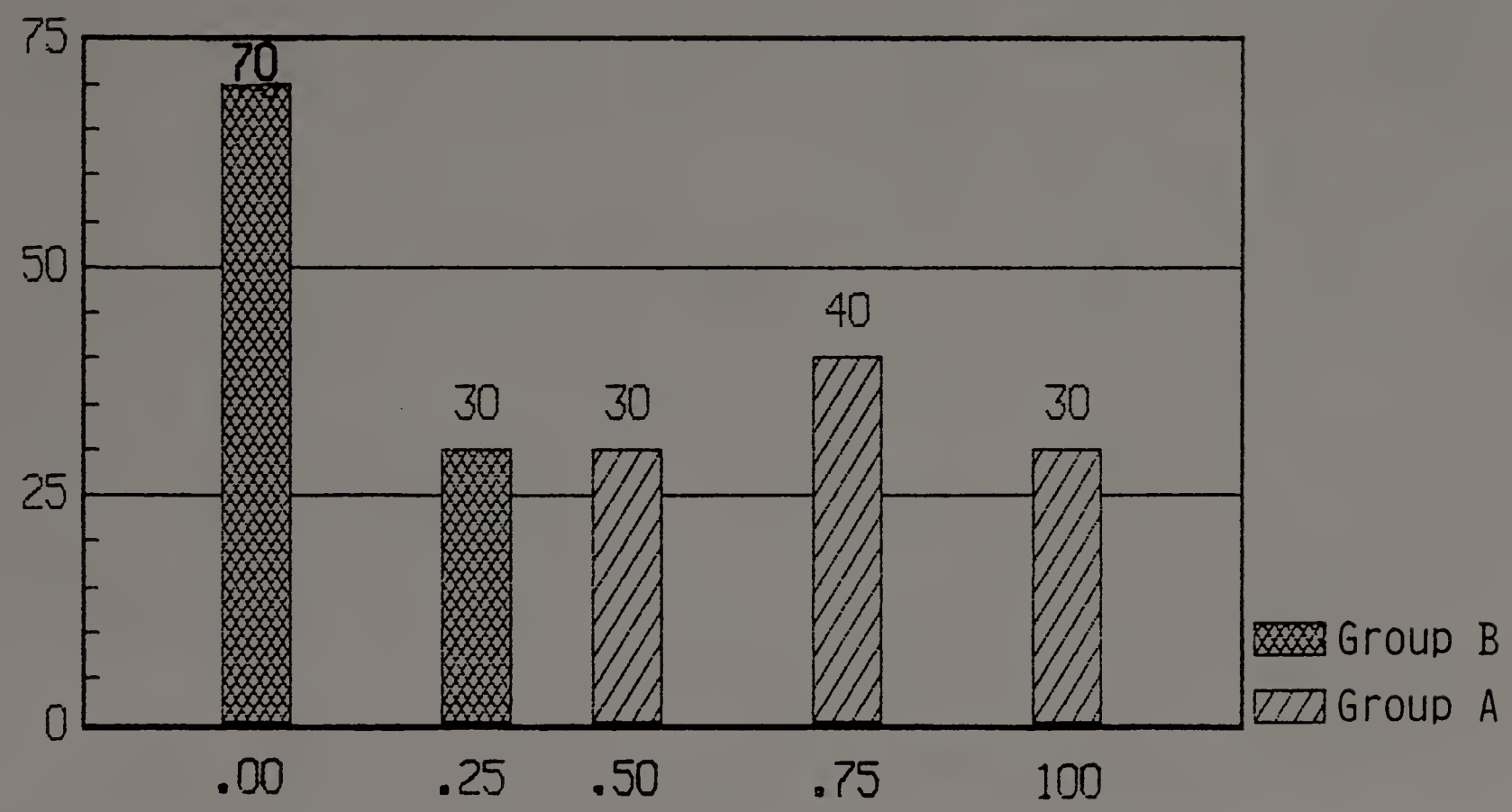


Figure 69. Distribution of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

Spanish-speaking students with specific learning problems, belonging to Group A, with the purpose of controlling some variables in their treatment. Group B did not participate in the tests of "The Ant and the Grasshopper" and "The Greedy Bear". Table 2 shows the comparison of pretest/posttest research for "The Ant and the Grasshopper" and "The Greedy Bear" (Group A).

Findings of "The Ant and the Grasshopper"

Details Skill. Figure 70 illustrates the distribution of the subjects based on the percentage of the pretest/posttest in the short story "The Ant and the Grasshopper". In the pretest, Group A had less than 60% mastery of the skill. In the posttest, 53% of the subjects mastered more than 80% of the skill and 8% of the subjects had 60% mastery.

Implication Skill. The distribution of the subjects based on the percentage of the pretest/posttest in the short story "The Ant and the Grasshopper" includes: in the pretest, 84% of the students mastered 0% of the "Implication" skill, and 16% of them mastered more than 75% of the skill; in the posttest, 92% of the subjects of Group A did not master the skills. This group did not receive treatment on this part of the study. As in Figure 70, Figure 71 shows that the mastery level of skills was slower when no microteaching techniques were used.

Table 2

Comparison of Pretest/Posttest Research
for "The Ant and the Grasshopper"
and "The Greedy Bear"
(Group A)

Skill	Pretest	Posttest	% Change
"THE ANT AND THE GRASSHOPPER"			
Order of Occurrence	0.26	7.74	+7.48
Imply Cause and Effect	7.79	7.73	-0.06
Details	0.38	23.49	+23.11

No microteaching techniques were used in this part of the study.

"THE GREEDY BEAR"			
Quality	0.12	43.42	+46.30
Imply Cause and Effect	0.28	92.36	+92.08
Main Idea	7.77	92.33	+84.56
Details	7.73	77.04	+69.31

This part of the study was conducted after the pretest had been administered. Microteaching techniques were used to develop the thinking skills. All of the procedure was conducted in Spanish.

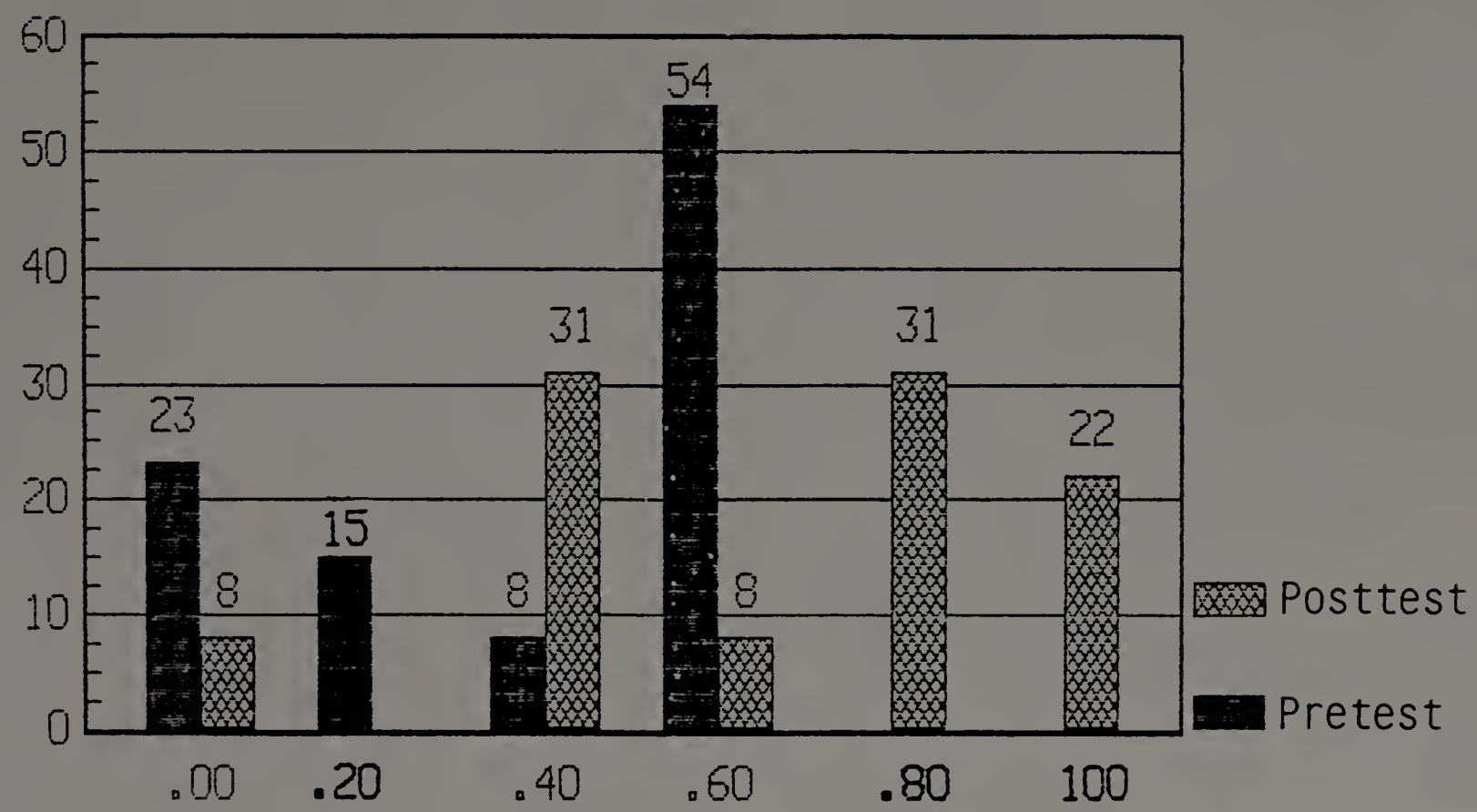


Figure 70. Distribution of the subject based on the percentage of the "Details" skills in the short story "The Ant and the Grasshopper".

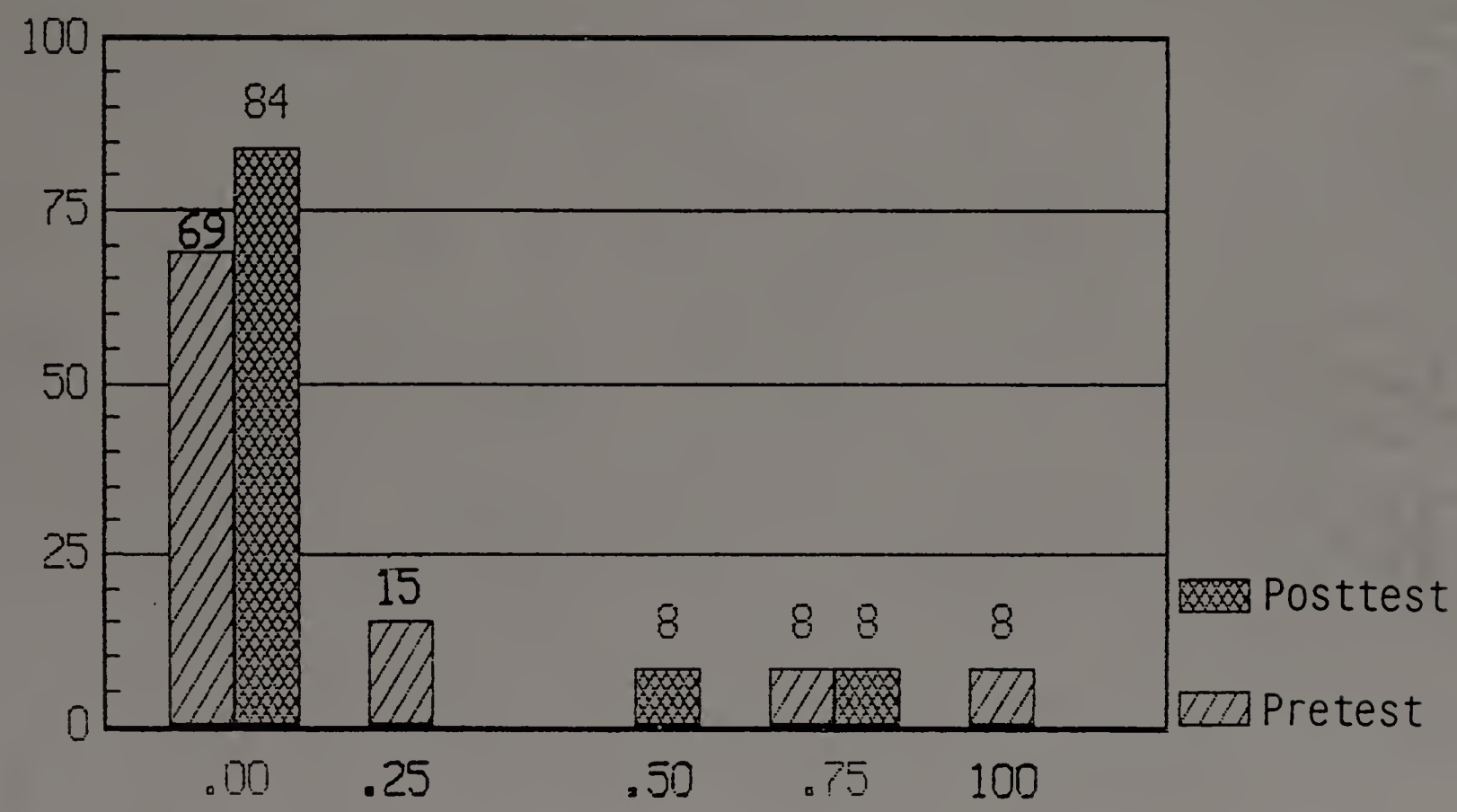


Figure 71. Distribution of the subject based on the percentage of the pretests/posttests in the skills of "Implication" in the short story "The Ant and the Grasshopper".

Order of Occurrence Skill. The distribution of the subjects based on the pretests in the short story "The Ant and the Grasshopper" indicated that 100% of the subjects did not master the "Order of Occurrence" skill. In the posttests, only 38% of the subjects mastered 67% of the "Order of Occurrence" skill. Sixty-two percent of the subjects had 0% mastery level. In this part, Group A did not receive treatment with microteaching techniques. Figure 72 shows the mastery level in the pretests and posttests.

Findings of "The Greedy Bear"

Skill to Imply Cause and Effect. Distribution of the subjects based on the percentage of the pretests/posttests in the short story "The Greedy Bear" indicate that in the pretest, 100% of the subjects in Group A mastered 67% of the skill of "Imply Cause and Effect". After having used the microteaching techniques in the posttests, 92% of the subjects of Group A mastered 100% of the skill. The findings showed that in the posttest, the students obtained a higher mastery of the skill. Figure 73 shows the subjects' mastery of the skill before and after using microteaching techniques.

Skill of Details. Distribution of the subjects based on the percentage of mastery of the pretest/posttest of the short story "The Greedy Bear" includes 92% of the

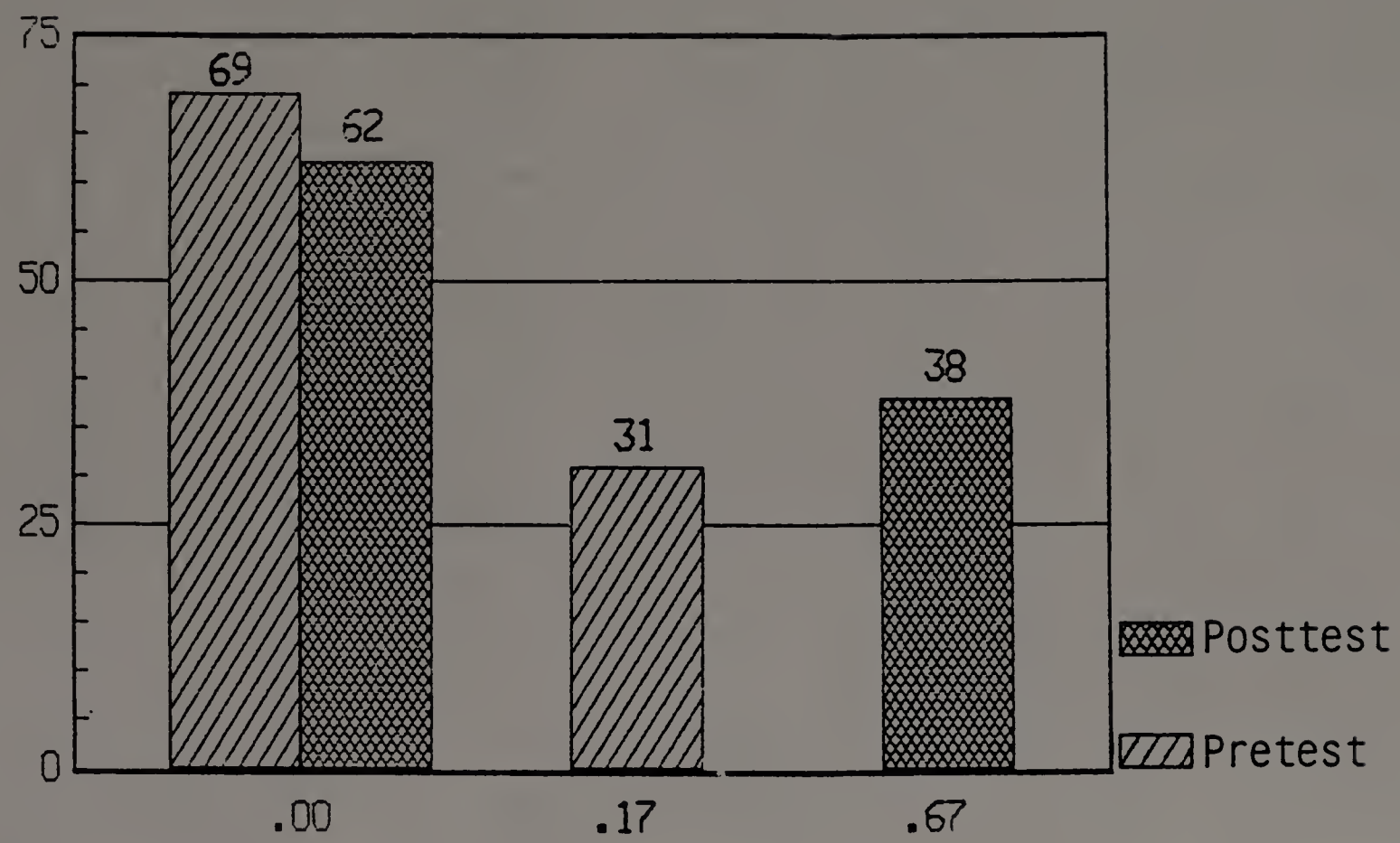


Figure 72. Distribution of the subject based on the percentage of pretests/posttests in the "Order of Occurrence" skills in the short story "The Ant and the Grasshopper".

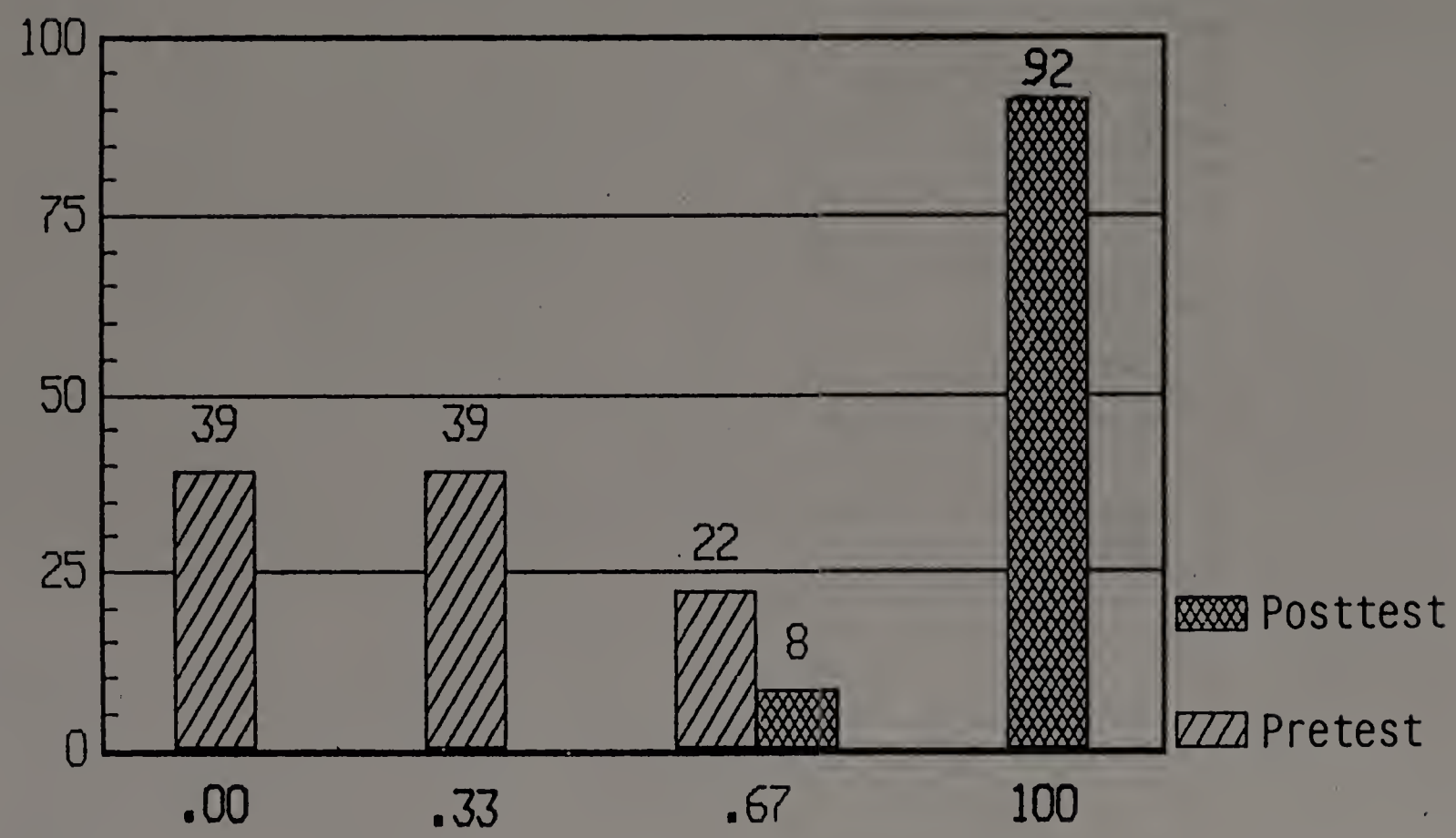


Figure 73. Distribution of the subject based on the percentage of pretests/posttests in the skills to "Imply Cause and Effect" in the short story "The Greedy Bear".

subjects of Group A mastered less than 50% of the "Details" skill, and 8% of the subjects mastered in the pretest. In the posttest, 77% of the subjects of Group A mastered 100% of the skill, and 23% of the subjects mastered 50%. Figure 74 shows the results before and after using microteaching techniques.

Main Idea Skill. Distribution of the subjects based on the percentage of mastery in the pretest/posttest of the short story "The Greedy Bear" includes 76% of the subjects in Group A mastered 0% of the skill in the pretest; 8% of the subjects mastered 33%; and 8%, 67%, and 8% had 100% mastery of the skill. In the posttest, 92% mastered 100% the skill and 8% mastered 33%. Figure 75 compares the level of mastery of skill before and after using microteaching techniques.

Characteristics of the Characters Skill. Figure 76 shows the distribution of the subjects based on the percentage of the pretest/posttest in the short story "The Greedy Bear". One hundred percent of the subjects of Group A mastered 20% of the skill of identifying "Characteristics". In the posttest, 69% of the same subjects of Group A mastered the skill after using the microteaching techniques.

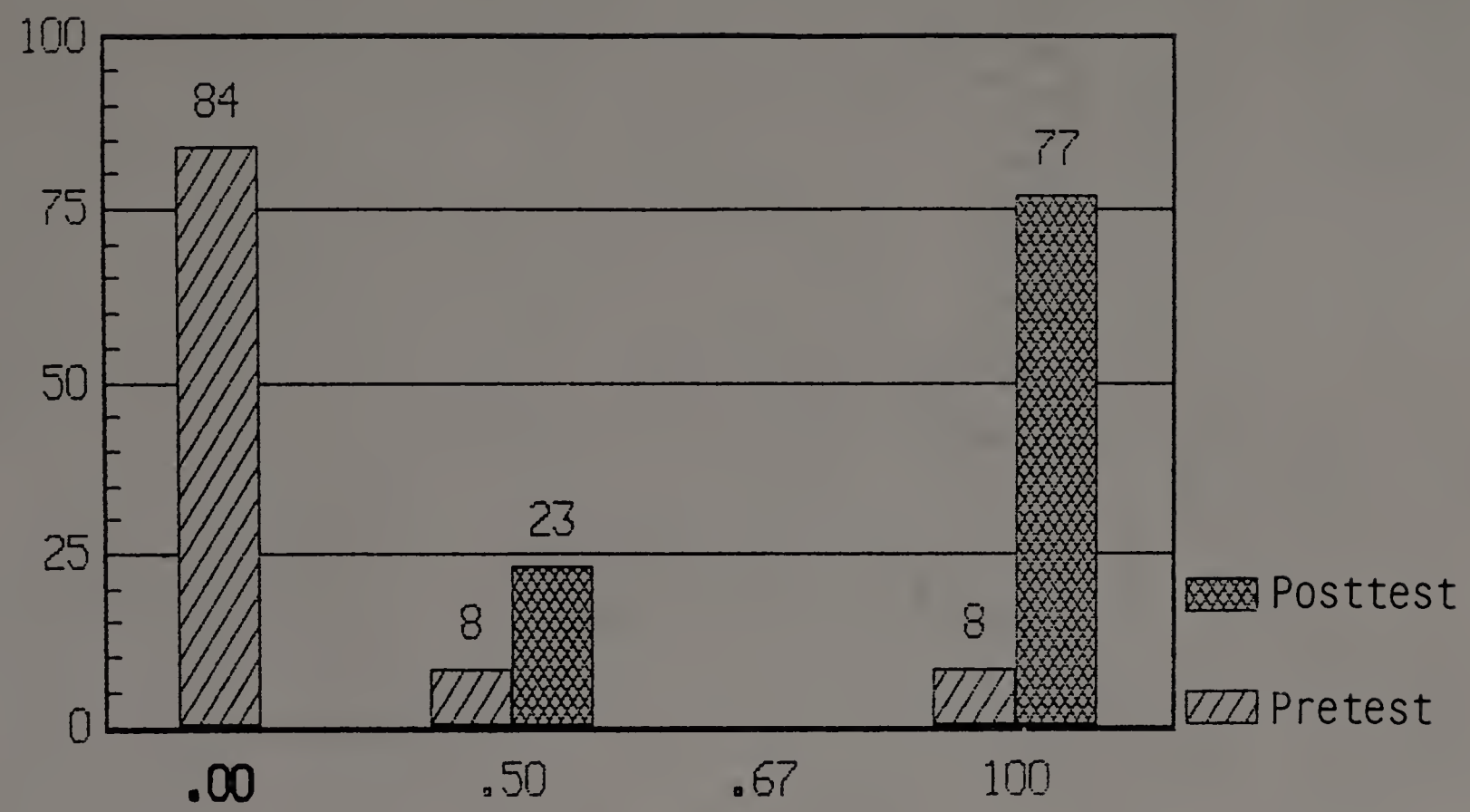


Figure 74. Distribution of the subject based on the percentage of the pretests/posttests in the "Details" skills in the short story "The Greedy Bear".

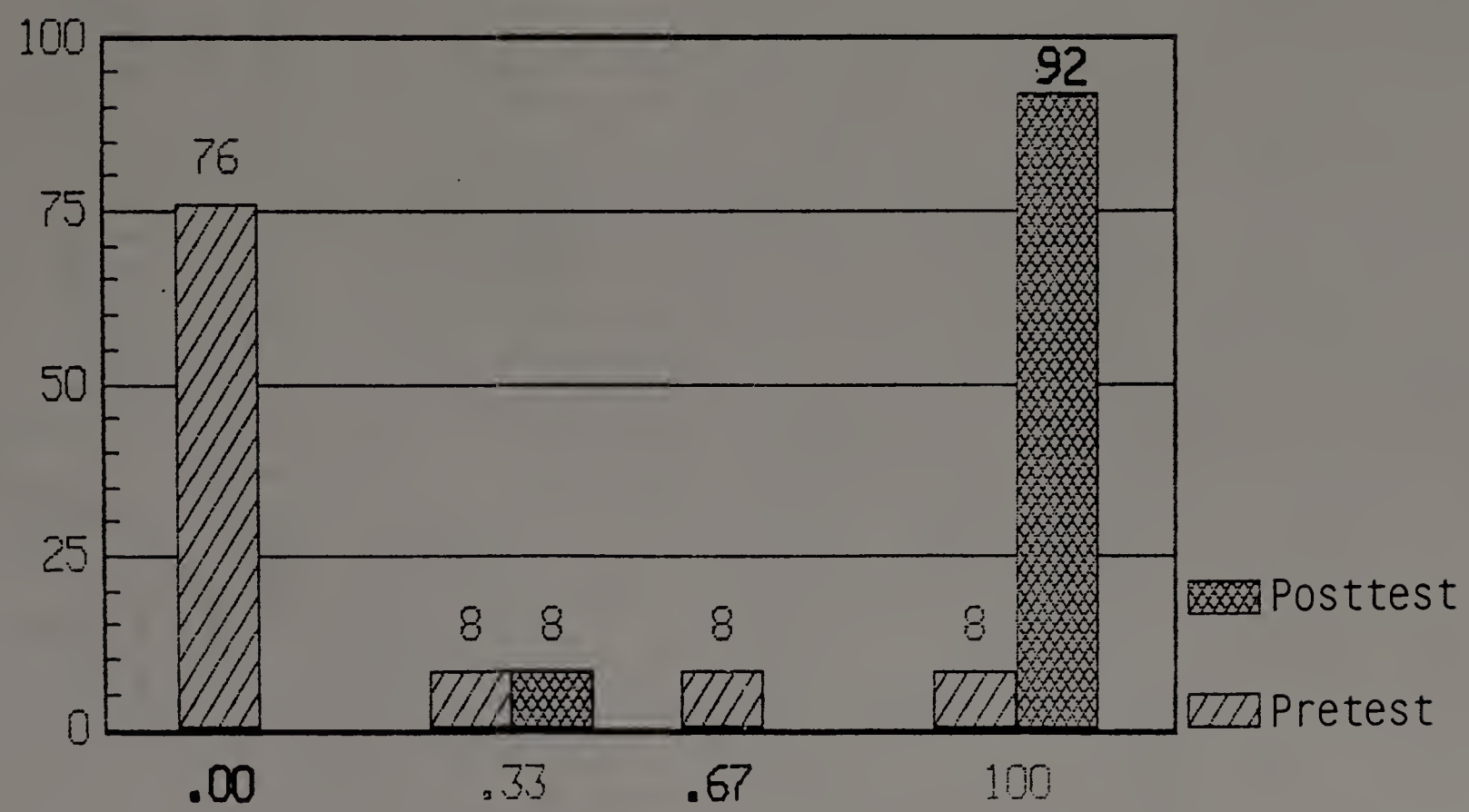


Figure 75. Distribution of the subject based on the percentage of the pretests/posttests in the "Main Idea" skills in the short story "The Greedy Bear".

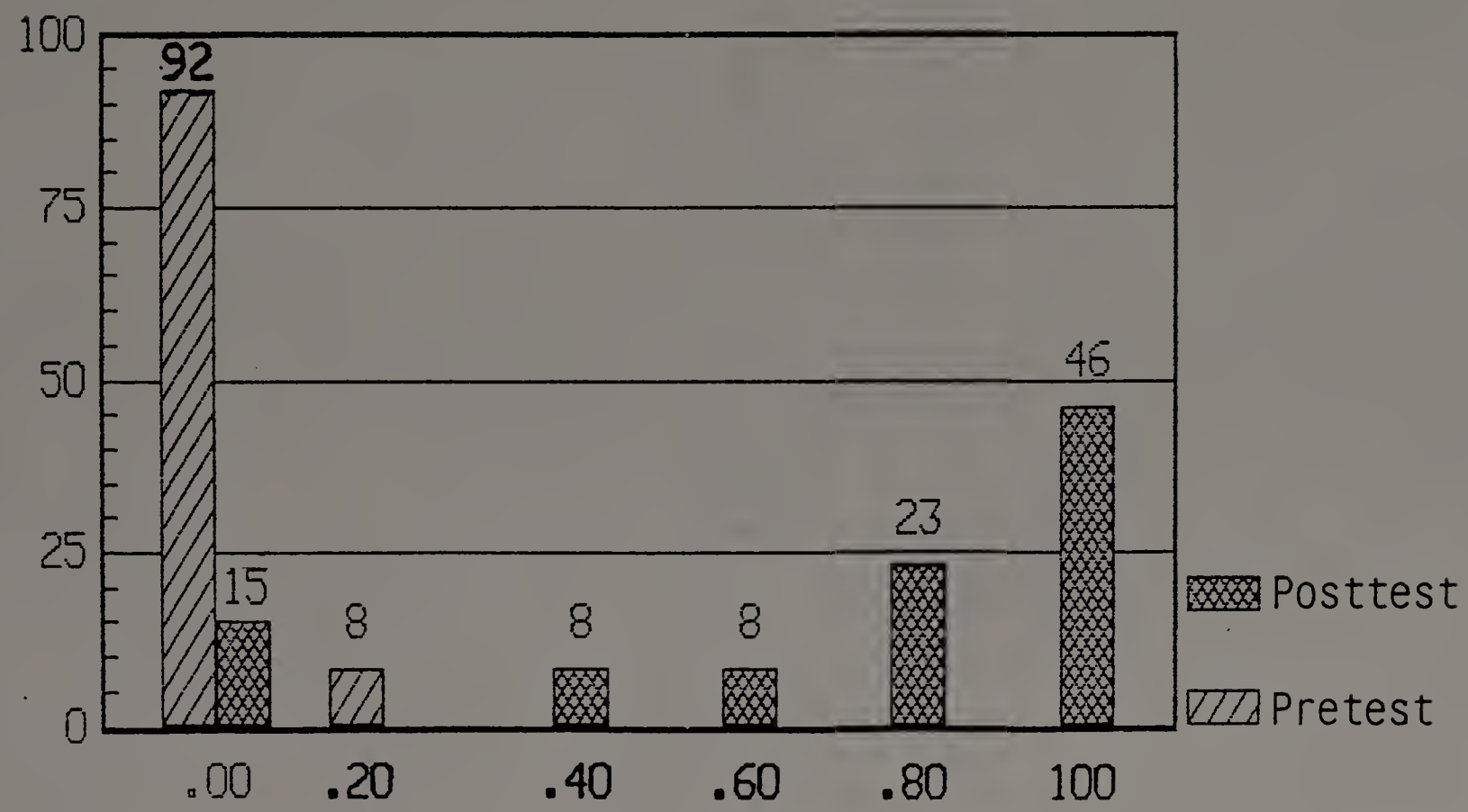


Figure 76. Distribution of the subject based on the percentage of the pretests/posttests of the "Characteristics" skills in the short story "The Greedy Bear".

Comparison of the Results of Group A and Group B in Pretests/Posttests on "The Wave That Wanted to Travel"

Findings of "The Wave That Wanted to Travel"

This test was administered to twenty Spanish-speaking students with specific learning problems. The twenty students were divided into two groups of which ten were identified as Group A and ten were identified as Group B. Group A and Group B were given a pretest and posttest, but with Group B the technique of microteaching was not used (no treatment was given during the study). After being given the pretest, Group A was treated using the microteaching techniques.

Table 3 shows the comparison of the pretest/posttest research for "The Wave That Wanted to Travel" (Group A and Group B).

Order of Occurrence Skill (Pretest). Based on the results of the pretest of the selection "The Wave That Wanted to Travel", 90% of Group A had no mastery (0%) of the "Order of Occurrence" skills and 10% of the students mastered the skill. Thirty-three percent of Group B mastered the skill. Figure 77 shows the results of the subjects' mastery of the skill before using microteaching techniques.

Order of Occurrence Skill (Posttest). The posttest of the selection "The Wave That Wanted to Travel" showed

Table 3

Comparison of the Pretest/Posttest Research for
"The Wave That Wanted to Travel"
(Group A and Group B)

	Group A			Group B		
Skill	Pretest	Posttest	% Change	Pretest	Posttest	% Change
Order of Occurrence	0.05	100.00	+95.95	0.23	0.32	+0.09
Imply Cause and Effect	0.23	90.08	+89.85	0.27	10.13	+9.86
Imply Ideas	0.06	0.76	+ 0.70	0.16	0.16	0.00
Details	10.30	10.65	+ 0.35	0.40	0.18	-0.22
Main Idea	0.17	30.45	+30.28	0.48	0.05	-0.43

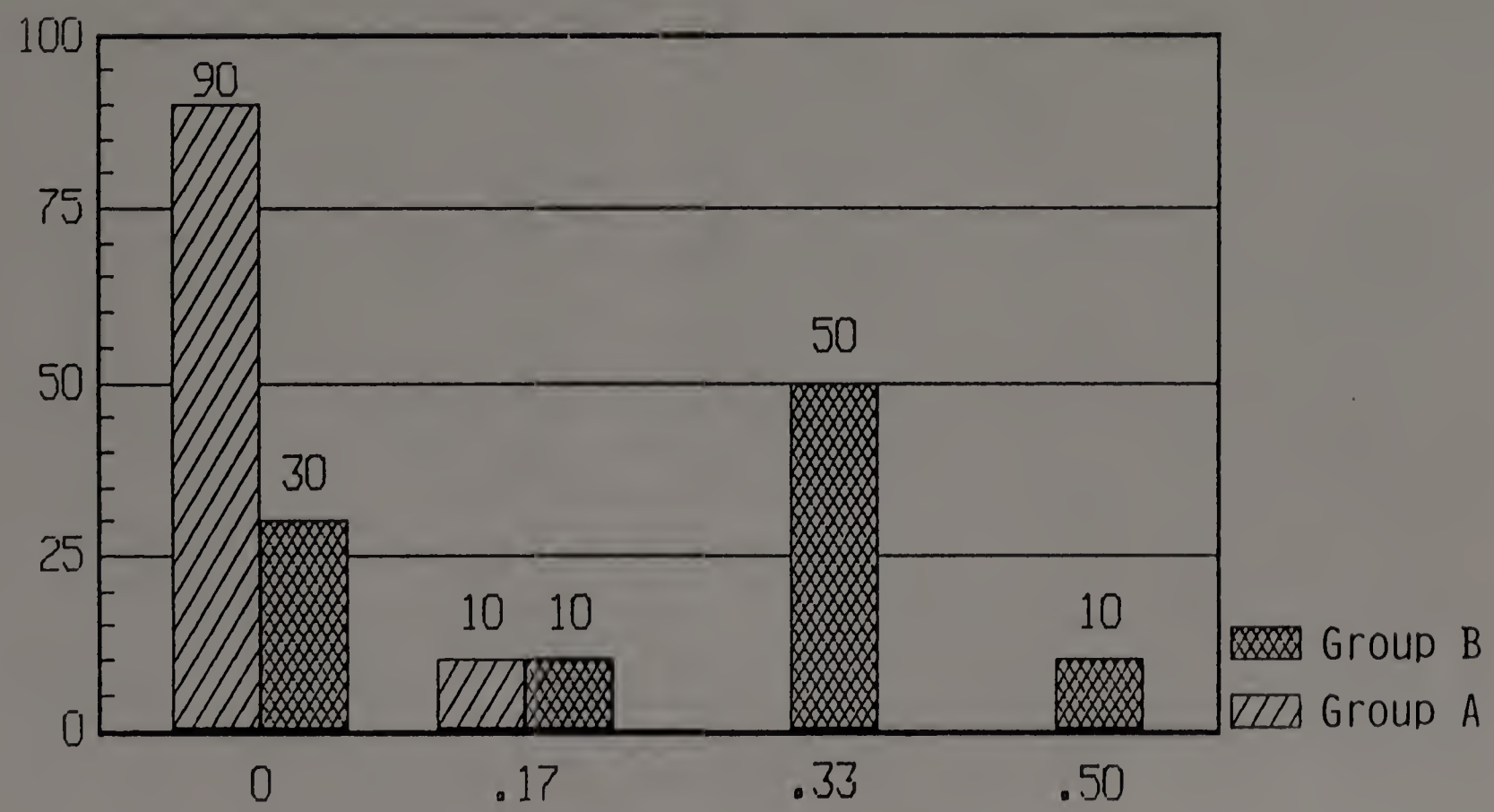


Figure 77. Distribution of the subject based on the pretests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

that Group A (100%) mastered 100% of the "Order of Occurrence" skill. Fifty percent of Group B mastered the skill. Figure 78 shows a comparison of Group A and Group B. Group A received microteaching, while Group B did not. Group A had a higher percentage of mastery of the skill.

Skill to Imply Cause and Effect (Pretest). Based on results in the pretest of the selection "The Wave That Wanted to Travel", Group A (100%) did not master the skill. Group B did not master the skill. Figure 79 shows the results of the subjects' mastery of the skill before using microteaching techniques.

Skill to Imply Cause and Effect (Posttest). The posttest of the selection "The Wave That Wanted to Travel" showed that 90% of Group A obtained 100% mastery of the skill to "Imply Cause and Effect". Eighty percent of Group B did not master the skill. Figure 80 shows a comparison of Group A and Group B. Group A received microteaching, while Group B did not. Group A had a higher percentage of mastery of the skill.

Skill to Imply Ideas (Pretest). The pretest of the selection "The Wave That Wanted to Travel" showed that 80% of Group A had 0% mastery of the skill. Ten percent of the subjects in Group A had 20% mastery of the skill and 10% had 40% mastery. One hundred percent of Group B did not master the skill. Figure 81 shows the results of the

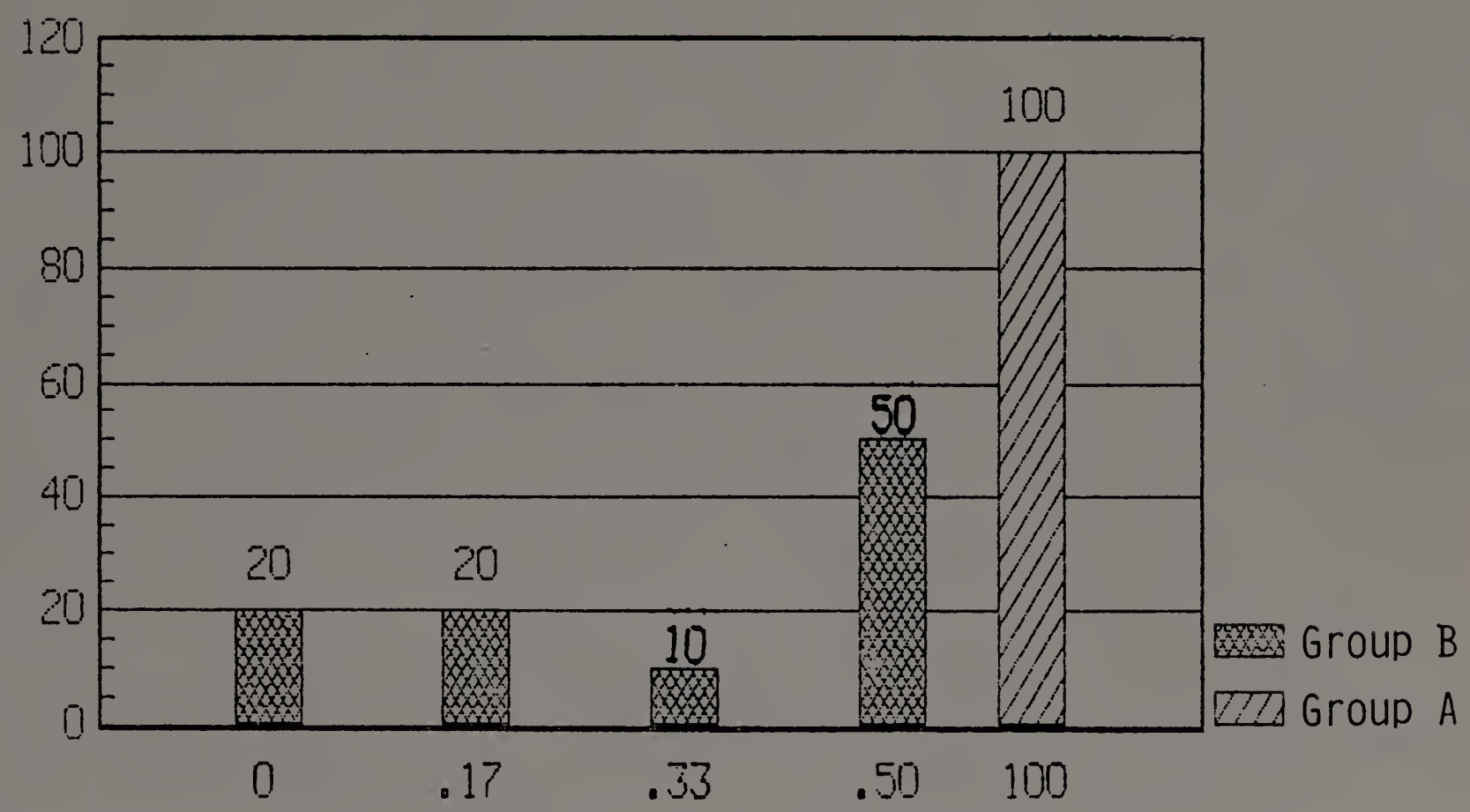


Figure 78. Distribution of the subject based on the posttests of Group A and Group B in the "Order of Occurrence" skills in the short story "The Wave That Wanted to Travel".

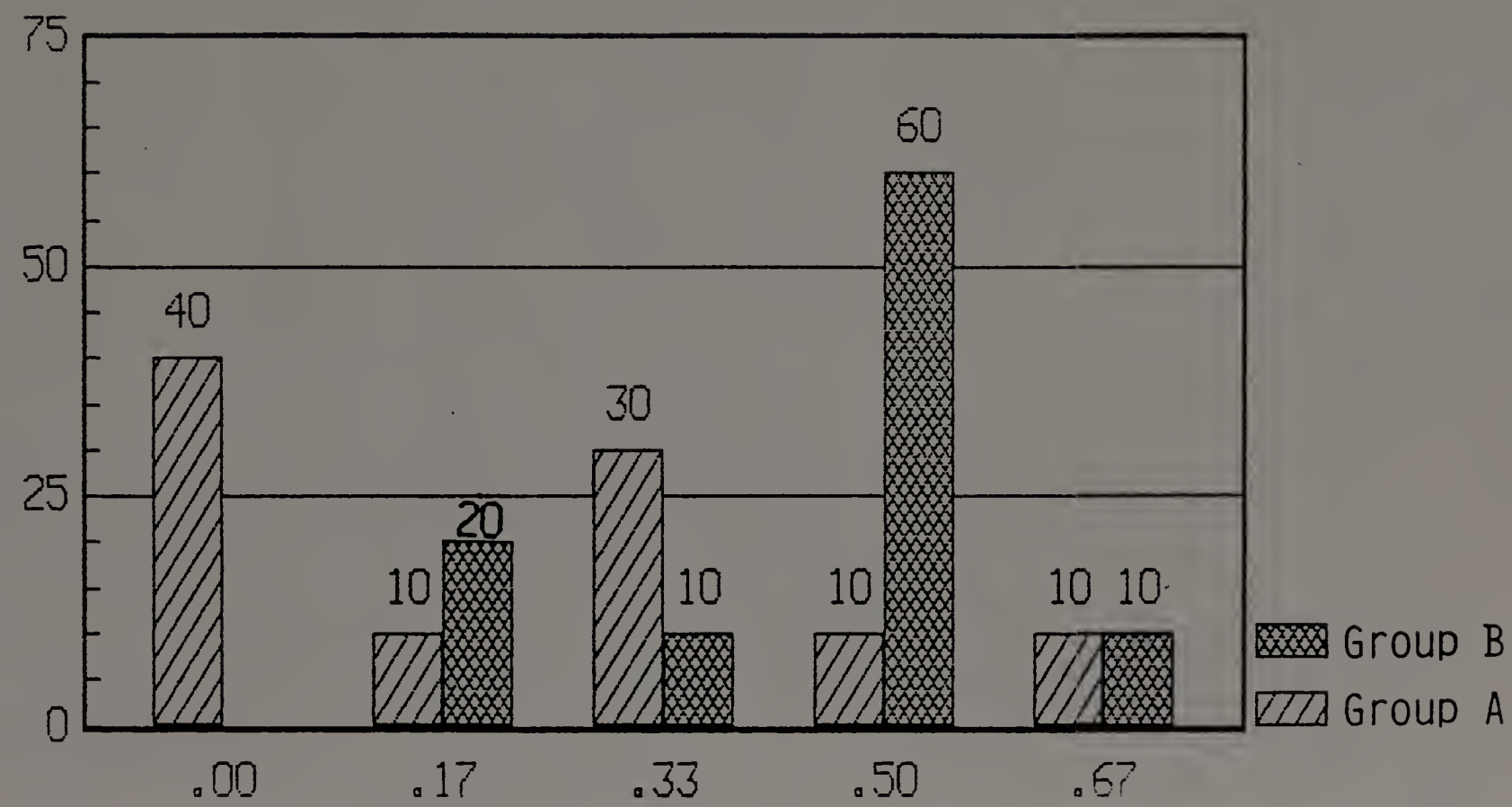


Figure 79. Distribution of the subject based on the pretests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

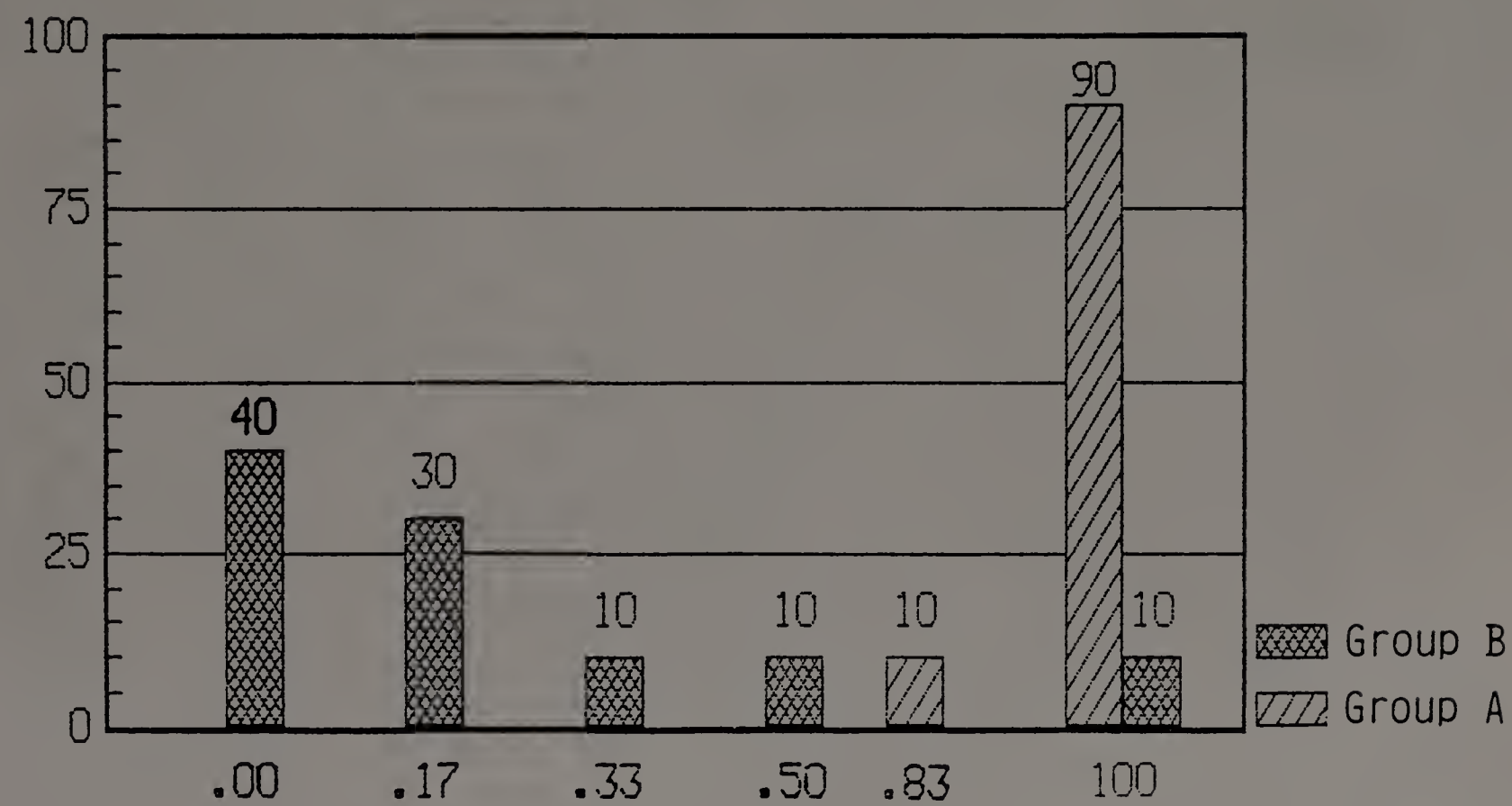


Figure 80. Distribution of the subject based on the posttests of Group A and Group B in the skills to "Imply Cause and Effect" in the short story "The Wave That Wanted to Travel".

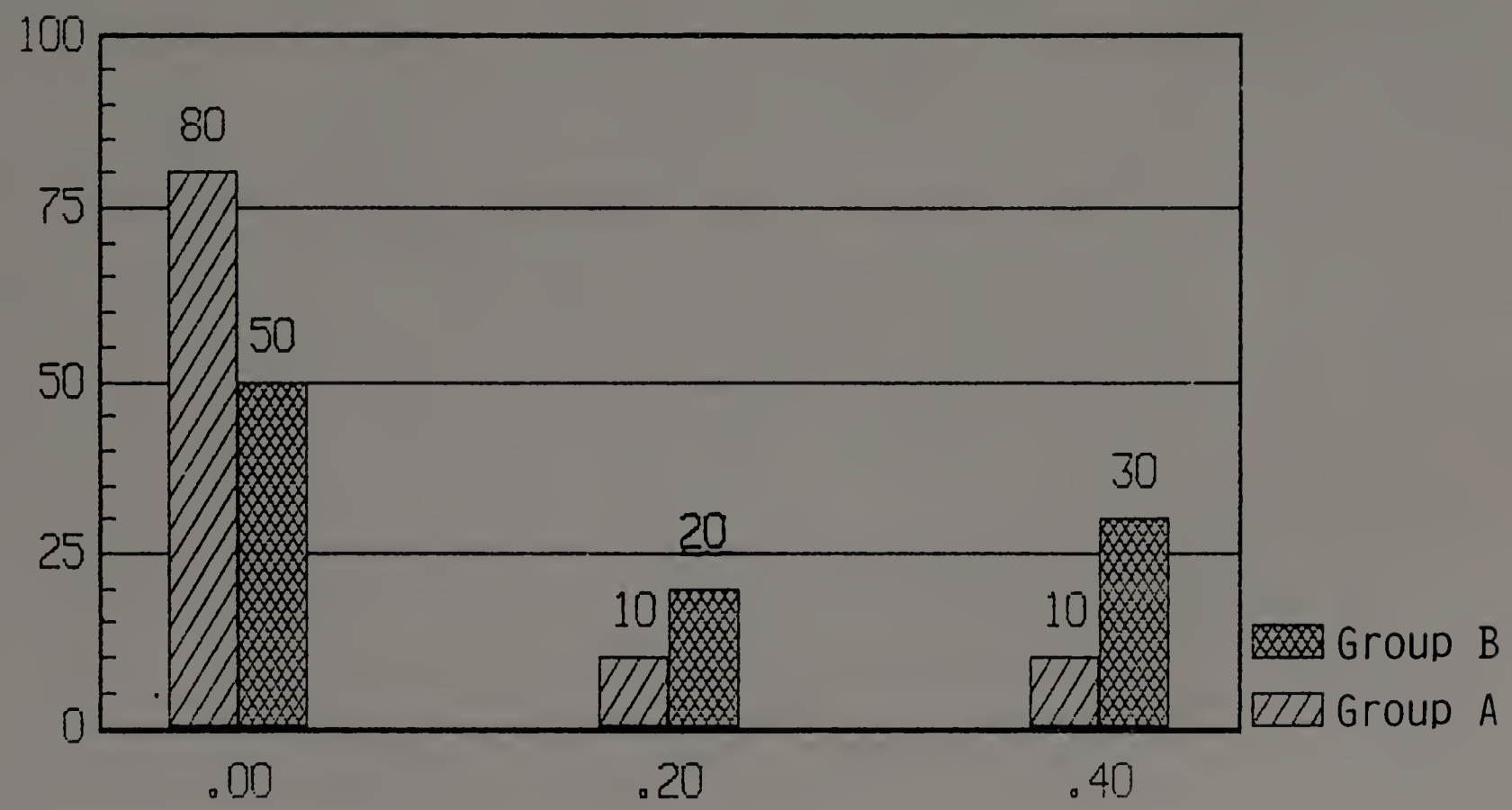


Figure 81. Distribution of the subject based on the pretest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

subjects' mastery of the skill before using microteaching techniques.

Skill to Imply Ideas (Posttest). On the posttest of the selection "The Wave That Wanted to Travel", 80% of Group A obtained 80% mastery of the skill to "Imply Ideas" and 20% obtained 60% mastery. Ten percent of Group B mastered 60% of the skill, and 90% had no mastery of it. Figure 82 shows a comparison of Group A and Group B. Group A received microteaching, while Group B did not. Group A had a higher percentage of mastery of the skill.

Details Skill (Pretest). The pretest of the selection "The Wave That Wanted to Travel" shows that 30% of Group A mastered more than 70% of the "Details" skill. Twenty percent of Group B mastered 75% of the skill, and 80% did not master the skill. Figure 83 shows the results of the subjects' mastery of the skill before using microteaching techniques.

Details Skill (Posttest). On the posttest of the selection "The Wave That Wanted to Travel", 90% of Group A mastered more than 75% of the skill and 10% did not. Ten percent of Group B mastered the "Details" skill and 80% did not master the skill. Figure 84 shows a comparison of Group A and Group B. Group A received microteaching, while Group B did not. Group A had a higher percentage of mastery of the skill.

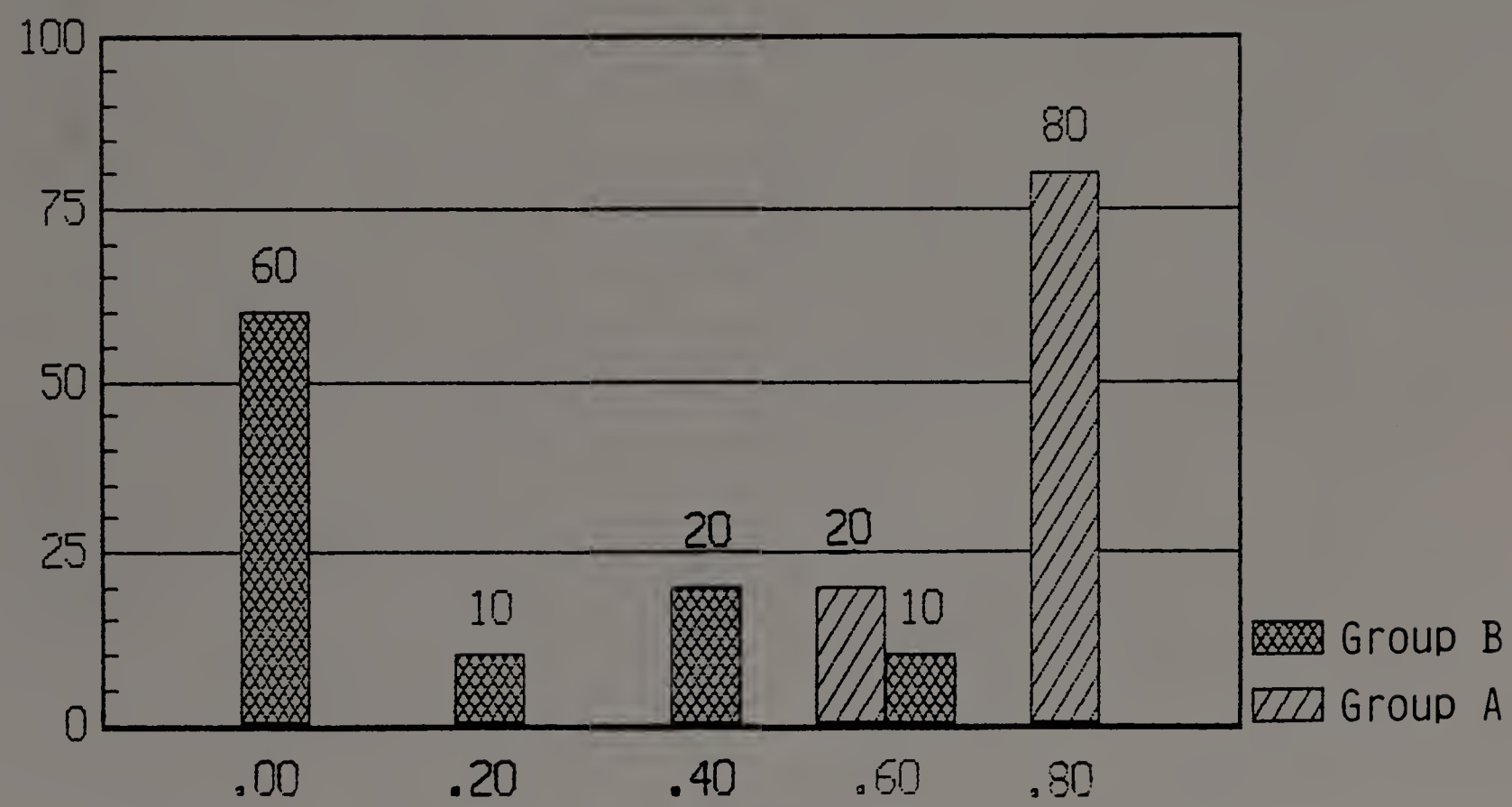


Figure 82. Distribution of the subject based on the posttest of Group A and Group B in the skills to "Imply the Idea" in the short story "The Wave That Wanted to Travel".

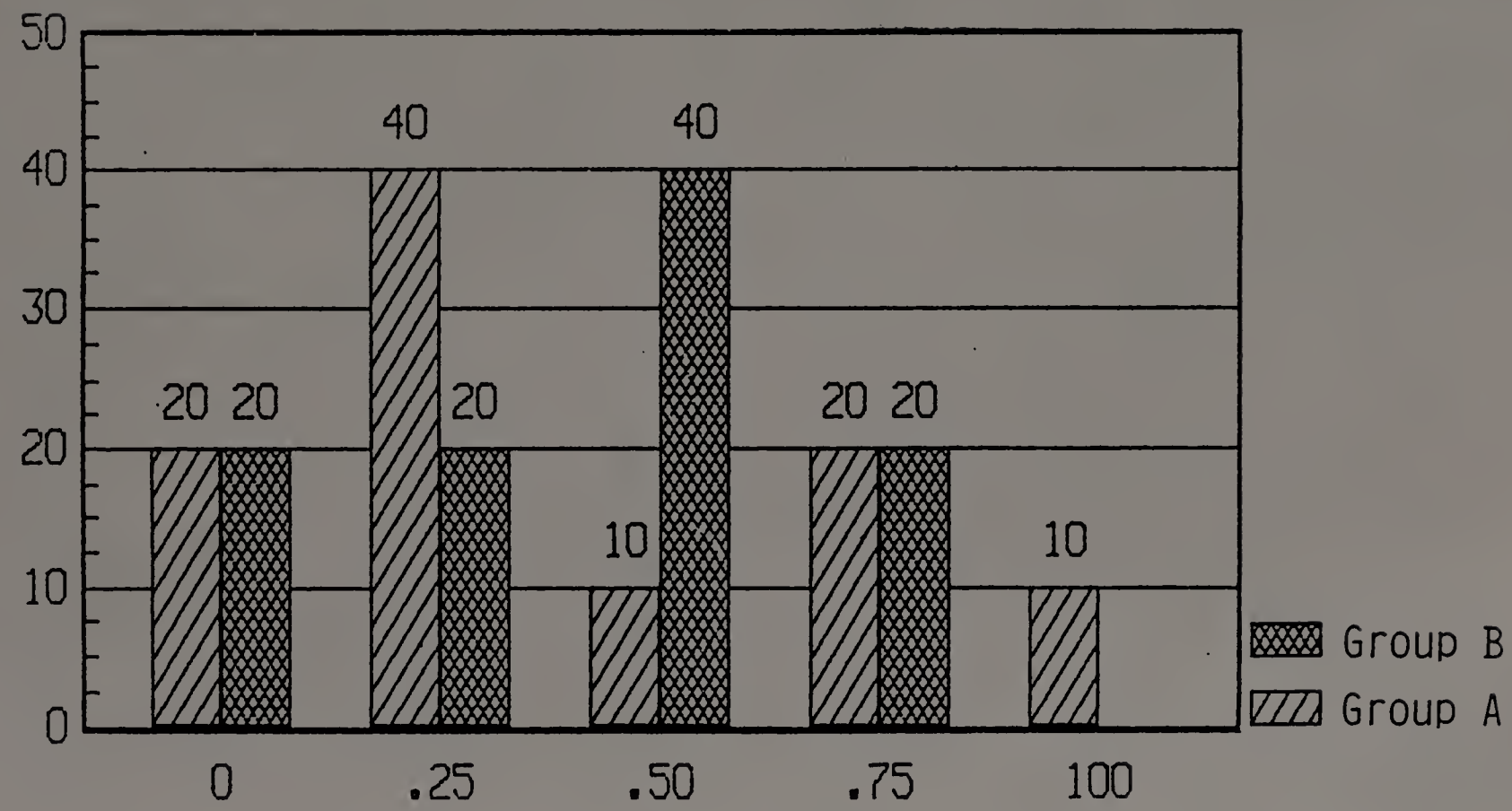


Figure 83. Distribution of the subject based on the pretest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

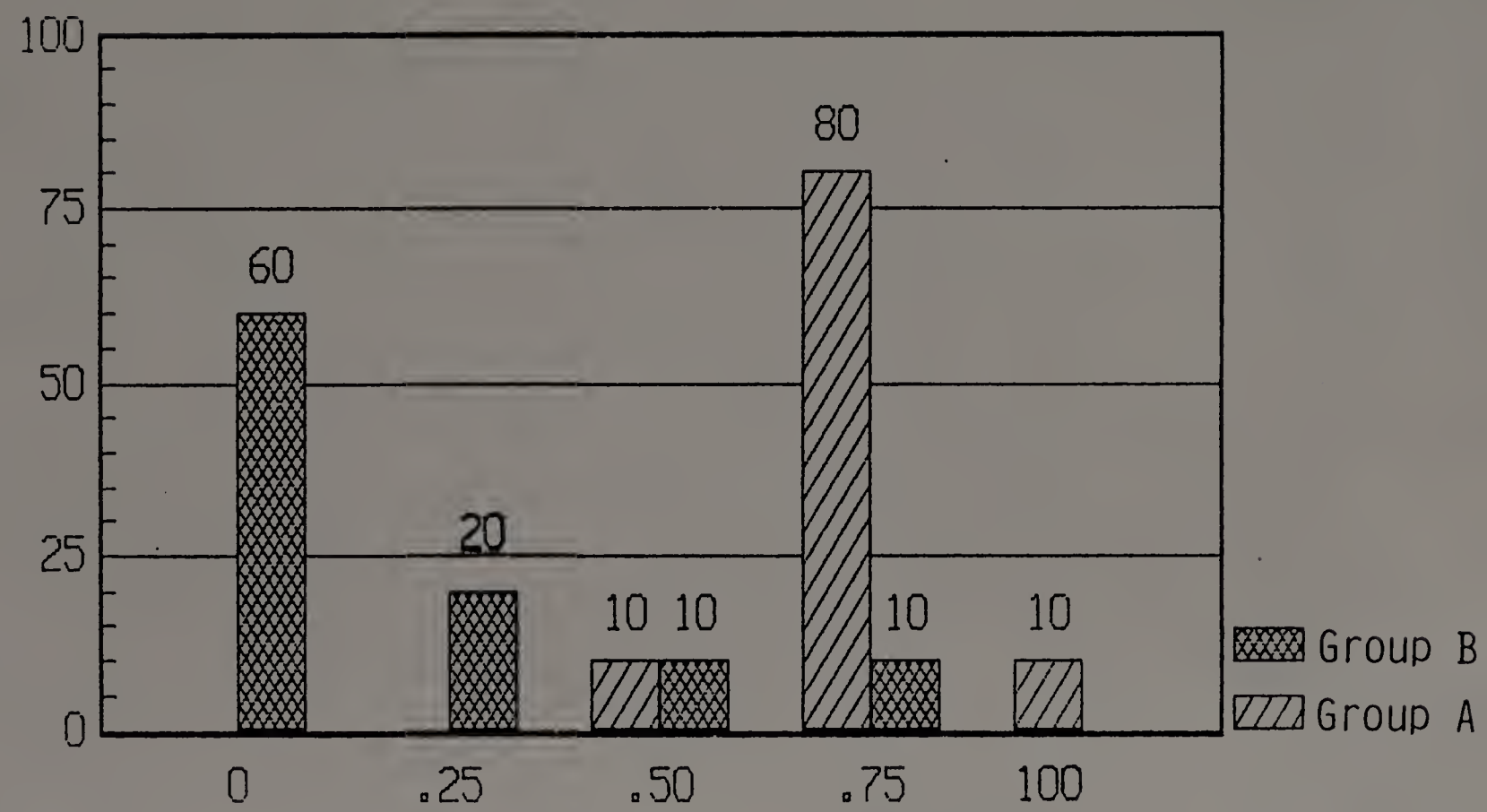


Figure 84. Distribution of the subject based on the posttest of Group A and Group B in the skills to identify "Details" in the short story "The Wave That Wanted to Travel".

Main Idea Skill (Pretest). Results of the pretest of the selection "The Wave That Wanted to Travel" showed that 30% of Group A mastered 75% of the "Main Idea" skill. One hundred percent of Group B did not master the skill. Figure 85 shows the results of the subjects' mastery of the skill before using microteaching techniques.

Main Idea Skill (Posttest). The posttest of the selection "The Wave That Wanted to Travel" showed that 70% of Group A mastered 75% of the "Main Idea" skill. One hundred percent of Group B did not master the "Main Idea" skill. Figure 86 shows a comparison of Group A and Group B. Group A received microteaching, while Group B did not. Group A had a higher percentage of mastery of the skill.

Summary of Findings

This study was designed to find out whether microteaching techniques are effective in developing simple and complex thinking skills in children with specific learning problems. It was addressed by research questions designed specially to guide the study and which were answered in this chapter.

The subjects in the first part of the study were thirteen Spanish-speaking students with specific learning problems (Group A). A pretest based on "The Ant and the

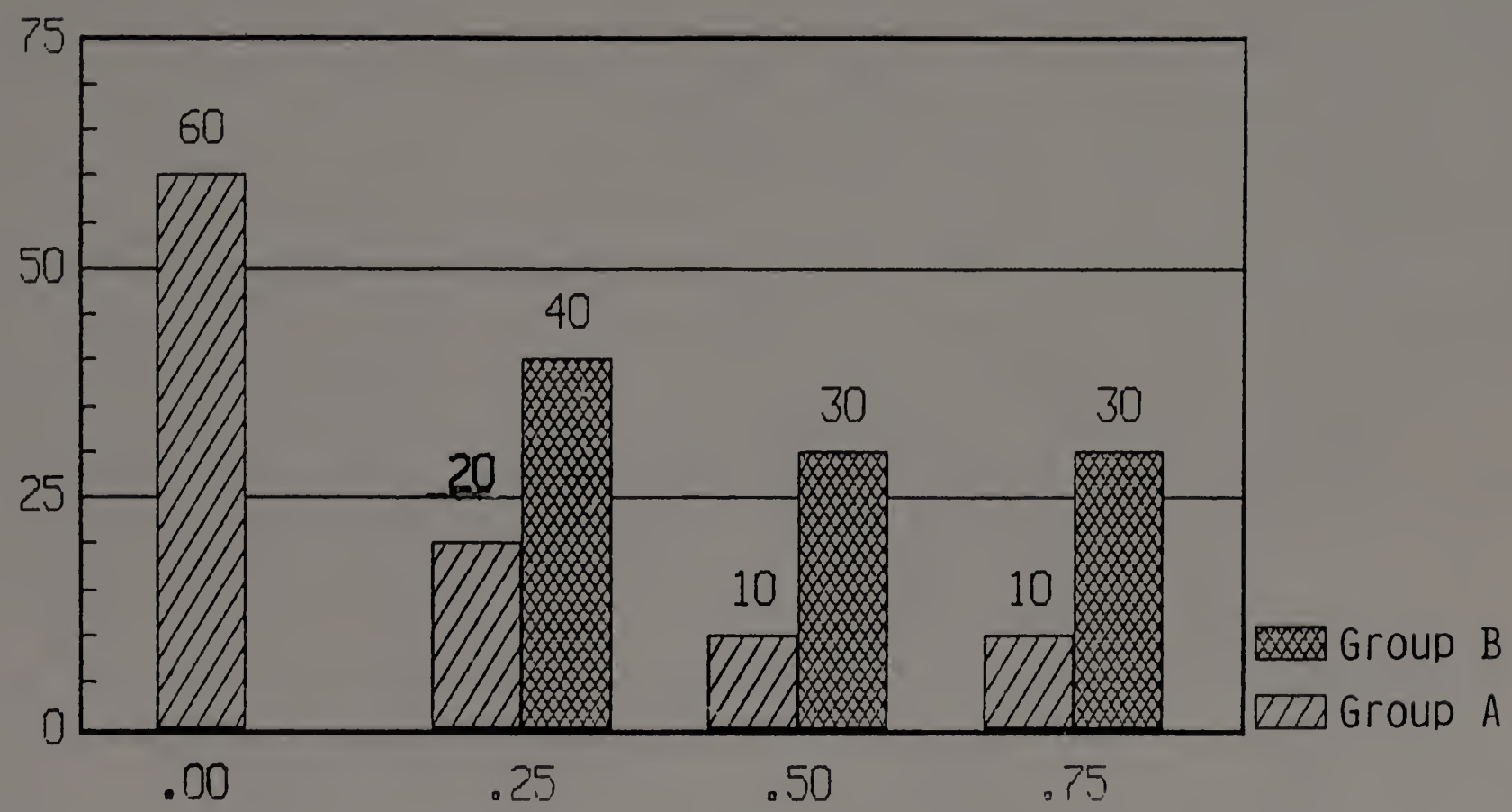


Figure 85. Distribution of the subject based on the pretest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

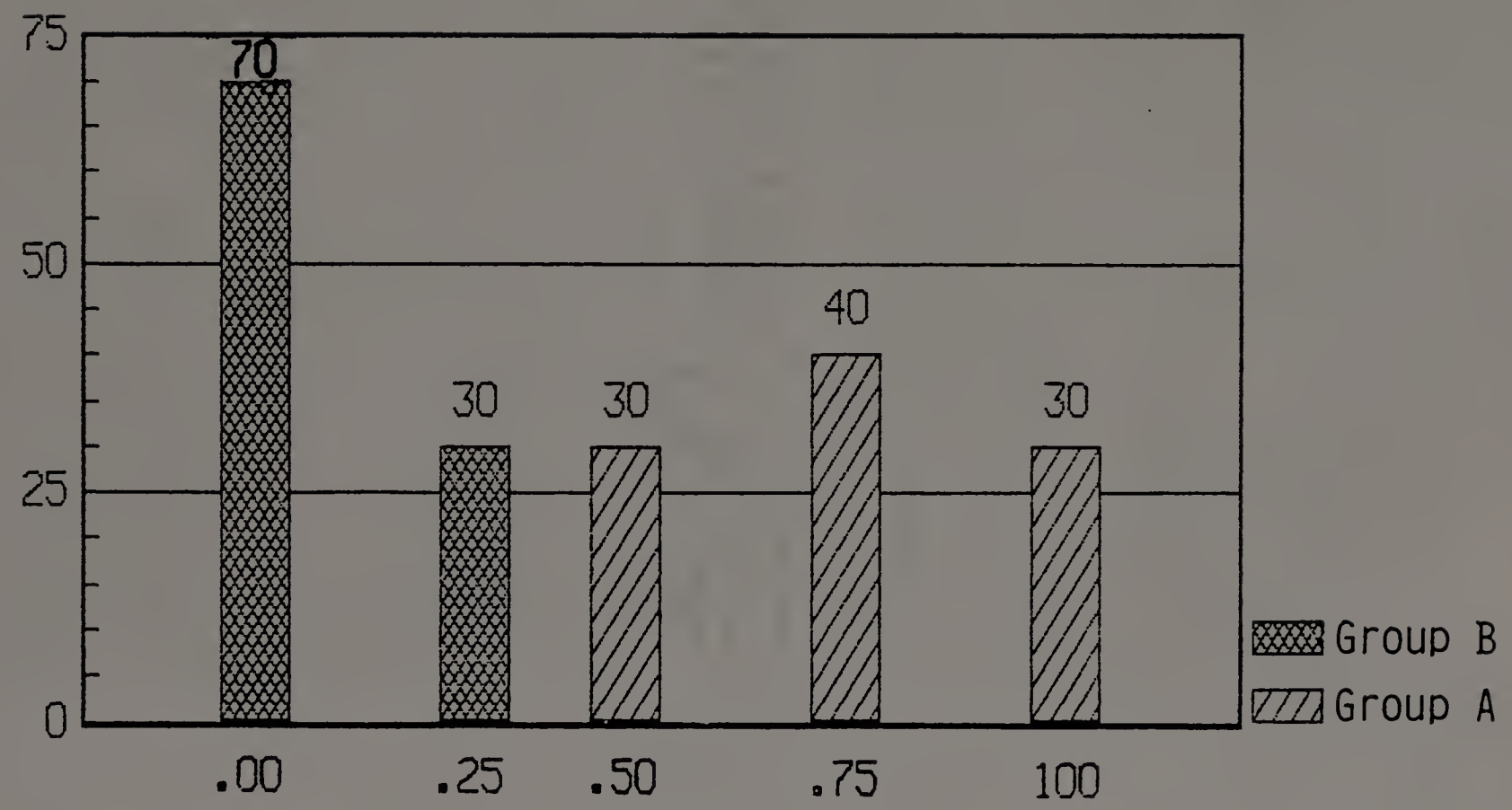


Figure 86. Distribution of the subject based on the posttest of Group A and Group B in the skills to find the "Main Idea" in the short story "The Wave That Wanted to Travel".

Grasshopper" was given to the subjects. After five weeks of regular teaching, a posttest was administered. This part of the study was conducted in order to find out and try to control the variables. No treatment with microteaching techniques was used in this part of the study. After the first part of the study, Group A had a five-week treatment based on the selections "The Greedy Bear" and "The Wave That Wanted to Travel". Both pretests and posttests were given in this opportunity. The findings showed that the mastery level of the skills increased after the students were treated with microteaching techniques.

The same pretests and posttests were given to a different group with specific learning problems (Group B). This group did not receive treatment with microteaching techniques. All procedures, tests, and materials used were in Spanish.

When comparing the results of the pretests and posttests of Group A and Group B, it could be seen that Group A, which was treated with microteaching techniques, got a higher mastery level than Group B. Hence it can be noted that microteaching is effective in the development of simple and complex skills in students with specific learning problems.

As this is an exploratory study, it cannot be said that the findings are statistically significant because

the results could be affected by a lot of variables that could not be controlled (see Tables 4 and 5 for summary comparisons).

Table 4

Distribution of the Subjects in Group A Based on the Percentage of Mastery of Skills ("The Ant and the Grasshopper" and "The Greedy Bear")

Skill	Pretest		Posttest	
	Subjects	Mastery	Subjects	Mastery
"THE ANT AND THE GRASSHOPPER"				
Details:	54%	60%	31%	40%
	8%	40%	8%	60%
	15%	20%	31%	80%
	23%	0%	22%	100%
			8%	0%
Imply Ideas:	69%	0%		
	15%	25%	84%	0%
	8%	75%	8%	50%
	8%	100%	8%	75%
Order of Occurrence:	62%	0%	62%	0%
	31%	17%	38%	67%
	7%	0%		

Continued, next page

Table 4--Continued

Skill	Pretest Subjects	Pretest Mastery	Posttest Subjects	Posttest Mastery
"THE GREEDY BEAR"				
Imply Cause and Effect:	39%	0%	8%	67%
	39%	33%	92%	100%
	22%	67%		
Details:	84%	0%	23%	50%
	8%	50%	77%	100%
	8%	100%		
Main Idea:	76%	0%	8%	33%
	8%	33%	92%	100%
	8%	67%		
	8%	100%		
Characteristics of Characters:	92%	0%	15%	0%
	8%	20%	8%	40%
			8%	60%
			23%	80%
			46%	100%

Table 5

Distribution of the Subjects in Group A and Group B
Based on the Percentage of Mastery of Skills
("The Wave That Wanted to Travel")

	Group A				Group B			
	Pretest		Posttest		Pretest		Posttest	
Skill	Subjects	Mastery	Subjects	Mastery	Subjects	Mastery	Subjects	Mastery
Order of Occurrence:	90%	0%	100%	100%	10%	50%	50%	50%
	10%	17%			50%	33%	10%	33%
					10%	17%	20%	17%
					30%	0%	20%	0%
Imply Cause and Effect:	10%	67%	90%	100%	10%	67%	10%	100%
	10%	50%					10%	50%
	30%	33%	10%	83%	60%	50%	10%	33%
	10%	17%			10%	33%	30%	17%
	40%	0%			20%	17%	40%	0%
Imply Ideas Inference:	10%	40%	80%	80%	30%	40%	10%	60%
	10%	20%	20%	60%	20%	20%	20%	40%
	80%	0%			50%	0%	10%	20%
							60%	0%
Details:	10%	100%	10%	100%	20%	75%	10%	75%
	20%	75%	80%	75%	40%	50%	10%	50%
	10%	50%	10%	50%	20%	25%	20%	25%
	40%	25%						
	20%	0%			20%	0%	60%	0%
Main Idea:	10%	75%	30%	100%	30%	75%	30%	25%
	10%	50%	40%	75%	30%	50%	70%	0%
	20%	25%	30%	50%	40%	25%		
	60%	0%						

C H A P T E R V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This chapter discusses some conclusions derived from the research and the study presented in the previous chapters. It also includes some recommendations for administrators of Special Education as well as for teachers of students with learning disabilities.

Throughout this study, the microteaching technique is identified as an effective tool toward the development of simple and complex thinking skills. The study has proven that this technique is very helpful with Spanish-speaking students.

Giving some reward to students when they answer questions correctly produces important, positive results and provides some motivation for them to continue their work successfully.

The use of the microteaching technique proved to be a help for the teacher in establishing a better teacher-student relationship and in less time than ordinarily required.

Teaching-learning activities should be focused on the cultural experiences of the students. These activities will bolster the students' self-confidence. The students

were found to be weak in the skills of locating the central idea and pinpointing details of a passage.

The use of diverse, concrete activities along with audiovisual materials, such as pictures and films, are very effective tools when trying to emphasize and develop simple and complex thinking skills in Spanish-speaking students with learning disabilities. The pedagogical use of closure is an excellent measure of success for evaluating the microteaching technique. Closure reveals whether the students understand the material presented. It also reveals their ability to communicate that knowledge in appropriate language.

Summary

The success of Spanish-speaking students with specific learning difficulties in the development of simple and complex thinking skills depends on the teacher's mastery of the varied elements of the microteaching technique.

Through the process of development and refinement of these skills, Spanish-speaking students will be able to have better success in a democratic society. They will acquire the ability to think more logically, communicate clearly, and interact socially in a creative and acceptable manner. They will be better able to assume responsibility in the family; to make decisions based on facts and

information gathered; to understand, appreciate, and protect nature and the environment; and finally to appreciate the different manifestations of human creativity, achieving a higher level of self-fulfillment. According to Glaser (1941), being a good citizen in a representative democracy is not just a matter of keeping within the law and being a good and kind neighbor. Good citizenship calls for the attainment of a working understanding of our social, political, and economic arrangements and for the ability to think critically about issues concerning where there may be an honest difference of opinion.

Effective thinking is particularly important for contemporary democracy as local, national, and international issues become increasingly complex. Additional sources attesting to this need and making recommendations could be cited; however, the message is clear that educators need to take renewed action to bring about qualitative improvements in student thinking.

Upon analysis of the findings and conclusions of the studies cited, the following recommendations are given for administrators and teachers of students requiring special adaptations in their instruction in thinking skills.

Recommendations

Recommendations for Further Research

The following recommendations are made for further research:

1. Studies should be conducted following an experimental design and adhering to standards for field procedures and data analysis. The ideal setting would be Puerto Rico.
2. Instruments used should be calibrated for validity and reliability purposes.
3. These studies should be longitudinal, at least for a period of one year for the treatment part.
4. The analysis of the data obtained could be used to open new investigations in the field of Special Education.

Recommendations for Administrators of Special Education

The following recommendations are presented for administrators of Special Education:

1. Additional studies and research should be conducted in order to further develop improved thinking skills in Spanish-speaking students with disabilities. As a

result, goals and objectives can be established. Programs, then, can be initiated and implemented that will meet the needs of the students.

2. A microteaching laboratory must be designed as a part of the teacher training curriculum at the college and university level. The teacher of Spanish-speaking students receiving services in Special Education will acquire the necessary knowledge of diverse strategies developed for the teaching of thinking skills.

3. The Education Department at colleges and universities should develop and require the aforementioned training in Special Education. This will insure that these teachers acquire the necessary knowledge to develop critical thinking skills. Success in this area would enable students to finish high school and become a contributing part of society. Also, this training would improve the teachers' own skills in dealing with students with specific learning disabilities.

Recommendations for Teachers of Spanish-Speaking Students with Specific Learning Disabilities

The following recommendations are presented for teachers of Spanish-speaking students with specific learning disabilities:

1. The development of thinking skills should begin in grades K-3; and throughout the remaining grades, they should continue to be refined.
2. Training in observation and memory-retention should begin to be developed immediately after the student begins kindergarten.
3. The process of developing critical thinking skills should begin with the most simple and proceed to the most complex.
4. Before beginning to develop the higher-level thinking skills in the student, the teacher should train students in the preliminary skills of observing, remembering, comparing, ordering, grouping, and classifying. These skills are a prerequisite for the mastery of other, more complex skills of thinking.
5. The teacher of students with special needs should conduct various activities

that foster the development of the students the skills of observation, memory, retention, comparison, placing in order or in groups, and classification. All of these can be stimulated and activated by using the five senses. These skills can be developed within a wide variety of disciplines: Mathematics, Science, Spanish, Social Studies, English, and Physical Education. The microteaching technique allows the teacher to integrate into each unit of class each of the above-mentioned skills.

6. In the process of developing critical thinking, the teacher should make the students aware of the components of each skill (that is, divide the skill into small parts, analyze the skill itself). Thus, the student will have a clearer vision and a better understanding of the skill.
7. Throughout the development of skills, one must consider the students' limitations but should also contribute toward each student regardless of his or her limitations.
8. For the effective development of thinking skills, the procedure should first be to direct the student's attention toward

concrete objects, then toward semi-concrete objects. After teaching these skills, one can move on to the abstract. This process is important for the success of higher-level thinking skills.

9. The questions that are used during the development of these thinking skills must be put in clear and simple form. They should be specific and should be adaptable to the students' ability level in order to give them time to think and answer.

10. The questions should not limit the student; instead, they should provide him or her the opportunity to express himself or herself freely without fear.

11. It is essential that the teacher implement the skills that provide immediate understanding to the student. In this way, the teacher will stimulate the student and give him or her the important opportunity to be successful in the learning situation. The student with specific learning disabilities becomes easily frustrated and is very sensitive to the teacher whom he or she views as a judge who will evaluate him or her. The student will be prepared to

join the group when he or she feels that he or she is no longer afraid to make a mistake.

12. The teacher of special needs students should keep up-to-date with the latest innovations and research in education.

APPENDICES

APPENDIX A

LETTERS:

REQUEST TO SUPERINTENDENT TO CONDUCT STUDY
IN SPRINGFIELD PUBLIC SCHOOLS;

REQUEST TO MIDDLE SCHOOL PRINCIPALS
TO CONDUCT STUDY IN THEIR SCHOOLS;

PARENT/GUARDIAN CONSENT FORM FOR CHILD
TO PARTICIPATE IN STUDY;

REQUEST TO DIRECTOR OF ANTONIO S. PEDREIRA SCHOOL
(PUERTO RICO) TO REVIEW PROPOSED TESTS;

RESPONSE FROM DIRECTOR OF ANTONIO S. PEDREIRA SCHOOL
(PUERTO RICO) TO REVIEW PROPOSED TESTS

MARGARITA GONZALEZ
122 CHESTNUT STREET, #501
SPRINGFIELD, MASSACHUSETTS 01103

Dr. Peter Negroni
Superintendent of Schools
Springfield Public Schools
195 State Street
Springfield, Massachusetts 01103

Dear Superintendent Negroni:

As part of the requirements to fulfill a Doctor of Education degree at the University of Massachusetts at Amherst, I am conducting a dissertation research study on how children with special needs can develop the thinking skills in the learning process. I am respectfully requesting your permission to conduct this investigation in the Springfield Public School System. I am presently working at Van Sickle Middle School as a BTM teacher.

The study will be conducted without any expense to the Springfield Public School System. The information obtained in this investigation will be strictly confidential, and recommendations will be made in general without identifying the participants involved.

The purpose of the study is to make recommendations to teachers of Special Education on how to develop skills to help children with learning limitations.

Thank you for your consideration.

Sincerely,

Margarita Gonzalez

MARGARITA GONZALEZ
122 CHESTNUT STREET, #501
SPRINGFIELD, MASSACHUSETTS 01103

Mr. John Coleman
Principal, Van Sickle Middle School
1170 Carew Street
Springfield, Massachusetts 01104

Dear Mr. Coleman:

As part of the requirements to fulfill a Doctor of Education degree at the University of Massachusetts at Amherst, I am conducting a dissertation research study on how children with special needs can develop thinking skills in the learning process.

Your approval is respectfully requested and required in order for me to conduct the study of TBM students and their respective teachers in your school. Information obtained in this study will be strictly confidential. Recommendations will be made in general terms and the identity of participants will not be revealed.

The purpose of the study is to make recommendations to teachers of Special Education on how to develop skills to help children with learning limitations.

Thank you for your consideration.

Sincerely,

Margarita Gonzalez

MARGARITA GONZALEZ
122 CHESTNUT STREET, #501
SPRINGFIELD, MASSACHUSETTS 01103

Ms. Virginia Anderson
Principal, Chestnut Middle School
495 Chestnut Street
Springfield, Massachusetts 01107

Dear Ms. Anderson:

As part of the requirements to fulfill a Doctor of Education degree at the University of Massachusetts at Amherst, I am conducting a dissertation research study on how children with special needs can develop thinking skills in the learning process.

Your approval is respectfully requested and required in order for me to conduct the study of TBM students and their respective teachers in your school. Information obtained in this study will be strictly confidential. Recommendations will be made in general terms and the identity of participants will not be revealed.

The purpose of the study is to make recommendations to teachers of Special Education on how to develop skills to help children with learning limitations.

Thank you for your consideration.

Sincerely,

Margarita Gonzalez

April 1, 1992

Dear Parent/Guardian:

I am a doctoral student in the School of Education at the University of Massachusetts at Amherst. I have been a teacher of Special Education since 1985. At this time, I am in the process of completing the requirements for the Doctor of Education degree. My dissertation consists of a study regarding the effects of the techniques of micro-teaching in the development of simple and complex thinking skills of Spanish-speaking children with specific learning problems.

If you think your child needs to be placed in a program for Special Education, I invite you to voluntarily allow your child to participate in this study. This study will begin during the first week of May and is expected to be completed in June (no later than the end of the school year).

During the first week, all of the children will be exposed to the traditional teaching techniques. After two weeks, Group B will continue with the traditional method of teaching and Group A will begin to take lessons with the modern techniques that involve computers; activities in the classroom, such as drama, working in groups, oral readings, use of pictures, movies; and analysis of situations regarding the stories read in order to measure the children's reading comprehension and the way they develop their thinking.

The tests were validated by Ms. Milagros Hernandez, Director of the Antonio S. Pedreira School in Trujillo Alto, Puerto Rico. Along with the letter, there will be a copy of three tests that will be given to the children. The study will require a commitment of eight weeks. There will be a daily session of thirty minutes. It will be held after school. The site of the classes will be announced. All the children that participate in Group B will be given a pretest and a posttest; and those in Group A will be given three pretests and three posttests.

The test consists of the following: Park I, "Order of Occurrence," which will require the placement of happenings according to the order in which they occurred in the reading; Part II, "Imply Cause and Effect," by

drawing; Part III, "Imply Ideas," by answering five questions; Part IV, "Details," by answering four questions; and Part V, "Main Idea," by answering four questions about the main idea of the story. These tests were mentioned earlier.

The purpose of my conducting this study is to analyze the findings and then present them in my doctoral dissertation.

Remember, your child's participation in this study is voluntary. Upon signing the form, you are consenting that your child can participate in this study according to the stipulations mentioned earlier in this letter. You are also assuring me that you will make no financial claim now or in the future because of your child's participation in the study.

Thank you for your interest in this study. I look forward to your response.

Respectfully yours,

Margarita Gonzalez
Doctoral Student
School of Education
University of Massachusetts

- -

(Do not cut here. Return the completed form and keep a copy for your files.)

I, _____, have read this letter and permit my child, _____, to participate in the study previously mentioned under the established conditions.

_____
Date

Abril 1, 1992

Estimados Padres:

Yo soy una estudiante doctoral de la Escuela de Educacion de la Universidad de Massachusetts en Amherst. He ejercido la profesion de maestra de educacion especial desde 1985. En estos momentos estoy en el proceso de completar mis requisitos para el grado de Doctora en Educacion. Mi disertacion consiste de un estudio sobre los efectos de la tecnica de microensenanza en el desarrollo de las destrezas de pensamientos simples y complejos en los ninos con problemas especificos de aprendizaje de habla espanola.

Siendo su hijo identificado como uno de los estudiantes del Programa de Educacion Especial, estoy invitandole a que si le gustaria que su nino o nina participe voluntariamente en este estudio. Este estudio comenzara a principios de mayo y finalizara a mediados de junio pero no mas tarde del fin de ano escolar.

Durante las primeras semanas todos los ninos seran expuestos a tecnicas tradicionales de ensenanza. Despues de dos semanas el Grupo B continuara con las tecnicas tradicionales. El Grupo A continuara con tomar lecciones de lectura con el uso de modernas computadoras, actividades llevadas a cabo en el salon de clase, tales como drama, trabajos en grupos, lecturas orales, uso de laminas, peliculas y analisis de situaciones de acuerdo a la limitaciones de estos y unas pruebas que midan su comprension de lectura y desarrollo del pensamiento, hechas por la investigadora.

Estas fueron validadas en Puerto Rico por la Sra. Milagros Hernandez directora de la escuela Antonio S. Pedreira en Trujillo Alto, Puerto rico. Adjuncto a esta carta se envia una copia de las tres pruebas que seran administradas a los ninos o ninas. El estudio requiere un compromiso de ocho semanas a razon de una sesion diaria de treinta minutos despues que los ninos salgan de la escuela. El lugar de las clases se anunciara pronto. Todo nino o nina que participe en el Grupo B sera sometido a una preprueba y una postprueba y los del Grupo A seran sometidos a tres prepruebas y tres postpruebas.

Las mismas consisten en la parte I Orden de sucesion, ordenar los sucesos de una lectura en el orden en que estas ocurren, II Inferir causa y efecto por medio de unos dibujos, III Inferir Ideas por medio de cinco preguntas, IV Detalle cuatro preguntas de detalles y, V Idea central. Cuatro preguntas de idea central. Estas pruebas fueron mencionadas anteriormente.

Mi proposito es analizar los hallazgos de este estudio para presentarlos en mi disertacion doctoral.

Recuerde que la participacion del nino o nina en el estudio es voluntariamente. Al firmar este formulario usted consiente que su nino o nina participe del estudio de acuerto a las estipulaciones anteriormente mencionadas. Usted esta ademas asegurandome, que no me hara ninguna reclamacion financiera, mi ahora ni en el futuro por la participacion de su nino o nina en este estudio.

Gracias por su interes en este estudio, espero su respuesta.

Respetuosamente,

Margarita Gonzalez
Estudiante Doctoral
Escuela de Educacion
Universidad de Massachusetts

- -

(No desprenda esta parte, devuelva el formulario completo y quedese con una copia para su archivo.)

Yo, _____, he leido lo anterior y consiento que mi nino o nina, _____, participe en el estudio antes descrito, bajo las condiciones ya establecidas.

_____
Date

MARGARITA GONZALEZ
122 CHESTNUT STREET, #501
SPRINGFIELD, MASSACHUSETTS 01103

February 25, 1992

Mrs. Milagros Hernandez
Director, Antonio S. Pedreira School
Trujillo, Puerto Rico

Dear Mrs. Milagros Hernandez:

I am a doctoral student at the University of Massachusetts at Amherst, and am conducting a study which contains the administration of tests related to the skills in simple and complex thinking.

As a very qualified person in this area, I am requesting your help and cooperation. Enclosed please find tests to be administered related to the skills in simple and complex thinking. Any corrections or recommendations you may have relative to these tests will be greatly appreciated.

Thank you in advance for your assistance and cooperation.

Cordially,

Margarita Gonzalez

MARGARITA GONZÁLEZ
122 CHESTNUT STREET, #501
SPRINGFIELD, MASSACHUSETTS 01103

25 de febrero de 1992

Estimada Sra. Milagros Hernández
Directora Escuela Antonio S. Pedreira
Trujillo Alto, Puerto Rico

Estimada Sra. Milagros Hernández:

Soy estudiante doctoral de la Universidad de Massachusetts en Amherst, estoy realizando un estudio el cual contiene la administración de unas pruebas de destrezas de pensamiento simples y complejas.

Siendo usted una persona muy capacitada en este particular solicito por este medio su acostumbrada cooperación en la correción de la misma.

Cualquier correción y recomendación suy será muy apreciada. Gracias anticipadas.

Cordialmente,

Margarita González

Road 181 Quebrada Negrito
Trujillo Alto, PR 00977

April 1, 1992

Mrs. Margarita Gonzalez
122 Chestnut, Apt. 501
Springfield, Massachusetts

Dear Mrs. Gonzalez:

I received your tests on the development of thinking skills. After analyzing them, I can say that they are very appropriate. Each part is clear and specific.

I administered such tests to my students and they could answer them with a minimum of difficulty.

I hope they can help you in the development of the work you are doing.

Hope to see you soon.

Sincerely,

Milagros Hernandez
Director
Juan J. Osuna School

Carr. 181 Bo. Quebrada Negrito
Trujillo Alto, PR 00977
1 de abril de 1992

Sra. Margarita González
122 Chestnut Apt. 501
Springfield, Massachusetts

Estimada señora González:

Recibí las pruebas de destrezas de pensamiento preparadas por usted. Las he revisado y le puedo indicar que a base de los conocimientos adquiridos las encontré muy apropiadas. Las instrucciones para cada parte están claras y precisas.

He administrado estas pruebas a mis estudiantes y ellos han podido contestarlas con un mínimo de dificultad.

Espero que estas observaciones puedan serle de ayuda en relación al trabajo que está realizando.

Esperando verla pronto, quedo

Atentamente,

Milagros Hernández
Directora
Escuela Juan J. Osuna

APPENDIX B

TESTS (ENGLISH AND SPANISH VERSIONS):

THE WAVE THAT WANTED TO TRAVEL;
THE GREEDY BEAR;
THE ANT AND THE GRASSHOPPER

THE WAVE THAT WANTED TO TRAVEL

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

Hi Friend:

We present to you a very interesting story, entitled The Wave That Wanted to Travel. We are sure that you will enjoy this story. Once you are finished reading, I would like you to answer a few questions on thinking skills which appear at the end of the selection.

THE WAVE THAT WANTED TO TRAVEL

The sea was very blue that day. The clouds decided to wash their white and grey skirts in it.

While the waves swayed back and forth, the blue water rose and a small white wave appeared. It had just been separated from a bigger wave.

-- "What is land like? Every day I am rocked by the big waves. They kiss my feet, but I want to know about the red flowers. I want to climb the tall palm tree and see what it feels like to be so high. I want to rub against the green leaves on the surface."

That is what the little wave was thinking.

The wave looked towards land in hopes that her desires would someday become real. And suddenly . . . zap! A strong push lifted her onto a rock. Her white dress blew in the wind. She wanted to go back into the sea, but one thought made her change her mind.

-- "I will stay right here on this little green rock."

And while leaning on her white elbows, she took a long look at the big palm tree. Then she saw the children from the land. They are blonde, dark skinned, tall and short ones.

The wave felt very happy.

If she could only play with them!

Suddenly, a boy, as blonde as the sun, saw her on the rock.

-- "Come, come," he yelled to the others. "I have discovered a little white wave!"

The wave looked at herself in the eyes of the boy. The boy looked into the mirror of the wave.

-- "Hi!" said the wave.

-- "Do you want to play with me?" asked the children.

-- "Yes, yes!"

-- "Let's see now boys. Let us carry the wave. We shall take it home."

And the wave traveled, first in the soft hands of the blonde boy. Later, she traveled in the soft hands of the dark-skinned boy.

-- "You hold her, Alfredo. It is like snow and cool, blue and white."

When they arrived, they placed the wave in the fountain in the yard. The fountain said:

-- "What are you doing so far from home?"

-- "The children brought me here from the sea."

-- "Daughter of the sea! Why did you come here where this poor fountain stands?"

-- "I wanted to walk . . . see land."

-- "Oh, what I wouldn't give to see the sea! I do not understand why you prefer this humble yard."

-- "You have chosen this poor fountain. You have left the great big sea, full of ships and fishes, seaweed and coral."

-- "I want to see new things. I want to go far, far, far."

-- "Tell me, wave, about the saline winds, the giant waves, the coral rocks."

Little White Wave told the fountain all about those things. The fountain sighed. Everyday the wave saw the sun come out between the trees. She saw the birds flying,

and, best of all, she made friends with a group of frogs that taught her how to sing.

But one day, Little White Wave began to miss her parents, Big Sea and White Wave. She awoke and was very sad. The fountain whispered nice things and the frogs did pirouettes to try to cheer her up.

The birds wanted to play with her; they touched her with their beaks. Her foam was getting smaller and the fountain said to her:

-- "It makes me sad to see you like this, but maybe the sun can help."

-- "The sun? How?"

-- "Yes, the sun. You traveled to land in the hands of the children. Now you shall travel in the air."

And so it was. Later, when the sun saw how sad the wave was, it began to warm her up. The wave felt a new emotion. She was rising, rising.

-- "Bye, dear fountain."

-- "Bye, Little White Wave."

Little by little she began to realize where she was again. She was in the air; she was a white cloud.

-- "How do you feel?" the cloud asked.

-- "Oh, very good! Look, I can see my parents from here. I am flying so high!"

Suddenly lightening struck. The cloud, scared, wanted to run. Then there was thunder. The clouds sweat so much

because they were scared, they dripped into the sea! The rain began to fall and the white wave began to descend, lower and lower. She closed her eyes and when she woke, she was home. Mommy Wave kissed her, and Big Sea smiled with happiness. And so the Little White Wave continued to be rocked by the bigger waves and to play with the sea horses.

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

I. SKILLS ON HOW TO CONCEIVE AND ORGANIZE INFORMATION

PLACE THE PICTURES IN THE ORDER IN WHICH THE EVENTS OCCURRED IN THE PREVIOUS STORY.

Observe the following scenes. I invite you to number them in the order in which they occurred in the short story. Later in the selection, you will search for the sentence that tells us exactly what occurred in each scene, and you will write the answers in the provided spaces on the next page.

SCENE 1: _____

SCENE 2: _____

SCENE 3: _____

SCENE 4: _____

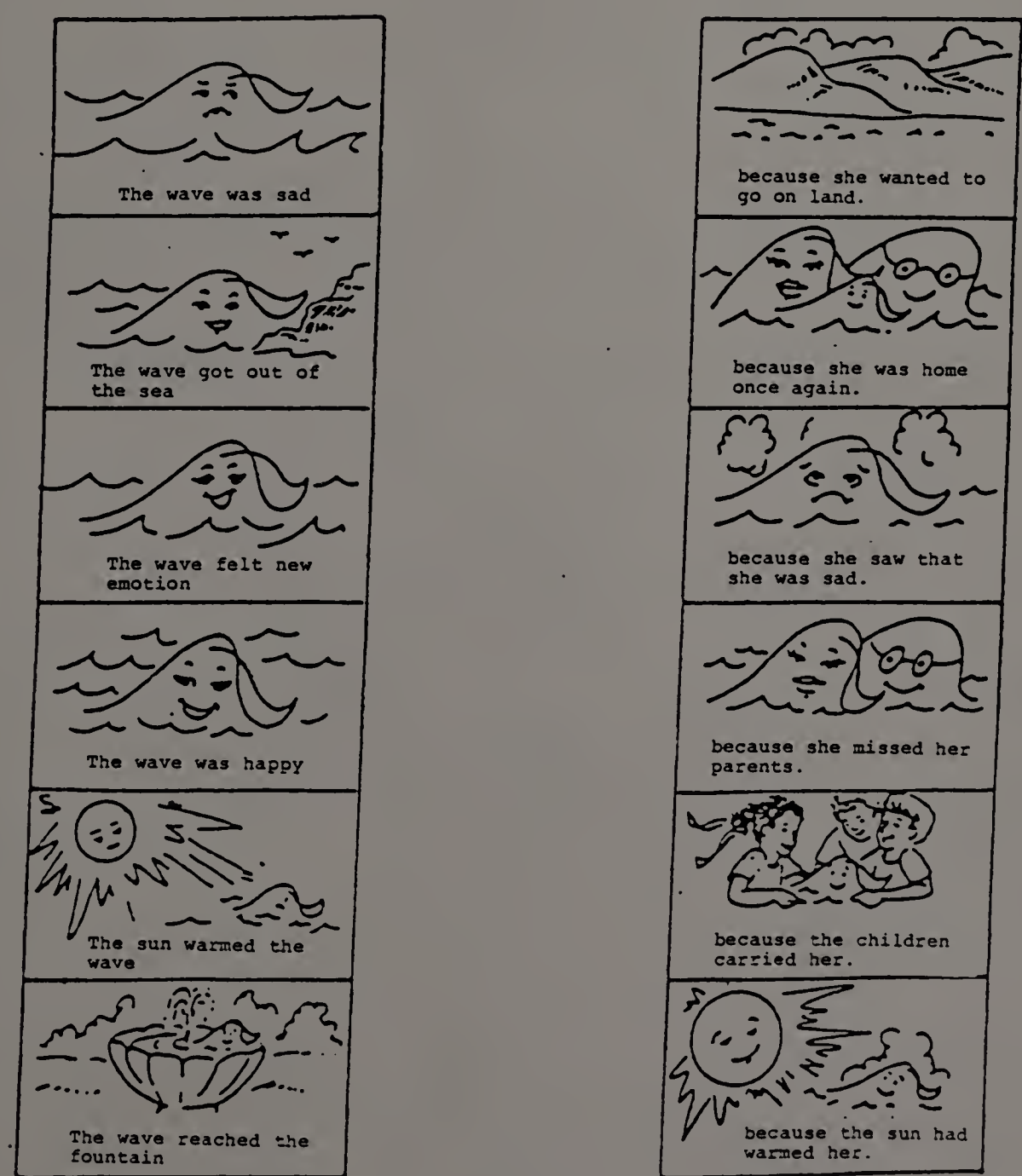
SCENE 5: _____

SCENE 6: _____

II. SKILLS OF IMPLICATION

SHOW CAUSE AND EFFECT IN RELATION TO THE CHARACTER THAT IS PRESENTED IN THE SELECTION.

In the story, many things happened to the wave. Can you establish a relation between the cause and the effect of what happened to the wave? I would like you to answer the exercise that follows. Draw lines to show your answers.



III. SKILLS OF IMPLICATION

TO IMPLY IDEAS NOT DIRECTLY STATED IN THE QUESTIONS.

Answer the following questions according to the story:

1. What happened to the wave when the sun warmed her?

_____

_____

2. What did the wave convert to after the sun had warmed her up?

_____

3. What happens when one cloud bumps into another cloud?

_____

_____

4. How did the wave return to the sea?

_____

_____

5. What did the author mean by the following expressions:

"The clouds scared with terror, when into the sea."

_____

_____

"How they sweated as they ran."

_____

_____

IV. SKILLS: IDENTIFY DETAILS THAT HELP CLARIFY THE MAIN IDEA OF THE STORY

Following are some exercises to prove how much you learned. Do you want to prove it? Write an (X) next to the right answer.

1. The story tells about a wave that wanted to:

_____ a. play with children

_____ b. go into the clouds

_____ c. get to know the land

_____ d. go to the fountain

2. The scene that conveys the main idea:

_____ a. the children carry the wave

_____ b. the wave misses home

_____ c. the sun warms the wave

_____ d. the wave returns to her parents.

3. From the following sentences, which expresses better the main idea of the story?

_____ a. But one day the wave began to miss her parents, Big Sea and White Wave.

_____ b. She looked towards land in hopes that someday her dream would come true.

_____ c. She closed her eyes and when she awoke, she was home again.

_____ d. The rain began to fall and Little White Wave began to descend.

4. The main character of the story:

_____ a. the fountain

_____ b. the sun

_____ c. the wave

_____ d. the sea

V. SKILLS OF ANALYSIS

IDENTIFY THE CENTRAL IDEA, TITLE AND MESSAGE OF THE AUTHOR IN THE STORY.

Write next to the corresponding picture the correct letter.

1. The theme of the story:

_____ a. the rain

_____ b. the home

_____ c. the land

_____ d. the sea

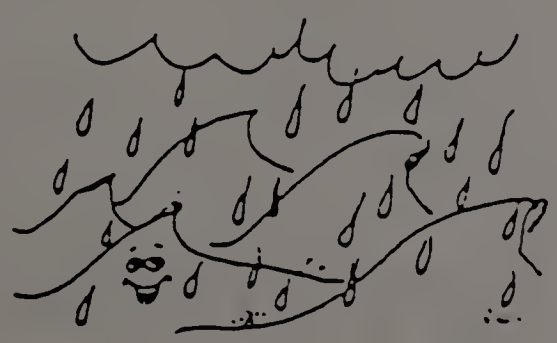
2. The main idea of the selections:

_____ a. The wave, after many adventures, returned to her home.

_____ b. The children, the sun and the fountain demonstrated that they were true friends.

_____ c. On her trip to land, the wave had many experiences.

_____ d. The wave, despite her fun experiences, missed her home.



3. Another appropriate title for the story:

_____ a. The Adventurous Wave

_____ b. The Sun and the Rain

_____ c. The Sea Adventure

_____ d. The Friends of the Sea

4. The author's message is:

_____ a. We should travel to new places.

_____ b. There is no better place than home.

_____ c. We should meet new friends.

_____ d. Traveling brings us happiness.

EVALUACION DIAGNOSTIA DE DESTREZAS DE PENSAMIENTO SIMPLES Y COMPLEJAS

Hola, amiguito:

Te presentamos una selección muy interesante titulada **La Olita que Quería Viajar.** Estamos seguros que vas a disfrutar con esta lectura. Una vez termines de leer, te invito a contestar unos ejercicios de destrezas de pensamiento que aparecen al final de la selección.

OLITA QUE QUERIA VIAJAR

El mar estaba aquel día tan azul. Las nubes decidieron lavar en él sus faldas blancas y grises.

Mientras en continuo vaivén se levantaban las azules aguas, surgió una olita blanca. Era recién salida de una ola inmensa.

- ¿Cómo será la tierra adentro? Todos los días me mecen aquí las grandes olas. Me besan los piececitos, pero yo quiero saber de las flores rojas. Quiero ir a la palma alta para sentir la emoción de su altura. Quiero restregarme en las verdes hojas de la superficie- pensaba así la olita.

Miraba hacia la tierra con el anhelo de los que desean algo intensamente. Y de pronto . . ., zas! Un fuerte empujón la trepó en una roca. Su vestidito de gasa blanca se batía al viento. Quiso

volver al mar, pero una idea la hizo cambiar.

-Me quedaré aquí, en esta roquita verde.

y, apoyándose en sus codos blancos, miró largamente hacia la espesura del palmar. Allí estaban los niños de la tierra. Los había rubios, morenos, altos y bajitos.

Olita se sintió feliz.

-¡Si pudiera jugar con ellos!

De pronto, un niño rubio como el sol, la descubrió en la roca.

-¡Vengan, vengan- gritó a los otros-, he descubierto olita blanca !

La olita se miró en los ojos del niño. El niño se miro en el espejo de la olita.

¡Hola!- dijo la olita moviéndose en la roca.

-¿Quieres jugar con nosotros? - los niños le preguntaron.

-¡Si, si!

- A ver niños, carguemos la olita. La llevaremos a la casa.

Y viajó la olita, primero, en las manos suaves del niño rubió. Luego viajó en las manos suaves del niño moreno.

- Cógela tú, Alfredo. Es nívea y fresca, azul y blanca.

Al llegar la pusieron en la fuente del patio. La fuente dijo:

-¿Qué haces aquí tan lejos, Olita?

- Los niños me trajeron del mar.

- ¡ Hija del mar! ¿Cómo llegas hasta aquí, donde está la humilde fuente?

- Quería caminar . . . ver tierra.

- ¡ Ah, cuánto daría yo por ver el mar! No me explico por qué has preferido este humilde patio. Has escogido este pobre estanque. Has dejado el mar gigante, lleno de buques y de peces, de algas y corale

- Quiero ver algo nuevo. Quiero ir lejos, seguir, seguir.
- Cuéntame, Olita, de los vientos salinos, de las olas gigantes, de las rocas de coral.

La olita contó a la fuente acerca de todo. la fuente suspiraba. Todo los días la olita veía salir el sol por entre los árboles.Veía volar los pajaritos, y sobre todo, hizo amistad con una banda de ranitas verdes que le enseñaron a cantar.

Pero un día la olita echó de menos a sus padres, el Mar Gigante y la Ola Blanca. Amaneció muy triste una mañana. En vano la fuente la arrullaba. Y en vano las ranitas le hacían piruetas.

Los pajarillos querían jugar con ella,tocándola con sus piquitos. Su espumita se consumía y la fuente le dijo:

-Me apena verte así. Pero puede que el sol te vea triste y se apiade de ti.

-¿ El sol? ¿Pero cómo?

-Sí, el sol. Has viajado por la tierra en las manos de los niños. Ahora viajarás por el aire.

Y así fue. Llegó el sol, y, al verla tan triste, comenzó a calentarla, a calentarla. La olitasintió una nueva emoción. Subía, subía.

- Adios, querida fuente.
- Adios, Olita Blanca.

Poco a poco volvió en sí. Estaba en el aire, en una nube blanca.

-¿ Cómo te sientes?- le preguntó la nube.

-Oh, muy bien! Mira, desde aquí veo a mis padres. Qué alta estoy!

De pronto, llegó un relámpago. La nube, asustada, quiso correr. Un trueno se escuchó. Las nubes, alocadas por el terror, huyeron hacia el mar. Cómo sudaban en su carrera! La lluvia fue cayendo y Olita Blanca fue bajando, bajando. Cerró los ojos y al despertar estaba en su casa. Mamá Ola la besaba, y Mar Gigante sonreía feliz.Y así siguió Olita Blanca meciéndose con el vaivén de las olas grandes, y jugando con los caballitos del mar.

EVALUACION DIAGNOSTICA DE DESTREZAS DE PENSAMIENTO SIMPLES Y COMPLEJAS

DESTREZA DE CONCEBIR Y ORGANIZAR DATOS:

I. ORDENA EL ORDEN EN QUE OCURREN LOS SUCESOS DE UN CUENTO MEDIANTE EL USO DE LAMINAS.

Observa las siguientes escenas. Te invito para que las enumere en el orden en que ocurrieron en la lectura. Luego vas a buscar en la selección la oración que nos dice lo que ocurrió en cada escena, y las copias en el espacio que se te provee en la página siguiente.

ESCENA 1._____

ESCENA 2._____

ESCENA 3._____

ESCENA 4._____

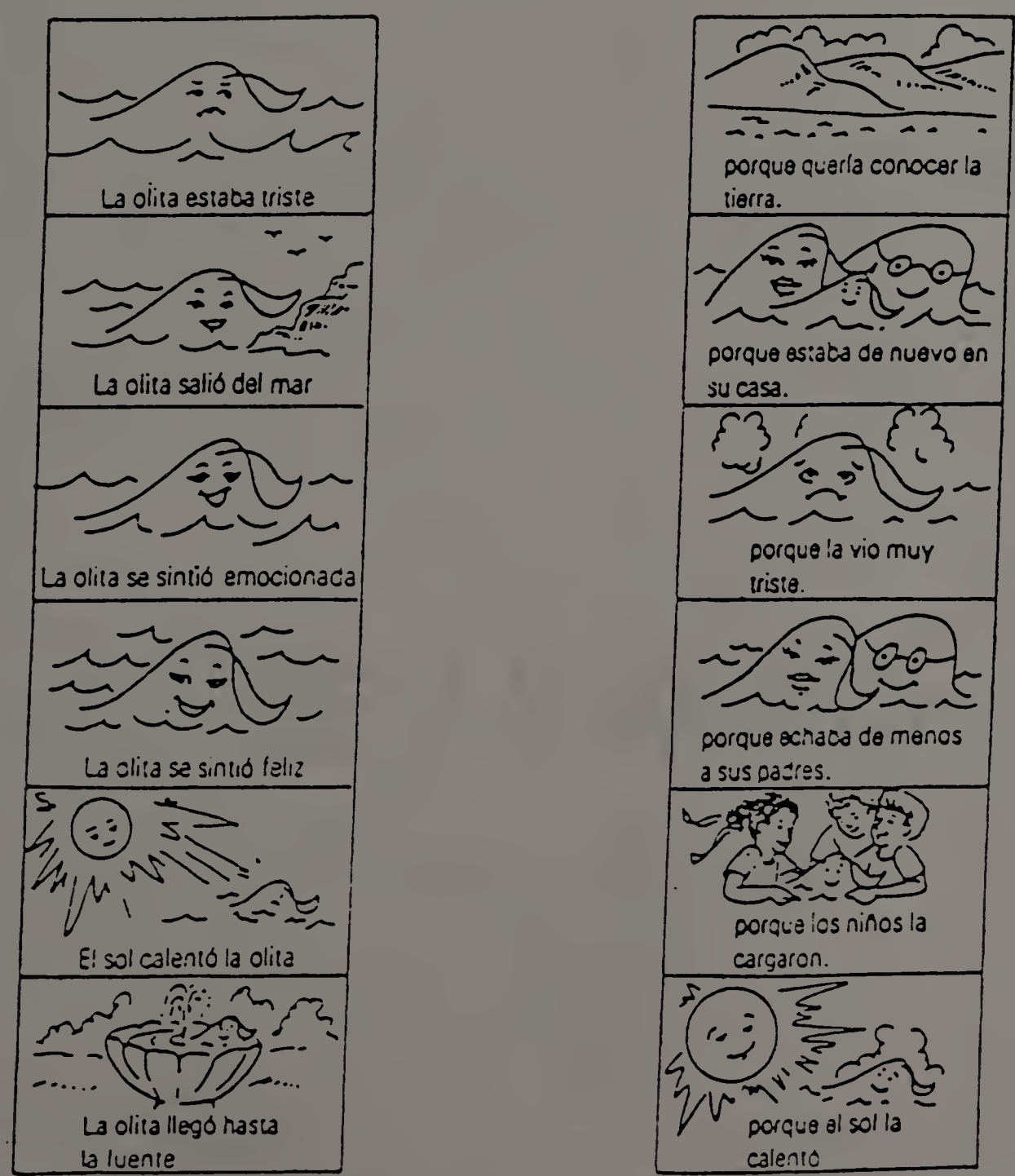
ESCENA 5._____

ESCENA 6._____

II. **DESTREZA DE INFERIR**

SEÑALAR CAUSA Y EFECTO EN RELACION CON EL PERSONAJE QUE SE PRESENTA EN LA SELECCION.

En la selección le sucedieron muchas cosas a la olita. ¿Puedes establecer la relación entre la causa y el efecto de lo que le sucedió a la olita? Te invito a contestar el ejercicio que aparece a continuación. Traza líneas para ilustrar tus respuestas.



III. DESTREZA DE INFERIR

INFERIR IDEAS NO EXPUESTAS POR MEDIO DE PREGUNTAS.

Contesta las siguientes preguntas de acuerdo con la lectura.

1. ¿Qué le sucedió a la olita cuando el sol la calentó?

_____

_____

_____

2 ¿En qué se convirtió la olita luego que el sol la calentó?

_____

_____

_____

3. ¿Qué sucede cuando una nube choca con otra?

_____

_____

_____

4 ¿ Cómo volvió la olita al mar?

_____

_____

_____

5. ¿Qué quiso decir la autora con las siguientes expresiones?:

"Las nubes alocadas por el terror, huyeron hacia el mar". "Cómo sudaban en su carrera!"

_____

_____

_____

IV. DESTREZA: IDENTIFICAR DETALLES QUE AYUDAN A CLARIFICA LA IDEA CENTRAL DE UNA SELECCION.

A continuación te presento unos ejercicios para que compruebes cuánto sabes. ¿Quieres demostrarlo ? Escribe una (x) al lado de la contestación correcta.

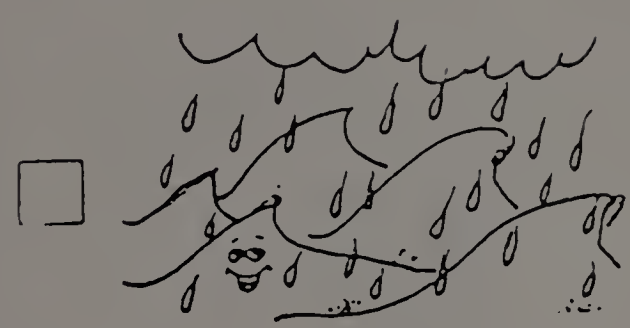
1. La selección trata sobre una olita que quería
   ---a. jugaarcon unos niños
   --- b. subir a las nubes
   --- c. conocer la tierra
   --- ch. llegar a una fuente
2. La escena que nos conduce a la idea centrales:
   --- a. los niños cargan la olita
   --- b. la olita añora su hogar
   --- c. el sol calienta la olita
   --- ch. la olita regresa con sus padres
3. De las siguientes oraciones, ¿cuál expresa mejor la idea central de la selección?
   --- a. Pero un día la olita echó de menos a sus padres, el Mar Gigante y la Ola Blanca.
   --- b. Miraba hacia la tierra con el anhelo de los que desean algo interesante
   --- c. Cerró los ojos y al despertar estaba en su casa.
   -- ch. La lluvia fue cayendo y Olita Blanca fue bajando, bajando.
4. El personaje principal del cuentoes:
   ---a. la fue
   ---b. el sol
   ---c. la olita
   ---ch. el mar

V. DESTREZA DE ANALIZAR

IDENTIFICAR IDEA CENTRAL, TITULO Y MENSAJE DEL AUTOR EN LA LECTURA

Escribe al lado del dibujo correspondiente la letra correcta.

1. El tema de la selecciones:
   a. la lluvia
   b. el hogar
   c. la tierra
   ch. el ma r



2. La idea central de la selecciónes:
   a. La olita, después de varias aventuras, regreso a su hogar:
   b. Los niños, el sol y la fuente demostraron ser verdaders amigos.
   En su viaje por la tierra, Olita tuvo variadas experiencias.
   ch. La olita, a pesar de sus experiencias agradables, añoró su hogar.

Otro título apropiado para la seleccióes:
   a. La olita aventurera
   b. El sol y la lluvia
   c. Una eventura en elmar
   ch. Los amigos delmar

4. El mensaje de la autora es
   a. Debemos viajar para conocer otros lugares.
   b. No hay mejor lugar que el hogar.
   c. Debemos conocer nuevos amigos.
   ch. El viajar nos proporciona felicidad.

THE GREEDY BEAR

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

Hi Friend:

I present to you a very interesting story, entitled The Greedy Bear. We are sure that you will enjoy this story. Once you are finished reading, I would like you to answer a few questions which appear at the end of the selection.

THE GREEDY BEAR

An old bear, which has managed to save a small fortune by working hard and depriving himself of many things, buried his treasure at the foot of an oak tree.

-- "I'm rich! I'm rich!" he told himself, thinking about the hidden treasure.

One night, a wolf discovered his secret and stole the greedy bear's treasure.

-- "It's been a while since I've checked on my money," the bear said to himself one morning. "I will check to make sure that everything is okay."

As the greedy bear approached the oak tree, he found a hole in the ground.

-- "I've been robbed! I've been robbed! I've been robbed!" he began to scream.

A deer that was passing by asked:

-- "What have they robbed?"

The bear responded:

-- "My treasure! I had buried it at the foot of this oak tree."

-- "Why did you hide it so far from your house?" asked the puzzled deer. "Wouldn't it have been better for you to hide it in your cave? That way it would be easier for you to use it whenever you wanted to."

-- "Use it!" the bear exclaimed. "Don't you know that that money cost me a lot to get? I never took money from there."

-- "Well, then," answered the deer, "why are you complaining so much? If you never took any money, place a rock in the place of your treasure and it should serve the same purpose."

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

I. SKILLS OF IMPLICATION

SHOW CAUSE AND EFFECT IN THE ACTIONS OF THE CHARACTERS.

Look for and write the phrase that completes each one of the following sentences:

1. The bear was rich _____.

2. The bear hid his treasure because _____.

3. The treasure was stolen because _____.

Phrases:

a. it was buried far from the house.

b. working hard and depriving himself of many things.

c. it has no use.

II. SKILLS: DETERMINE RELEVANT DETAILS OF THE CHARACTERS ACCORDING TO THEIR CONDUCT

From the following words, select the one that best describes the bear:

1. worker
2. happy
3. greedy
4. economical

Which part specifically in the story makes you believe that your answer is the correct one?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

III. SKILLS OF ANALYSIS

IDENTIFY THE MAIN IDEA.

Answer the following questions:

1. Which was the advice the deer gave the bear?

_____

_____

_____

_____

2. What is your opinion of the advice?

_____

_____

_____

_____

3. If you had the bear's fortune, what would you have done with it?

_____

_____

_____

_____

_____

_____

_____

_____

_____

IV. SKILLS WHICH DETERMINE THE QUALITIES AND THE ATTITUDES OF THE CHARACTERS

Following you will find some sentences. When you read them, you can think about the character. Note these qualities in the space provided. You may use the words "economical", "dishonest", "foolish", "greedy", and "worker".

1. The bear got a fortune that cost him his job.

   _____

2. The bear put his fortune away. _____

3. The wolf stole the bear's money. _____

4. The bear buried his money. _____

5. The bear wanted to have more and more money.

   _____

EVALUACION DIAGNOSTICA DE DESTREZAS DE PENSAMIENTO SIMPLES Y COMPLEJAS

Hola, amiguito:

Te presento una selcción muy interesante titulada

El Osó Avaro.Estamos seguros que vas a disfrutar con esta lectura. Una vez termines de leer, te invito para que contestes los ejercicios que aparecen al final de la selección.

EL OSO AVARO

Un viejo oso, que había conseguido una pequeña fortuna a costa de trabajos y privaciones, enterró su tesoro al pie de una encina.

— ¡Soy rico! ¡Soy rico! — se decía, pensando en el tesoro escondido bajo tierra.

Pero un lobo que había sorprendido su secreto, fue de noche al pie de la encina y robó el tesoro del oso avaro.

— Hace tiempo que no he ido a echar una ojeada a mi dinero —se dijo el oso cierta mañana—. Voy a ver si todo marcha bien.

Pero al llegar al pie de encina, el oso sólo encontró un agujero en el suelo.

— ¡Me han robado! ¡Me han robado! ¡Me han robado! — empezó a gritar.

Un ciervo, que acertó pasar por allí, le preguntó:

— ¿Qué es lo que te han robado, amigo?
— ¡Mi tesoro! Lo tenía enterrado al pie de esta encina.
— ¿Por qué lo has escondido tan lejos de tu casa? —se extrañó el ciervo—. ¿No habría sido mejor guardarlo en tu cueva? Allí, a cada instante, hubieras podido retirar cómodamente lo necesario.
— ¿Retirar lo necesario? —se escandalizó el oso—. ¿No sabes que ese dinero me costó mucho de ganar? ¡Nunca retiraba nada!
— Pues entonces —le contestó el ciervo—, ¿a qué viene el quejarte tanto? Si nunca retirabas nada, pon una piedra en lugar del tesoro y te hará el mismo servicio.

EVALUACION DIAGNOSTICA DE DESTREZAS DE

PENSAMIENTO SIMPLES Y COMPLEJAS

I. DESTREZA DE INFERIR

SEÑALAR CAUSA Y EFECTO EN LAS ACTUACIONES DE LOS PERSONAJES.

Busca y escribe la letra de la frase que completa cada una de las siguientes oraciones:

1.El oso se hizo rico_____.

2.El oso escondió su tesoro porque_____.

3.El tesoro fue robado porque _____.

a. fue escondido lejos de la casa.

b. trabajando mucho y privándose de muchas cosas.

c. no daba ningún uso.

II. DESTREZA : DETERMINAR DETALLES RELEVANTES DE LOS PERSONAJES DE ACUERDO A SUS VALORES Y CONDUCTA

De las siguientes palabras, selecciona la que mejor describe al oso:

1. trabajador 3.avaro

2. feliz 4. económico

Señala en la lectura, un suceso que corrobore que tu contestación es la correcta.

_____

_____

_____

III. DESTREZA DE ANALIZAR

IDENTIFICAR IDEA CENTRAL

Contesta las siguientes preguntas:

1. ¿Cuál fue el consejo que el ciervo le dio al oso?

_____

_____

_____

2. ¿Qué opinas tú de este consejo?

_____

_____

_____

3. De tener la foetuna del oso, ¿qué hubieras hecho con ella?

_____

_____

_____

IV. DESTREZA DETERMINAR LAS CUALIDADES Y LAS ACTITUDES DE LOS PERSONAJES

A continuación encontrarás unas oraciones. Cuando las leas puedes pensar cómo es el personaje. Anota esas cualidades en el espacio que se provee. Puedes utilizar las palabras económico,

deshonrado, tonto, avaro y trabajador.

1. El oso consiguió una fortuna a costa de su trabajo_____

_____

2. El oso guardó toda su fortuna._____

3.El lobo robó el dinero al oso._____

4.El oso enterró su dinero._____

5.El oso quería tener más y más dinero._____

THE ANT AND THE GRASSHOPPER

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

Hi Friend:

I present to you a very interesting story, entitled The Ant and the Grasshopper. We are sure that you will enjoy this story. Once you are finished reading, I would like you to answer a few questions regarding the simple and complex dexterities of thought which appear at the end of the selection.

THE ANT AND THE GRASSHOPPER

A very nice day during the Spring, a grasshopper goes for a walk. He says:

-- "What a nice day! What a beautiful sun!"

All of a sudden, he sees an ant. He watches the ant work. But, why does the ant work?

-- "It is such a beautiful day," says the grasshopper.

The ant says:

-- "I have to find a place to put our food for the Winter."

-- "Don't you see that it is Spring?" asks the grasshopper. "These are days in which to go for walks."

-- "I don't have time to fool around," says the ant. "I have many things to do."

-- "Well, if you'd rather work than play, that is something else. But to me, Spring is a time to play," says the grasshopper. "Oh, what a beautiful Spring day!"

Summer arrives with its hot days. The grasshopper likes the heat. He goes out to dance and says:

-- "What a beautiful day! Everything is so green! The days of Summer are marvelous."

Then the grasshopper sees the ant bringing food to its home.

-- "Is that food for the Winter, my ant friend?" asks the grasshopper, with a small laugh.

-- "Yes," says the ant. "A little is for today, and a little for later."

-- "But, my ant friend, it is Summer," says the grasshopper. "Why are you bringing more and more food to your home? Summertime is for dancing. Let's dance!"

-- "I cannot dance now," says the ant. "Winter is very cold. I think you'd better go look for some food now."

-- "You are such a know-it-all," says the grasshopper, as he continues to dance.

Summer passes and Autumn arrives. It is a rainy and windy day. And nothing is green anywhere. The grasshopper says:

-- "What a beautiful rainy day. How nice it is to do nothing on a rainy day."

The rain passes. The grasshopper goes for a walk and says:

-- "Everything is so pretty. The colors of Autumn are so pretty!"

The grasshopper sees that the ant puts some of his food out to dry and says:

-- "I see that some of your food got wet because of the rain, my ant friend."

-- "Yes, it got wet," the ant said, "but the wind will dry it off. And Grasshopper, Winter is next. You'd better go look for food."

-- "Work day and night, my ant friend. You don't know how nice it is to play and do nothing," says the grasshopper, and he goes home.

-- "How nice it is to do nothing on a rainy day."

Finally, Winter arrives with its cold and snow. Now, the grasshopper goes to the ant's house and says:

-- "My ant friend, can you give me some of your food?"

-- "That is what happens to those that do not work," says the ant. "You are not going to eat my food. Now it is my turn to play and for others to work!"

The grasshopper is quiet and he leaves.

Now the ant is the one that says:

-- "Spring, Summer, and Fall are when I work. And Winter is here now. Now it is my turn to rest."

DIAGNOSTIC EVALUATION OF SIMPLE AND COMPLEX THINKING SKILLS

I. SKILLS TO IDENTIFY DETAILS

Continuing, we present some exercises to prove how much you know. Would you like to prove it? Write an (X) next to the correct answer:

1. In what station of the year does the story take place?

   _____ a. Spring

   _____ b. Autumn

   _____ c. Winter

2. What station arrives later?

   _____ a. Spring

   _____ b. Winter

   _____ c. Autumn

3. Who looks for food and stores some for the Winter?

   _____ a. The ant

   _____ b. The grasshopper

   _____ c. The animals

4. Who walks playing the violin?

   _____ a. The ant

   _____ b. The animals

   _____ c. The grasshopper

5. Who works day and night?

_____ a. The grasshopper

_____ b. The ant

_____ c. The bee

II. SKILLS OF ANALYSIS

Friend:

Answer the following questions regarding the story:

1. Why was it important for the ant to store food?

_____

_____

_____

2. Do you think the ant was just with the grasshopper?

_____

_____

_____

3. Do you think it will be difficult for the grasshopper to find food? Why?

_____

_____

_____

4. If you had a chance to see how an ant or a grasshopper lived, which would you prefer? Why?

_____

_____

_____

_____

_____

III. SKILLS OF GATHERING AND ORGANIZING INFORMATION

Place in order of occurrence the following as they happened in the story. Use numbers "1" to "6"; write the number next to the space provided for each sentence.

_____ He suddenly sees an ant.

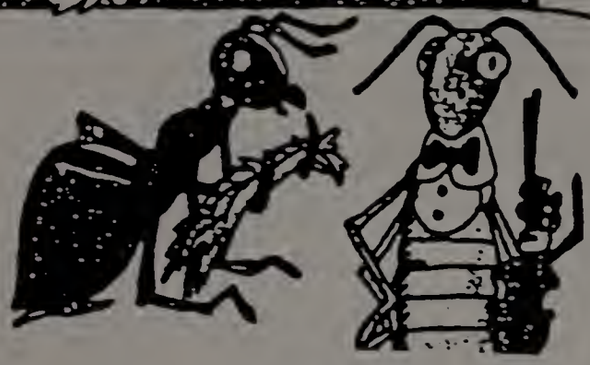
_____ Summer passes and Autumn arrives.

_____ Oh, what a pretty Spring day!

_____ Finally, Winter arrives with its cold and snow.

_____ A pretty Spring day, the grasshopper goes for a walk.

_____ Summer arrives with its hot Summer days.



EVALUACION DIAGNOSTICA DE DESTREZAS DE PENSAMIENTO SIMPLES Y COMPLEJAS

Hola, amiguito:

Te presento una selección muy interesante titulada La Hormiga y El Saltamontes. Estamos seguros que vas a disfrutar con esta lectura. Una vez termines de leer, te invito para contestar los ejercicios de destrezas de pensamiento simples y complejas que aparecen al final de la selección.

Un bonito día de primavera, sale un saltamontes a dar un paseo. Dice:

—¡Qué bonito día! ¡Qué bonito sol!

De repente ve una hormiga. Y ve que la hormiga trabaja. —Pero, ¿por qué trabaja? ¡Es un día tan bonito! —le dice el saltamontes.

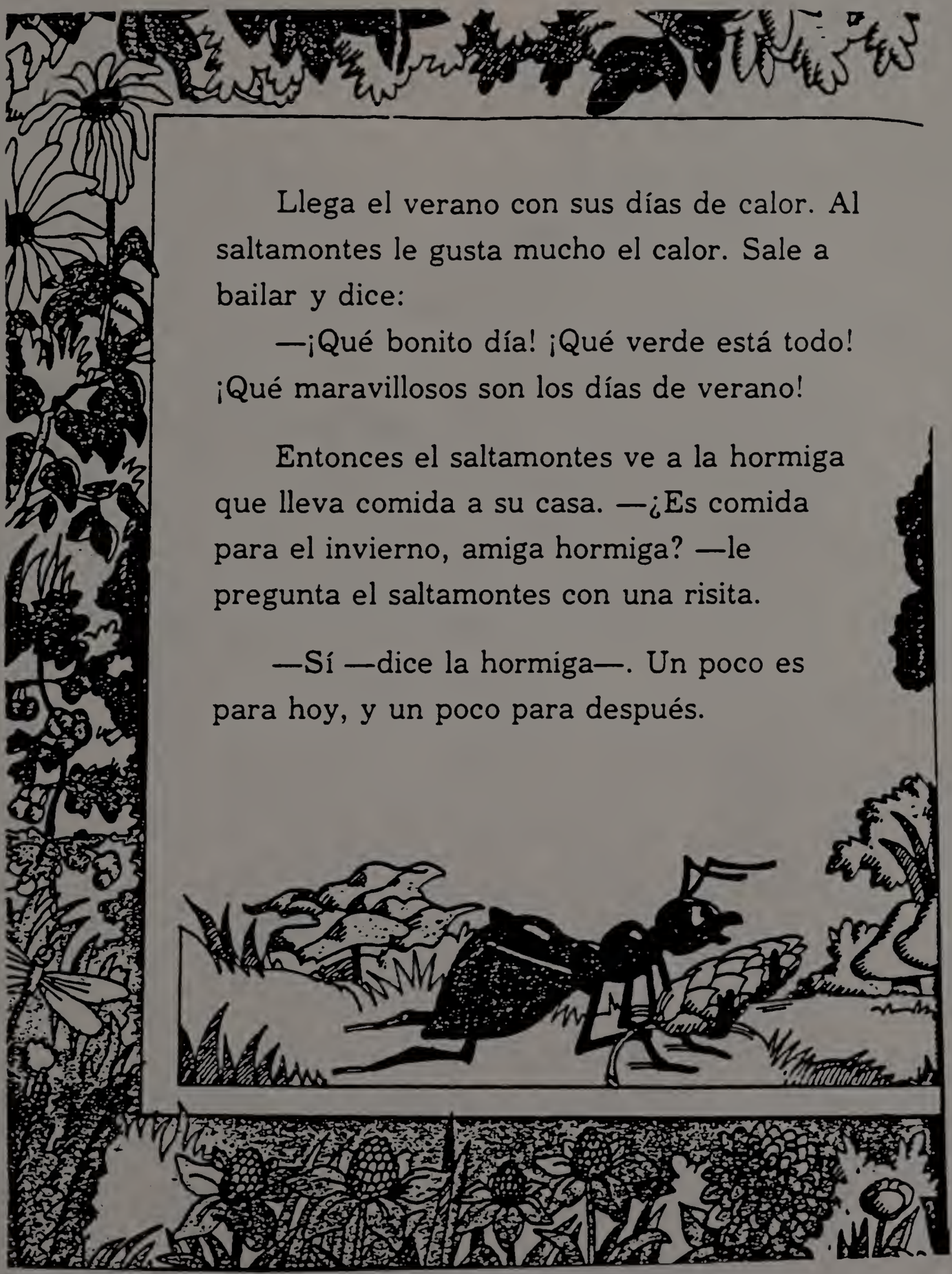
La hormiga le dice:

—Tengo que buscar un lugar donde poner la comida para el invierno.

—¿No ve que es primavera? —le pregunta el saltamontes—. Estos son días para ir de paseo con el quitasol.

—No estoy para pasatiempos —le dice la hormiga—. Tengo muchos quehaceres.

—Bueno, si le gusta más trabajar que jugar, eso es otra cosa. Pero para mí, la primavera es para jugar —le dice el saltamontes—. ¡Ay, qué bonito día de primavera!



Llega el verano con sus días de calor. Al saltamontes le gusta mucho el calor. Sale a bailar y dice:

—¡Qué bonito día! ¡Qué verde está todo! ¡Qué maravillosos son los días de verano!

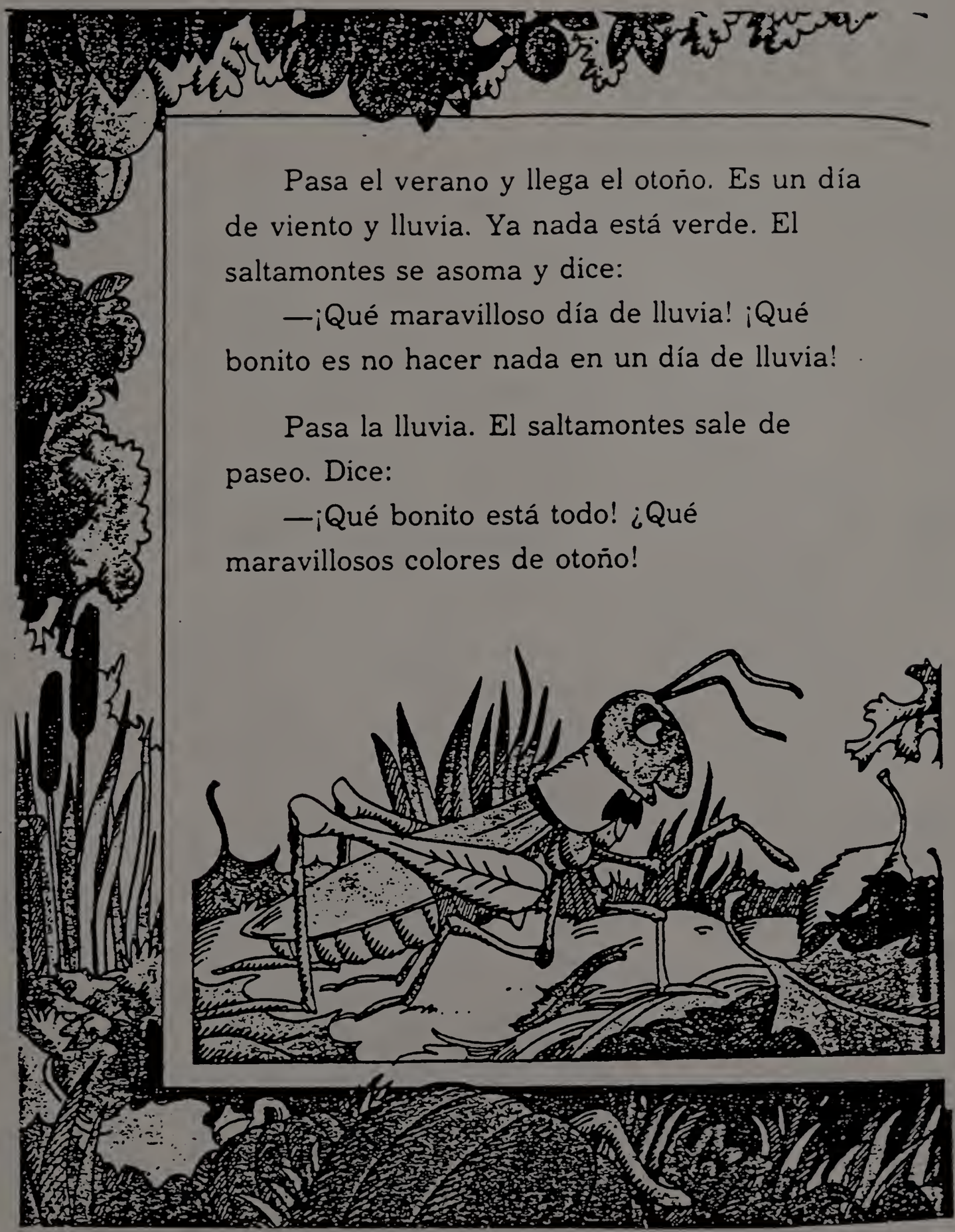
Entonces el saltamontes ve a la hormiga que lleva comida a su casa. —¿Es comida para el invierno, amiga hormiga? —le pregunta el saltamontes con una risita.

—Sí —dice la hormiga—. Un poco es para hoy, y un poco para después.

—Pero, amiga hormiga, es verano —le dice el saltamontes—. ¿Para qué lleva más y más comida a su casa? El verano es para bailar. ¡Vamos a bailar!

—Yo no estoy para bailar ahora —le dice la hormiga—. El invierno es muy frío. Mejor se va a buscar comida, amigo saltamontes.

—¡Qué sabelotodo! —dice el saltamontes y sigue con su baile.

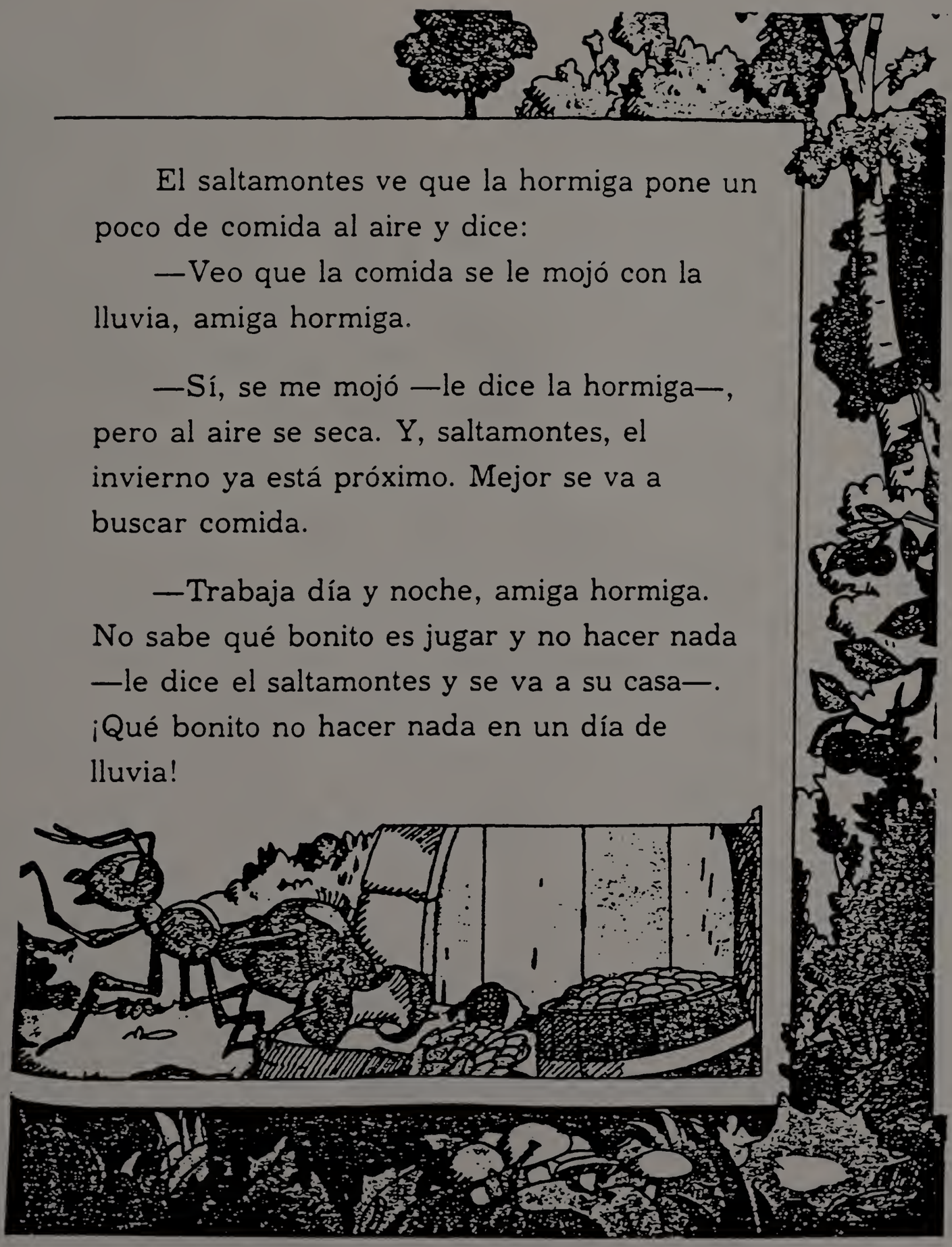


Pasa el verano y llega el otoño. Es un día de viento y lluvia. Ya nada está verde. El saltamontes se asoma y dice:

—¡Qué maravilloso día de lluvia! ¡Qué bonito es no hacer nada en un día de lluvia!

Pasa la lluvia. El saltamontes sale de paseo. Dice:

—¡Qué bonito está todo! ¿Qué maravillosos colores de otoño!

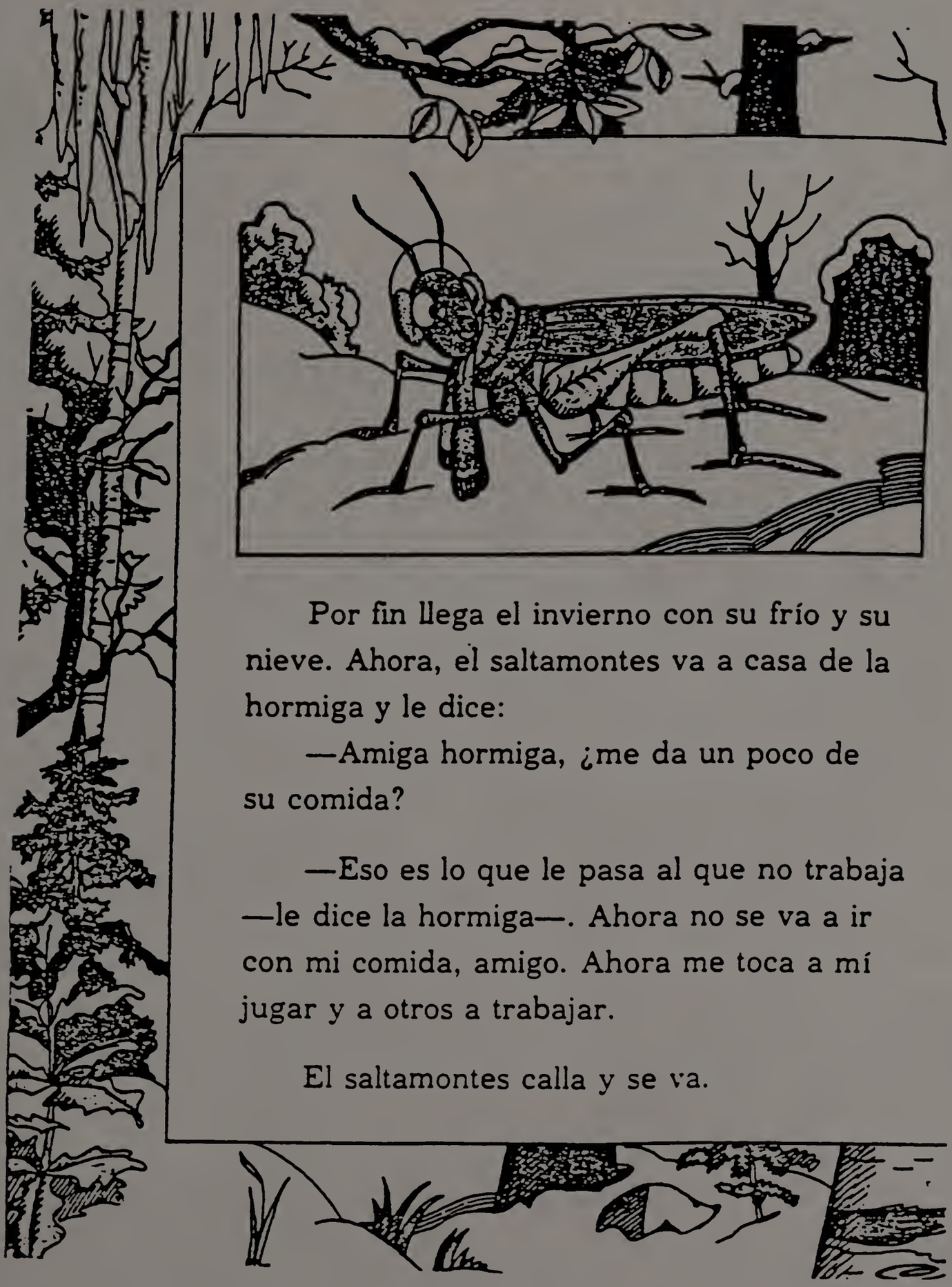


El saltamontes ve que la hormiga pone un poco de comida al aire y dice:

—Veo que la comida se le mojó con la lluvia, amiga hormiga.

—Sí, se me mojó —le dice la hormiga—, pero al aire se seca. Y, saltamontes, el invierno ya está próximo. Mejor se va a buscar comida.

—Trabaja día y noche, amiga hormiga. No sabe qué bonito es jugar y no hacer nada —le dice el saltamontes y se va a su casa—. ¡Qué bonito no hacer nada en un día de lluvia!



Por fin llega el invierno con su frío y su nieve. Ahora, el saltamontes va a casa de la hormiga y le dice:

—Amiga hormiga, ¿me da un poco de su comida?

—Eso es lo que le pasa al que no trabaja —le dice la hormiga—. Ahora no se va a ir con mi comida, amigo. Ahora me toca a mí jugar y a otros a trabajar.

El saltamontes calla y se va.

Ahora es la hormiga la que dice desde su casa:

—Primavera, verano y otoño es cuando yo trabajo. Y ya está aquí el invierno. Ahora a mí me toca descansar.

EVALUACION DIAGNOSTICA DE DESTREZAS DE PENSAMIENTO SIMPLES Y COMPLEJAS

I.DESTREZA IDENTIFICAR DETALLES

Acontinuación te presentamos unos ejercicios para que compruebes cuánto sabes. ¿Quieres demostrarlo? Escribe una (x) al lados de la contestación correcta.

1.¿En qué estación del año se desarrolla el cuento?

---a. verano

--- b. otoño

--- c. invierno

2.¿Qué estación llega después?

---a. verano

---b. invierno

---c. otoño

3.¿Quién conseguía comida y la guardaba para el invierno?

---a. la hormiga

---b. el saltamonte

--- c. los animales

4.¿Quién paseaba tocando el violín?

--- a. la hormiga

--- b. los animales

--- c. el saltamonte

5. ¿Quién trabaja día y noche?

--- a. el saltamonte

--- b. la hormiga

--- c. la aveja

II. DESREZA DE INFERIR

Amiguito:

Contesta las siguientes preguntas de acuerdo con la lectura.

1. ¿Por qué para la hormiga era importante guardar comida?

_____

_____

2. ¿Crees que la hormiga fue justa con el saltamonte?

_____

_____

3.¿Crees que le será difícil al saltamonte conseguir comida? ¿por qué?

_____

_____

4.Si tuvieras la oportunidad de ver como vive la hormiga o cómo vive saltamonte, ¿a cuál te gustaria ver? ¿por qué?

_____

_____

_____

III. **DESTREZA DE CONCEBIR Y ORGANIZAR DATOS**

Ordena el orden en que ocurren los sucesos de un cuento. Usa los númerales del 1- 6 escribe el número de acuerdo al orden en que ocurren el cuento en el espacio que tienes en cada oración.

---- Un bonito día de primavera, sale un saltamonte a dar un paseo.

---- De repente ve una hormiga

---- Ay, qué bonito día de primavera!

---- Llega el verano con sus días de calor.

---- Pasa el verano y llega el otoño.

---- Por fin llega el invierno con su frío y su nieve.

APPENDIX C

TEACHER'S HANDBOOK

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TEACHER'S HANDBOOK

This Handbook presents thinking skills through the development and strategy of microteaching. To improve the teaching of thinking skills, it is necessary to familiarize teachers who teach children with specific learning disabilities with different strategies, different methods of learning, and different methods that prepare the child in the development of their thinking skills.

The process of thinking, with its diverse elements, can be analyzed as a group of skills or specific thinking activities which receive, process, and produce information. These skills can be simple or complex. The basic skills are related with our capacity to receive and make significant information. The complex skills are more inclusive; they rely on the basic ones.

This Handbook offers information of diverse techniques of teaching utilizing microteaching in the development of thinking skills. A brief history of microteaching is presented. The Handbook also offers the teaching of teaching about the development of simple and complex thinking skills with an example of a strategy to teach simple and complex thinking skills to children with specific learning problems.

The purpose of this Handbook is to familiarize teachers with specific problems of learning and the diverse

strategies for teaching the development of thinking skills to children with specific learning disabilities.

Historical Development of Microteaching

In 1963, microteaching began as a technique of teaching/learning at Stanford University (California) as part of the educational requirements for teachers to satisfy the requirements of the Department of Education in the State of California. Professor Dwight W. Allen (1963) designed the first demonstrative lessons in the components of microteaching techniques.

During the summer of 1963, more than sixty candidates for teacher certification in the Internship Program at Stanford University were divided and randomly placed into two even groups. Half of the group received training with microteaching techniques; the other half of the group received training on the subject of cooperation in local schools. It was during that summer that, for the first time, the demonstrative classes of microteaching were recorded. This idea came from Keith Acheson, investigative helper of education on the faculty at Stanford University.

The first technical skills (on videotape) of microteaching, which was developed and utilized clinically, was "The Beginning of a Lesson". This was done by H. E. Aubertine, along with Frederick McDonald and

Dwight W. Allen, professors of the seminar offered in the summer of 1963. As a result of such seminar, it was discovered that microteaching prepares teachers to better carry out the process of teaching/learning. It also proved the fact that the span of the microteaching clinic was less (ten hours per week) compared with the twenty-five hours per week required by the students in the practice of teaching.

During the second year of the microteaching clinic, there were changes in the structure of the techniques. Added to the technique was a session of repetition, during which the teacher taught the lesson, critiqued it, looked at the videotaped lesson, and immediately retaught it to a different group of students to see if the students had improved. Under this new structure, new skills and techniques were added to microteaching such as "Pedagogical Closure", which came about by William Johnson (1969), the diagnostic examination, the art of making up questions, interrogatories from both parties, and the skills of "Reference Markers", developed by Donald Wehmeyer.

Following are the methods used in this laboratory which contributed to the preparation of teachers in the techniques of teaching. By using the classroom as a laboratory, the teachers pretend to be prepared for teaching the development of simple and complex thinking skills to students with specific learning problems.

(1) Focus on necessary student interests and backgrounds.

(2) Select activities that are appropriate for students according to age and intellectual development which reflect their relevant knowledge in specific areas.

(3) Demonstrate sensibility to the students' different cultural backgrounds.

(4) Maintain and provide interest in the topic of teaching by utilizing a problem, creating a challenging situation, or expressing a controversial idea.

(5) Clearly establish the lesson's rules and objectives.

(6) Establish an atmosphere that promotes implication, discovery, and development of skills in the art of asking questions. Have examples that illustrate ideas with clarity to stimulate positive discussion and offer motivation for the development of active participation among all the students.

(7) Discuss with the students their rights in the classrooms.

(8) Maintain the students' information of the criteria for completing the lesson in an excitable way.

(9) Provide the opportunity to work in groups.

(10) Develop in the students the responsibility of learning:

- Ask the right questions
- Show them how to search for resources
- Develop interest in learning new and diverse topics

(11) Direct the students to make good use of their time:

- Provide them with good studying skills
- Guide them to organize the study material

The microteaching technique should be an atmosphere that contributes to the learning process. Specific skills included in the training program of microteaching are the development of simple and complex learning skills in children with specific learning problems which are exposed to the methodology for the development of thinking. When developing learning skills, it is important to determine how much the student already knows about the topic. In order to achieve this, a diagnostic examination must be given.

The diagnostic examination is used to determine how much the student knows about the topic. At the same time, the student will realize how much he or she knows and is

willing to show it. This technique is a stimulation; but if it is done frequently, it can be very effective. The diagnostic test can be the same test which will be utilized for the final unit or for an analogical test (in which no grade is given). The instrument for the diagnostic test can be a question. [Example: In the beginning of the lesson, the teacher asks, "What three physical properties affect the transferring of heat?"] When the teacher knows how much the student knows about the topic, then the various reference markers can be used to establish an effective communication in developing thinking skills.

Students with specific learning problems present difficulties in comprehension and the grasping of ideas. For an effective accomplishment in the development of thinking skills, the use of multiple reference markers must be emphasized. Teachers can be trained to have a more effective way of teaching if they are taught a variety of "Reference Markers" to make a judgmental suggestion between them and present them effectively.

Reference markers that can be used as alternatives include:

(1) The comparison of something known to something unknown.

(2) Discussing the topic from different points of view. [Example: Discussing the American Revolution from the slave's

point of view, from the settlers of the South, and from the industrial North.]

(3) The analysis of the object's different functions is studied. [Example: The heart--its position in the thorax, its labor to move and receive blood, its position as an organ in the body, its size, etc.]

(4) Variety of methods in the solution of problems.

(5) Variety in the elements of time. [Example: Compare the knowledge of man that lived in the age of Christopher Columbus with a man of today to better understand and judge with greater effectiveness the fate of the Discovery of America.]

(6) Variation in the context of the atmosphere. [Example: Study shelter in different atmospheres.]

(7) Variation in the sources of information. Use different books, interviews, consultations, etc.

(8) Variation in the different level of difficulty. [Example: Different assignments, questions of diverse complexity.]

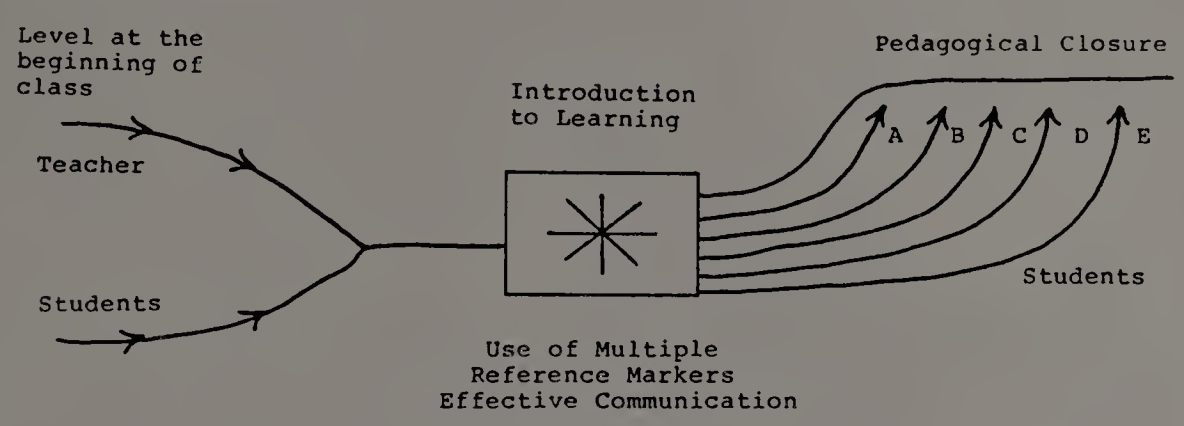
(9) Variation of the abstract levels. [Example: The use of concrete or semi-concrete objects or abstract ideas in teaching the parallels of triangles.]

(10) Variation of the complexity level. [Example: The simple scene is presented of an Eskimo home, the resistance of ice on cold land; the dangers of leaving the house in very cold weather.]

After the use of multiple reference markers, the students will demonstrate in the pedagogy the knowledge acquired from the skills. At this time, the students experience the satisfaction of understanding what they are investigating. They can explain and discuss it in a way they can relate to the new understanding of what was just learned. The activity is divided into two categories: (1) Partial Pedagogical Closure, when only part of the lesson is understood; and (2) Total Pedagogical Closure, when the objectives of the lesson have been learned.

Teachers should have different means to provoke what occurs in partial closures in such ways that students can understand where they are and where they are going. It gives the students a feeling of satisfaction and security.

Teachers should be aware of movements and verbal expressions of students in order to know who reaches the pedagogical closure and when. The pedagogical closure can be illustrated with the following diagram:



In this diagram, it is observed that at the beginning of class the teacher and the student are on different levels. Through introduction to learning and the use of different reference markers, the necessary communication is established which facilitates the goal of the objectives. The arrows indicate that the students reached the pedagogical closure at different times.

Following are various forms to reach the pedagogical closure:

(1) Through the consolidation of information, concepts, and principles until a generalization is reached.

(2) Outlining the principle ideas.

(3) Summarizing the essential aspects.

(4) Reviewing the principle points as the lesson progresses.

(5) Applying the learned to new or analogical situations.

(6) Establishing the sequence when going from the known to the unknown.

(7) Utilizing what is learned to make patterns for individual or group projects.

(8) Utilizing the learned ideas in creative form:

- Guessing
- Exhibits
- Stories
- Recitals
- Poems
- Questions
- Other

One of the diverse forms that the teacher can use to get to the pedagogical closure is using the questions as instruments in the development of thinking.

John Dewey (1910) has given us a possible answer: "Curiosity is as far from explorative attitudes as the origin of thinking is." Initially, curiosity in the child is like a natural "instinct". As the child grows with his

or her participation in social relations of the adult world, the child uses interrogatory language, from the questions, to continue exploring. The questions substitute the hands. In this way, questions come to be something like hands--that which is used in thinking to explore the world.

According to Benjamin Bloom (1986), in an educative investigation he confirmed that between eighty percent and ninety percent of the questions teachers ask students in the classrooms are from memory of some sort, text or informative. How do you transform this information? How do you get away from making the classroom a place for memorization and recitation, and converting it into a community of inquiries, of processing information and constructing understanding? One strategy would be for teachers to adopt a reference of markers or taxonomy that permits observation, classification, analyzing, and evaluation of the questions asked. These markers will facilitate the stimulation of questions that activate thinking and construct knowledge.

The Art of Formulating Questions

The art of formulating questions is a technique where teachers need to be trained adequately. Their training should begin early. There are two processes that are

related with the art of formulating questions: education and thinking. They are both complex processes. To think is to imagine or discuss something, reflect, examine with caution before forming an opinion, practice the faculty to conceive spiritually, think and imply. The process of thinking is initiated early in the child's life. We make him or her confront that which he or she is not familiar with. We help him or her find similarities and recognize differences, common elements or determine meaning. By doing this, we are guiding him or her to think. It is an activity where the students participate in the discussion of a topic with certain information, making suggestions and analogies, demonstrating equivalencies. It is a process that occurs in all areas of knowledge (homework), life, all skills, and the activities in and out of school. It is an activity for those that think; remember; reorganize ideas, experiences and materials; formulate principles and apply them; utilize skills; and develop new procedures or methodologies while we set aside what we know to enter the unknown. The conduct that involves the acquisition of an idea, the recognition of similarities and differences, penetrate in the significance of things. All that means is to think.

Learning as a procedure begins when we observe and copy living experiences, relate to common elements, and formulate concepts or generalizations to continue ascending

in the hierarchy of knowledge. The learning process requires visualization of materials and skills from a new point of view to deepen the content and discern, judge, and evaluate.

A relation exists between learning and thinking that makes us give extreme importance to the fact that teachers develop and perfect asking techniques.

There are some verbs that illustrate sequence of the observed conduct during the process of learning. Examples include: listen carefully, observe, visualize, perceive, associate, remember, imagine, abstract, conceptualize, generalize, understand, reorganize, and evaluate.

Other verbs demonstrate the sequence of related conducts with the solution to problems, make decisions, inventing, creating. They are: concentrate, look, inquire, explore, scrutinize, analyze, compare, try, discover, conjecture, meditate, deliberate, project, discern, judge, criticize, imply, deduce, conclude, etc.

An able teacher can make his or her students develop the potential of thinking by encouraging it. The question is: "What instruments help to reach that goal?" The question is directed to the ability to construct ideas and thoughts, to see when they have won the students by means of literature or independent study, to provoke the interchanging of ideas that help explore the significance of what is learned. This induces them to note similarities

and differences, form concepts of what is observed, discuss and experiment, observe common elements of concepts; arriving at generalizations, seeing the sequence while establishing relations or restructuring ideas; offering evidence or proof and verification. Dr. Irving Lorge signals four types of questions that stimulate the students to think:

(1) Questions that lead the way to determine if the students have understood the material:

- Which revolve around one main idea?
- Which revolve around details that support the main idea?
- Which have the author's or someone else's conclusion?

(2) The question relating new experience with past experience:

- Is this the same situation that the author presents?
- How would we do this at the present time?
- How much of that can be applied today?

(3) Questions that derive implications:

- Does this passage help us understand our prejudice?
- What values does this story contain?
- Does this mean that our ancestors were wrong as far as . . .?

(4) Questions that help formulate a hypothesis:

- Why did it happen?
- How can this success be explained?

Robert Bush and Dwight W. Allen show other types of questions:

(1) Questions which involve concrete and positive facts.

(2) Questions that are answered with general ideas.

(3) Questions that challenge reflective and critical thinking.

(4) Questions that stimulate discussion.

(5) Questions that inquire, investigate, and scrutinize.

One of the responsibilities of the teacher is to make the thinking process pleasant, satisfactory, and not frustrating. Nothing helps to discipline the personality better than to think.

The teacher is the crucial point in the creation of a work environment that challenges and stimulates the thought of the creator. The art which is developed when asking will stimulate the students' originality in their expression, precision and property in the answer, responsibility in the word, integrity when speaking about and supporting his or her point of view. The students should

not fool around or hesitate. They should speak frankly as to whether or not they agree. They should not feel bad if they do not know. They should be conscientious that they lose prestige when they say foolish things, or support an idea that is erroneous. The teacher should not feel uncomfortable either if he or she does not know how to answer a question that he or she was asked. On the contrary, he or she should take advantage of the opportunity to discuss the objective. He or she should give individual or group assignments, form committees, or simply extend the discussion for a future class.

It is the responsibility of the teacher to be an example at all times; illustrate how he or she reaches a generalization, how he or she forms and verifies an hypothesis, before asking a student to do it. He or she also needs to develop in his or her students an attitude that is the greatest in this process; think and reason well each experience, apply the knowledge incorporated into new situations. It is also important to think about the stage of development and the intellectual level at which the student finds him/herself. With this, one can expect more or less use of the participation. The problems and situations that are presented should challenge students and be defined well enough so that they stimulate the thinking process without frustration.

Some essential points when making up questions are:

(1) The teacher should anticipate the possibilities of error that his or her questions may cause and be ready to back them up.

(2) He or she should prepare the questions with anticipation in order to avoid the risk of them being ambiguous or too simple. These should be written in the daily plan. The purpose of the questions is to simplify or broaden the discussion between the students and the teacher. The students should not be asked to define each opinion, especially if the topic is controversial. On the other hand, the students should be stimulated to ask questions on those things which they do not fully understand. It is advantageous that the teacher formulate the questions first and later pause to have a student answer it. If it is convenient and necessary, the question should be rephrased.

(3) It is important to be aware of syntax. Many teachers, especially those that take the initiative in the profession, formulate

a declarative statement before the question, which confuses the student. [Example: The plants that exhibit these characteristics, how are they called?]

(4) Clarity and precision are fundamental when formulating questions. They should be careful of redundancy or irrelevant words.

(5) The center of discussion should be the topic and the students, never the teacher.

(6) One-word answers or phrases should be very limited. These are called mechanical answers.

(7) It is convenient to avoid the questions that have obvious answers. This does not imply that the teacher should not offer some clues or insinuate some important aspects which may help to answer the question.

(8) Unintelligent questions, questions without purpose or feeling, should not be asked.

(9) The teacher should permit that various students answer the same question. This gives way for some observation of the actual perspectives and to better use the level of development (amplitude and depth

when thinking). In the discussions, competitiveness should not play a part whatsoever. The focus should be on interchanging ideas, respect for others, collaboration to explore and examine ideas, to expand on the different points of view and enrich ideas and concepts.

(10) Questions that promote guessing should not be asked.

(11) The teacher should promote interaction of answers which make the students feel satisfied with themselves.

(12) The teacher should make sure that all students get a fair chance to answer questions so that no student feels left out.

(13) The teacher should praise and recognize the students when they formulate questions.

The teacher confronts many challenges. Two of them are fundamental: selection and content, and presentation. It is necessary to understand the material and know the objectives as well as know how to present it in a way that will stimulate the students' interest and desire to learn.

The dictionary of psychology defines "stimulate" as: "The external energy to reception that excites." In a

broad sense, it is an object or internal or external success, an objective aspect, that provokes or modifies an experience or that alters the activity in a living organism. The implication of this definition in the teaching and learning situation is evident.

Human beings form habits easily and fall into routine frequently. It is convenient for the teacher to be conscientious of this and try to bring variety into the classroom to avoid monotony and to increase the student's attention. A good teacher is attentive to the reactions of the students. Generally, they are observed through key things, such as facial expressions, eye and head movements, and the position of their bodies. When he or she feels that the activity has not provoked the desired results, he or she recognizes that the stimulant has to be modified or altered.

Behavior Techniques

Among the stimulants that the teacher can use are the following:

Change of Position: The students react to the movements of the teacher. For this reason, the teacher should move naturally among the students and the classroom when he or she feels it is necessary. The teacher should change positions to maintain the students being alert and awake.

Gestures and Manners: Hand, head, and body movements are important in communication. The oral message is evidently more interesting and significant if it is accompanied with hand signals, gestures, and manners.

Tone of Voice: The teacher should use diverse inflexion in his or her tone of voice to attract the attention of the students.

Centralize Attention: There are occasions when the teacher desires to capture the attention of the students and direct them specifically toward something in particular. He or she can do this by means of oral expression, gestures, or a combination of both. Examples include:

(a) Oral Expression: "Observe this diagram." "Look closely at this detail." "Listen to what so-and-so is saying." "Listen closely to what I am going to say." "This is very important."

(b) Signs and Gestures: Signal an object; make a short but precise noise; clap your hands.

(c) Combination of Oral Expression and Gestures: "This is very important." (The teacher points to the chalkboard while expressing him/herself orally.)

Interaction Patterns: The climate of work demands continuous interaction between the teacher and students. The teacher should deliberately use different types of

interaction in the same class in order to make the contents of the presentation more interesting. In the classroom, one can observe many types of interaction when knowing:

(a) Teacher-Group: The teacher talks to the group in general, asks questions, gives a demonstration, gives a conference, gives an explanation.

(b) Teacher-Student: The teacher talks to a student in particular, asks questions, or discusses a certain point with him or her.

(c) Student-Student: The teacher asks a student to comment or amplify what another student has said. This way he or she makes the students get involved in a discussion among themselves while he or she observes from a distance.

Pause or Silence: Silence is a resource that is effective when it is utilized at the opportune moment. There are occasions when a silent moment allows the student to reflect, reason, think, and organize his or her ideas. The use of silence is a form of reducing stimulus, which represents a change, and so it contributes to capture the students' attention.

Change of Sensory Canals: The use of the chalkboard, audio-visual objects, and figures help the teacher transmit a message that he or she wishes to convey. This produces a

change in the sensory canals that are frequently used in the classroom--hearing and vision.

The oral message should be accompanied with the visual image that can be visual aids, a figure, or a model. Sometimes tactics can be a means to reach or convey better communication.

When the chalkboard is used or any other visual aid is used to transmit the message, it is recommended that the teacher make use of the visual image instead of expressing him/herself orally. It is to say, he or she should signal the object or the word and direct the student to understand the object without using oral expression.

Besides the strategy of the art of formulating questions as a means to expand the development of thinking, there is the contra-interrogatory. They are listed below:

(1) The Contra-Interrogatory: The teacher utilizes the answers of the students to formulate new questions and tries to amplify and clarify the information in such a way that all students will understand it.

(2) Contra-interrogatory rests in the skills of making up questions, inquire, ask, carefully examine, try out the questions, interpret, scrutinize, drill. It can be said that it is a refined phase of asking

questions. It consists of guiding the students to amplify their answers and asking additional questions before accepting the final answer. It is an indirect way of obtaining more group participation and of making the students develop their mental thinking skills which allow them to comprehend, apply, analyze, synthesize, and evaluate.

The teachers should make professional decisions on contra-interrogatory. He or she has to decide which answers require it and which do not.

When skills are used correctly, the students feel rewarded because their answers have been given the importance required and they are applying their knowledge and have clearly applied their basic skills.

Types of questions that can be utilized in contra-interrogatory are:

(1) Questions to obtain more information.

- What more can you say about this in particular?
- Can you expand on this topic?
- Does someone want to add to this information?

(2) Questions to imply more security, more comprehension, and application.

- Are you sure of what you are saying?

- Can you give an example?
- In what other way can you apply this information?
- What reasons do you have to recommend this action be taken?
- What made you reach this conclusion?

(3) Questions to obtain alternatives or contrasting points of view. These questions make the students reach higher levels of satisfaction in the development of skills, such as analysis and comprehension.

- What other way would you answer this?
- What other way would you resolve this problem?
- What would happen if it were done in another way?
- What do you think would happen if it were done contrary to the way in which you suggest?
- What other conclusions could we come to?

(4) Questions to prove or evaluate.

- How can we verify that this is true?
- What evidence do we have to prove that it is true?

These skills can be carried out as the example that follows shows. It consists of a teaching strategy that promotes the development of basic and complex thinking skills in children with special learning disabilities.

EXAMPLE: Subject--Spanish; Grade--Second Grade

1. Objectives

   (a) Recognize the personification as a literacy resource in the story.

   (b) Identify the principal expressed idea: initial sentence.

   (c) Organize the given idea in order to establish the meaning of the story.

   (d) Recognize the vocabulary of the story.

2. Attitudes

   (a) Recognize that love is an element of cooperation (solidarity).

   (b) Recognize that responsibility is an element of love.

   (c) Be conscientious of the importance of knowing and taking care of the loved object.

<u>Strategy of Teaching</u>:

(a) Exploration: Activities for the exploration of the concepts of the dog and the child. Through the observation with audio-visuals, a movie of a dog with a child, the students would say what they know about the topic. The teacher would be able to use questions like:

- What do you see on the audio-visual (movie)?
- Have you seen a dog?
- What characteristic does it have?
- What does a dog do?
- What do you think the dog feels for his or her master?
- How can you see these feelings?

(b) Activities of exploration of moral concepts: Informal conversation regarding love. The teacher can utilize questions such as:

- Who loves you?
- How do you know?
- Who do you love?
- How do you show it?

With the answers to these questions, the teacher continues exploring the concepts of cooperation (solidarity), responsibility, compromise, and care for the loved object.

Conceptualization:

(a) The teacher will show relation of the experiences to the different stages of exploration with the vocabulary that appears in the story "The Best Friend" (at the end of this Handbook) and will

utilize things such as audio-visuals, context, gestures, and simple definitions:

- Cross
- Recreation
- Refrigerator
- Special
- Offer
- Refreshment
- Suffer
- Outside

(b) Silent lecture of the story: Discussion of the story with the following questions:

- What was the dog like?
- What was the boy like? What problem did the boy have?
- What feeling from the boy woke the dog?

(c) The teacher can continue the discussion of the story with the following questions:

- Where do dogs go in order to help people?
- In this story, some dogs helped some people. Can you tell us who they were?
- Why do you think that people have dogs?

- Why do you think the boy and his dogs became best friends?
- Do you think the dogs are good because they help people?
- Do you think the dog deserves to be called man's best friend?
- If you could have a dog as a companion, what type of dog would you like to have and why?
- If you could train a dog so that it did things for you, what things would you show it how to do?

(d) The teacher can maintain a discussion by asking questions that permit the student to take on certain roles, to identify values in conflicts, and to analyze the consequence of their action.

(e) Put in order the happenings of the story:

_____ In the school, the dog was next to the boy all day.

_____ He helps the boy when he gets dressed.

_____ The dog sleeps next to the boy all night long.

_____ Every morning, the boy and his dog go to school together.

_____ If the boy needs something, he tells the dog.

"The Best Friend"

It is said that of all the animals, the dog is man's best friend. The dog can go for a walk, knows how to play ball, and can even protect your house.

The dog can do many other things as well. There are some people that would suffer a lot without the help of their dog.

This woman cannot see. Thanks to her dog, she can travel around the city. The dog takes her to work and later shows her the way home.

The dog sees for the woman. The dog knows when he can cross the street. The dog protects the woman. He does not cross the street if he sees a car coming.

The woman and the dog are very good friends. The woman loves her dog and the dog loves her.

The people that come from the fields have much work to do. A cowboy lives in the fields. His dog helps him with the animals.

The dog is with the animals all day and night. At night, he protects them if a wild animal approaches. During the day, if one of the animals makes an attempt to leave, the dog looks for him. Thanks to the dog, the cowboy's life is a little easier.

In a country where there are many big mountains, there lives another dog. This dog helps the people out

very much. The dog is big and strong. He likes the cold as well as the mountains.

There are people that climb to the top of the mountains. It is not easy. There is a lot of snow and it is very cold. Sometimes the snow falls from the top of the mountain and the person is trapped. The dog looks for the person.

This boy and his dog are very good friends. They spend all day together. They go everywhere together. The boy needs the dog's help.

This dog is from a very special school. They show the dog many things at this school. After school, the dog can help the people that need it.

The boy that we see here does not run to school like the other children. He cannot. The boy does not carry in his arms what he needs. He cannot. If he drops a coin, he does not pick it up. He cannot. His dog helps him with all these things, and many more.

Every morning, the boy and his dog go to school together. The dog carries the boy's books, picks up whatever the boy drops, and protects his friend--the boy.

At school, the dog is next to the boy all day long. He is with him in the classroom. He goes out to recess with him. After school, the dog helps the boy go home.

There the dog goes to the refrigerator, opens the door, and offers the boy a soda. The dog knows what

soda is for the boy and the dog will not drink it himself.

When it is cold and there is ice on the street, the boy goes out to play with his dog. The dog takes the boy for a ride on the ice.

If the boy needs something, he tells the dog. The dog hears the boy and what he says. He helps the boy get dressed. He also helps him if he falls.

At night when the boy goes to his bed, the dog helps him once again. The dog takes the boy's clothes and puts them in the hamper.

The dog sleeps with the boy all night. He spends all day with him. The boy loves his dog. The dog loves the boy as if he were one of his puppies.

Thanks to the dog, this boy's life and the life of many other people is much better.

The dog sure is a wonderful friend to people.

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