

THE EFFECTS OF THREE TYPES OF METAPHOR
ON SIXTH GRADE STUDENTS'
READING COMPREHENSION

by
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I hereby recommend that this dissertation prepared under my direction
by Paula Jean Gaus

entitled The Effects of Three Types of Metaphor on Sixth Grade
Students' Reading Comprehension

be accepted as fulfilling the dissertation requirement for the Degree
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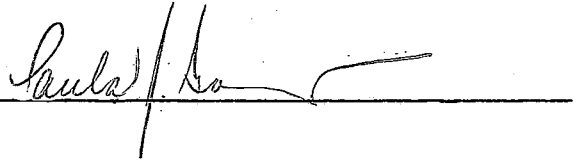
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A handwritten signature in cursive script, appearing to read "Paula J. Ho", is written over a horizontal line. The signature is positioned to the right of the word "SIGNED:".

To Mom, Dad, and David with thanks and love.

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ABSTRACT

The purpose of this study was to investigate differences in recall of four modified passages of descriptive exposition on the topic of Appaloosa horses; one passage contained simple metaphors, one contained explicitly-cued metaphors (similes), one contained a combination of metaphors and similes (the original passage) and one contained literal language only. The passage was selected from a children's magazine.

A large group preassessment evaluation determined that subjects similar to those in the experimental study (1) had little knowledge of passage content, (2) indicated no differences existed in information contained in the four passages, (3) could respond adequately to incomplete sentences as recall probes, (4) understood metaphor-related vocabulary.

In the experimental study, sixth grade subjects were individually and randomly assigned to read one of four passages. Recall was assessed, first, by asking subjects to recall the passage; second, by asking for explanation of all initial recall topics; and finally, by presenting subjects with incomplete sentence probes. Recall was taped, transcribed, and analyzed in order to obtain a recall score.

The findings of the study follow.

1. There were no significant differences in total recall of the four experimental passages.

2. Subjects generally recalled expected informational units, i.e., units of information contained in the text.
3. No single response phase accounted for a majority of recalled information.
4. When subjects provided unexpected informational units, i.e., units of information not contained in the text, those informational units could be directly traced to prior world knowledge which supplemented or contradicted textual information. Unexpected responses occurred in response to general passage information as well as in response to target (metaphor and metaphor-equivalent literal) information.
5. In the recall of target informational units, there were no significant differences in the types, quality, or amount of information recalled across the four passages.
6. When target informational units were considered in relation to total recall, significant differences in resulting proportions were found. Generally, Metaphor and Literal Passage mean indices were significantly higher than the Explicitly-cued Metaphor Passage means. The Combined and Explicated Passage shifted inconsistently relative to other passage recall proportions.

In recall of metaphor-embedded text, the following conclusions seem justified.

1. There appear to be no significant differences in recall of text containing different forms of metaphor or literal language.

2. Subjects generally recall information which is contained in the text; unexpected recall information can be related to subjects' prior world knowledge.
3. No single response format appears to permit subjects optimum opportunity for recall of text.
4. There appear to be no significant differences in subjects' recall of metaphor or metaphor-equivalent literal informational units.
5. The propensity of a reader to recall specific metaphor or metaphor-equivalent literal informational units differs according to type of passage read within this study.

The following implications may be drawn from this study.

1. Research focusing upon recall of text rather than upon recall of isolated units may produce different, and more practically valid, results.
2. Instruction in metaphor comprehension seems best integrated into general comprehension instruction, rather than isolated as a skill exercise.
3. Children's blending of prior world knowledge with textually presented information should be considered a natural phenomenon and indicative of positive growth in reading.
4. Blending of prior world knowledge with textually presented information appears to support an interactive theory of the reading process.
5. Further research into response of children to explicitly-cued metaphors (similes) seems justified.

CHAPTER 1

THE PROBLEM

Reading comprehension is an active communication process which occurs when the reader seeks to construct meaning based upon textual features provided by the writer (Goodman, 1976; Smith, 1971; Winograd, 1977). Reading is of ultimate value when it provides new information or expands information which is already known, and yet such increases in knowledge occur only when the reader comprehends what is read. This communication process is facilitated when the language of the writer is understood by the reader and when concepts are fully and completely developed; conversely, any written language which is not understood by the reader interferes with comprehension.

Language containing metaphors has been proposed as one type of language which may facilitate, or conversely, interfere with comprehension in children. In terms of reading comprehension, metaphoric language has been considered theoretically in one of two conflicting ways. Viewed in one way, metaphoric language is perceived as the comparison, or juxtaposition, of old knowledge with new thus facilitating assimilation of the new information (Athey, 1977; Devine, 1964; Robinson, 1975; Roe, Stoodt, and Burns, 1978). An opposing view postulates that because metaphoric language is more complex than literal language, it impedes comprehension and recall (Harris and Sipay, 1975; Zintz, 1978).

The disagreement which centers upon the relative merit of metaphoric language is not restricted to reading educators. Psychologists, philosophers, and linguists are openly in debate about the use of metaphor in educational writing, or instructional materials (Greene, 1971; Haynes, 1975; Miller, 1976; Ortony, 1975, 1976). Much of the debate appears to be based upon theoretical differences.

A growing and current interest in establishing experimental support for the theoretical positions is evident. Researchers are beginning to look at the effect of metaphor upon children's comprehension (Billow, 1975; Gardner et al., 1975; Gardner and Winner, 1978; Pollio and Pollio, 1977; Smith, 1976; Winner, Rosentiel, and Gardner, 1976). Much of this research, however, has examined isolated metaphors under laboratory conditions; that is, such examinations have focused on metaphoric language apart from a contextual setting found in extended discourse. The usefulness of such findings is minimal for educators who are interested in the effect that metaphor has upon children's comprehension of text (cf. Mishler, 1979). Further, researchers have not investigated how different types of metaphor may affect children's understanding of what is read.

In order to further explore the problem of interest in this study, this chapter will follow a traditional format: (1) statement of the problem, (2) hypothesis, (3) definitions, (4) justification and significance, (5) assumptions, and (6) limitations. Chapter 2 contains a review of pertinent literature; Chapter 3, a description of the design of the study. In Chapter 4, the findings of the study are presented. Chapter 5 offers conclusions, implications, and suggestions for further research.

Statement of the Problem

The primary purpose of this study was to investigate the effects on reading comprehension of the three different types of metaphors most commonly found in children's materials. The three types of metaphors were studied within extended discourse. The primary question was whether comprehension differed across modified passages containing (1) simple or classic metaphors [metaphor], (2) metaphors triggered by a cue word [explicitly-cued metaphor], and (3) metaphor which is a combination of (1) and (2) and contains literal, equivalent information within the text [combined and explicated metaphor]. The effects of the three metaphoric modes of presentation were compared to those found for the passage without metaphors [literal passage]. Specifically, the study sought answers to the following six questions:

1. Is there a difference between children's understanding of a passage that contains metaphors and one without metaphors?
2. Is there a difference between children's understanding of a passage containing metaphors and one containing explicitly-cued metaphors?
3. Is there a difference between children's understanding of a passage containing metaphors and one containing combined and explicated metaphors?
4. Is there a difference between children's understanding of a passage containing explicitly-cued metaphors and one without metaphors?

5. Is there a difference between children's understanding of a passage containing explicitly-cued metaphors and one containing combined and explicated metaphors?
6. Is there a difference between children's understanding of a passage containing combined and explicated metaphors and a literal passage?

Hypothesis

In order to meet the purpose of this study, the following research hypothesis, stated in the null form, was generated: There will be no significant difference among sixth grade students in their recall of four experimental passages that contain metaphors, explicitly-cued metaphors, combined and explicated metaphors, and literal language, respectively.

Introduction to Metaphor

As will be discussed further in the second chapter, metaphor is not easily defined. Thus, the purpose of this section is to introduce metaphor as a concept.

Metaphor is a subcategory of the more general area of "figurative language." Figurative language is the literary mode of presenting one idea in terms of another. "Words have their literal meaning, but they can also be used so that something other than the literal meaning is implied. A girl is a girl, but a doll, a peach, or . . . a mouse can also be a girl. What is literally impossible may, through [figurative language] be highly interesting, significant and moving" (Barnet, Berman, and Burto, 1960, p. 41-42).

The array of distinctions among the many subcategories of figurative language is often confusing to the uninitiated. Metaphor is best described by means of examples. When a reader encounters the simple metaphor, "The man growled," s/he is forced to take "growled" in a non-literal way. Since it is unlikely that a man could emit the sound of a lion or a bear, the reader would instinctively search for an alternative meaning: the man's speech was loud, irritated, and unreasonable. "The man growled" seems to be more accurate, more succinct, and more vivid than "The man's speech was loud, irritated, and unreasonable." Several more examples should suffice to develop a concept of metaphor. "The sea-stallion galloped forth upon the waves" describes a ship's voyage. "He gave free rein to his employees" transfers known information about riding a horse to employees. An Appaloosa horse will be described in this study as looking like "chocolate drops on a white tablecloth."

Metaphor appears to have several identifiable components. As identified by Richards (1936) and others, metaphor contains a topic (or tenor), a vehicle, tension, and ground. The topic is "the underlying idea or principle subject of a metaphor." It is the major idea or concept being discussed. In "The man growled," the topic of the metaphor is "man."

Topics are described or qualified by vehicles. The interaction of a topic with its vehicle forms a metaphor. In "The man growled," the vehicle of the metaphor is "growled." "Growled" is intended to convey information about the man; specifically, it refers to the way in which he spoke. "The bear growled" would not be a metaphor since the interaction of the topic and vehicle in this case does not create "tension."

Tension is created in the reader when s/he encounters a metaphor. A man cannot literally growl. Since readers may assume that writers attempt to make sense, an alternative meaning for the words is explored. Tension remains until an acceptable understanding of the statement is found; tension is reduced when salient features of the vehicle begin to make sense when attributed to the topic. In "The man growled," the tension is reduced when the reader recognizes that characteristics of a growl (loudness, irritability, and unreasonableness emitted) can be attributed to a man.

The ground is the term used to describe that which the tenor and vehicle have in common. It is the salient features which can be attributed to the topic by the vehicle. Obviously, in "The man growled," the ground is "loud, irritable, and unreasonable speech." Tension occurs until the ground is discerned by the reader.

A metaphor, then, is a method of transferring characteristics of one object or idea (the vehicle) to another (the topic). The characteristics of the vehicle are not literally transferable to the topic. Tension is created in the reader until an acceptable meaning (the ground) is discerned. Metaphor provides a method of making a vivid and succinct statement to the reader.

Definitions

To clarify their meanings as they are used in this study, the following terms are defined.

Metaphor has the following components:

1. Tenor or topic: As defined by Richards (1936) and others, the tenor is the "underlying idea or principle subject" of the metaphor. It is the major concept discussed. The tenor is described or qualified by its vehicle. The interaction of tenor and vehicle forms a metaphor. For example, in the metaphor, "A ship is the ocean's charger" (Brooke-Rose, 1958), "ship" is the tenor. From this study, the tenor of the metaphor, "The Nez Perce tribe . . . became foster-parents to the Appaloosa" is Nez Perce tribe.
2. Vehicle: The term vehicle, originated by Richards (1936), refers to that part of the metaphor which describes and qualifies the tenor. In the metaphor, "The sun is heaven's candle" (Brooke-Rose, 1958), the vehicle is "candle" since its purpose is to attribute some feature(s) to the tenor "sun." In "The Nez Perce tribe . . . became foster-parents to the Appaloosa," the vehicle is "foster-parents."
3. Tension: As expressed by Richards (1936), tension is created in the reader when s/he first encounters a novel metaphor. The tension is reduced when salient features of the vehicle begin to make sense when attributed to the topic. Tension is eliminated when the ground is fully determined and the metaphor is fully understood. When, for example, the reader attributes loving and caring attitudes toward the Appaloosa to the Nez Perce tribe, the tension is reduced.

4. Ground: Related to tension, ground is that which the tenor and vehicle have in common. The reader must determine the ground, or salient features. Until this is accomplished, tension occurs in the reader. In the metaphor, "Billboards are warts on the landscape" (Verbrugge and McCarrell, 1973), the reader must determine the ground, "both are ugly protrusions." In "The Nez Perce tribe . . . became foster-parents to the Appaloosa," the ground would be the features of loving and nurturing attitudes.

A distinction is made between metaphors which are distinct and creative and metaphors which have lost their tension-producing qualities.

5. Novel Metaphor: A novel metaphor requires a reader to initiate tension-reducing processes upon its encounter. The ground must be determined in order for the metaphor to be understood. All metaphors discussed in this study are novel.
6. Dead Metaphor: A dead metaphor differs from a novel metaphor in that it has lost its ability to elicit tension-reducing processes in the reader. For example, the dead metaphor, "He kicked the bucket," is immediately interpretable by most Americans as "He died." Dead metaphors are often called idioms. A dead metaphor which is not immediately understood by a reader, by a non-native speaker, or by a child is considered a novel metaphor for that person.

Four forms of metaphor, as postulated by Perrine (1971), are discussed in this study. This classification system, developed for its pedagogical utility, permits categories which are mutually exclusive

and apparently universal. The system offers the further advantage of helping establish the degree of remoteness (tension) present between the tenor and the vehicle of the metaphor. The four forms are:

7. Form 1 Metaphor: The topic and vehicle are included in the text. "A is a B" is the most familiar, e.g., "Too long a sacrifice can make a stone of the heart"--Yeats. From this study, ". . . Appaloosas were the jewels of Chinese emperors," is a Form 1 metaphor.
8. Form 2 Metaphor: Only the topic is given; the vehicle must be inferred. An example from Shakespeare: "Sheathe thy impatience; throw cold water on thy choler." In the first clause, the verb "sheathe" makes impatience into a sword. Thus, the vehicle, sword, must be inferred. In the second, the verb and its object "throw cold water" assumes that choler is a fire. In a Form 2 metaphor from this study, "Appaloosas . . . have lines painted up and down their hooves," the verb painted turns the hooves into a type of canvas on which an artist or draftsman may paint lines.
9. Form 3 Metaphor: Only the vehicle is named. Such a metaphor can easily be mistaken for a literal statement. "Night's candles are burnt out" from Shakespeare could be interpreted literally as referring to candles. However, the context leads us to infer a topic--stars--for the Form 3 metaphor. In a Form 3 metaphor from this study, "These horses are black or brown and are covered with snowflakes," the reader uses the context to infer a reasonable topic. In this case, the reader must determine that a pattern--the topic--of white specks covers the otherwise dark animal.

10. Form 4 Metaphor: Neither the topic nor the vehicle are named in the text; both must be inferred. There are few examples of this complex form extant in the literature. Only one such metaphor occurs in the experimental Metaphor Passage. The apparent subject of the Form 4 metaphor is actually the figurative term (vehicle) in another metaphor. "One other color pattern found in Appaloosas is the raindrop. These Appaloosas . . . have a white blanket with splatters inside their blanket." Splatters is associated with raindrop pattern, which is itself metaphorical.

There were three types of metaphoric passages examined in this study: metaphor, explicitly-cued metaphor, and combined and explicated metaphor. There was one passage with literal language only. Each passage has been modified to contain the specific type of language labeled and the same information. The four types of passages are:

11. Metaphor Passage: The metaphor passage contained novel metaphors of all four forms. A metaphor has four components which are either explicit or implicit: topic, vehicle, tension and ground (Richards, 1936). An example of a metaphor from the Metaphor Passage is "Some Appaloosas are colored with large spilled drops of chocolate on a white tablecloth."
12. Explicitly-cued Metaphor Passage: This passage contained metaphors which may more commonly be known as similes. Simile is usually defined as "explicit comparison between essentially unlike things, introduced by a connective (e.g., 'like,' 'as,' 'than') or a verb such as 'seems'" (Barnet, Berman, and Burto,

p. 42). An example of a metaphor from the Explicitly-cued Metaphor Passage: "Some Appaloosas look as though someone spilled large drops of chocolate over a white tablecloth."

13. Combined and Explicated Metaphor Passage or Original Passage:

This contained a combination of both metaphors and similes. Some of the metaphors were explicated; that is, some of the metaphors and explicitly-cued metaphors were followed or preceded by a literal equivalent sentence. An example of a metaphor from the Combined and Explicated Metaphor Passage: "Some Appaloosas are white with large brown or black spots all over their body. It looks as though someone spilled large drops of chocolate on a white tablecloth." The Combined and Explicated Metaphor Passage is the original passage.

14. Literal Passage: The Literal Passage did not contain metaphoric language. Metaphors found in the three other experimental passages were replaced by literal language which, according to adult consensus, contained the same information. An example of a transformed metaphor in the Literal Passage: "Some Appaloosas are white with large brown or black spots all over their body."

For the purposes of this study, a distinction was made between metaphoric language and literal language.

15. Metaphoric Language: For the purposes of this study, metaphoric language is a general term for text that contained any of the types or forms of metaphor controlled in this study.

16. Literal Language: For the purposes of this study, literal language is a general term for text that does not contain the target, controlled metaphors.

For ease in comparing the four experimental passages, each passage was simplistically reduced to a series of propositions.

17. Proposition: As advanced by Thorndyke (1977) and modified for use in this study, a proposition is defined as ". . . a clause or sentence containing an active or stative verb. Relationships between modifiers and their modified terms are not considered as separate propositions unless they appear as relative clauses" (p. 82).

The propositional analysis of the experimental passages for this study was more sensitive to the underlying structure of the passage, and was more in line with Thorndyke's example than with his definition. Specifically, a proposition is identified if the existing verb was stated, or implied, within a phrase, clause or sentence. Thus, in the sentence "Many centuries ago, Appaloosas were the jewels of Chinese emperors," there were two propositions: (1) Many centuries ago, and (2) Appaloosas were the jewels of Chinese emperors. "Many centuries ago" formed a separate proposition because it was implied that "Appaloosas were (existed) many centuries ago."

Justification and Significance

A review of pedagogical texts in the field of reading indicates the vast majority of reading educators have ignored the topic of metaphoric language. This may be because it is incorrectly viewed as

belonging solely to the domain of literature, specifically poetry (Hafner, 1977; Harris and Sipay, 1975; Marston, 1975; Terry, 1972). Those reading experts who have entered the debate over metaphor's contribution to comprehension have little research on which to support their positions. The theoretical base provided for the positions comes from philosophers, linguists, rhetoricians, literary critics, and psychologists.

One view posited by reading educators is that metaphoric language can "increase understanding by comparing one idea or thing with another" (Roe, Stoodt, and Burns, 1978, p. 138). This view assumes that through the interaction of compared items in a metaphor, new insights into the items will result. This process should facilitate comprehension. A recent study by Arter (1976) did not support this hypothesis, but it contains numerous methodological flaws (to be discussed in Chapter 2) which have been avoided in this study. However, cognitive psychologists have shown increasing interest in metaphoric language (e.g., Gardner and Winner, 1978; Ortony, 1977a; Pollio and Pollio, 1977; Winner et al., 1976) because metaphoric language has offered the possibility of interesting insights into the comprehension process. Because a novel metaphor is not immediately understood, the suspended processing operation by which the reader determines the ground--understands the metaphor--is of interest. Cognitive psychologists are also interested in metaphor because developing theories of comprehension seem to support it as a positive influence on comprehension.

Recent and developing ideas about the existence of schema may support the use of metaphor in educational writing. Schema, broadly defined, is the active organization of past actions and reactions to

form an "organized setting" within which new information may be more readily understood (Bartlett, 1932). A schema, when activated, assists a reader in inferring necessary information that is not given by specifying the sorts of things that can appropriately fill the void. It places constraints upon what inferences can be generated. The first step in comprehension takes place when a satisfactory inference has been made (Rumelhart and Ortony, 1977). A postulated problem-solving schema may aid in the process of gaining new insights into metaphorically compared items.

When a writer uses metaphoric language, to compare the known to the unknown, s/he places constraints upon the unknown variable and helps the reader to generate appropriate inferences about it. When metaphor compares or contrasts two known items, constraints are similarly placed upon those items being discussed. Metaphor would, thus, seem to be rather unique in its ability to produce constrained inferences.

Most reading educators who discuss metaphoric language are not so favorably disposed toward its use in instructional materials. It ". . . constitutes a source of frequent difficulty for the pupil or student in his attempt to find out what the textbook says" (McKee, 1948, p. 81). From this still unsupported assumption, educators have come to believe that metaphoric understanding and complex metaphoric language become another skill which must be purposefully developed and taught (Durkin, 1974; Harris and Sipay, 1975; Pearson and Johnson, 1978; Zintz, 1978). Zintz (1978) and Harris and Sipay (1975) state that young children are often able to understand metaphoric language only on a literal level. If a problem-solving schema exists, placing constraints

upon the unknown variable in the metaphor, comprehension on a literal level is impossible. That is, a child not comprehending language in its metaphoric context responds as if to anomaly; hence, the reader not only fails to understand on a literal level, s/he does not understand at all.

The complexity of metaphoric language is certainly attested to by the linguistic literature which surrounds it. Extensive and contradictory reports about how a metaphor functions in language, and how one may be identified, can be found (Black, 1977; Brooke-Rose, 1958; Grice, 1975; Hoffman, 1977; Mathews, 1971; Richards, 1936). However, linguists' inability to adequately describe metaphoric language cannot be taken as evidence that children's competence and performance with metaphoric language is lacking.

The conflicting views about metaphor's ability to facilitate or impede comprehension, with opposing theoretical rationales, provide little useful information for the practicing educator. Only when some research support for either position becomes available will educators have a clearer view of how metaphoric language affects children's understanding. That research must address metaphor in its contextual setting and may address its various types. The present study addressed these concerns.

Assumptions

For the purposes of this study, the following assumptions were made:

1. The subjects who participated in the preassessment evaluation are comparable to those in the experimental study.

2. The preassessment evaluation provided necessary and sufficient data about the comparability of the experimental passages.
3. The experimental passages were equivalent in the information presented.
4. Three phases of recall did reliably and validly assess student knowledge gained from the passages.

Limitations

The study was subject to the following limitations:

1. The findings derived from the present study were passage and task specific; i.e., any generalizations beyond the specific passage and reading comprehension procedures should be considered speculative. The results are limited to a single passage, the performance measures may not measure competence, and the communicative context may have influenced the recall productions of subjects.
2. None of the passages were exactly identical to the original published passage. The Metaphor Passage and Explicitly-Cued Metaphor Passage were modified in order to contain only metaphors representative of the type indicated. While the Combined and Explicated Metaphor Passage was almost identical to the published original, several sentences were deleted.
3. Administration of the experimental instruments was restricted to subjects in selected accessible public school classrooms in Tucson, Arizona.
4. Administration of the experimental instruments was restricted to sixth grade subjects.

CHAPTER 2

REVIEW OF LITERATURE

The presence of language suggests, concomitantly, the presence of metaphor (Shibles, 1974). It should come as no surprise, therefore, that metaphor as a subject of study can be traced back to Aristotle (Poetics), and a recent bibliography of works about metaphor contains some 4000 entries (Shibles, 1971). Recent interests in metaphor have been extensive as evidenced in a survey by Booth (1978) in which he indicated that the discussions of metaphor have ". . . multiplied astronomically in the past fifty years, . . . [and] that the year 1977 produced more titles than the entire history of thought before 1940" (p. 49). From this vast literature, representative theories and studies of metaphor will be discussed. In the specific area of children's comprehension of metaphor, the literature is not nearly so vast and an effort will be made to review it in its entirety.

Specifically, this chapter contains (1) an overview of metaphors found in children's educational materials, (2) a description of various theories of metaphor proposed and/or criticized by linguists, philosophers, psychologists, literary critics, and educators, and (3) a review of empirical studies addressing children's understanding of metaphor.

Metaphor in Educational Materials

At issue in this study was whether children understand metaphor. The rationale for the study presupposed the existence of metaphors in children's educational materials. Instructional time devoted to metaphor comprehension similarly presupposes the existence of metaphor in educational materials. Such instruction is widely advocated (Durkin, 1974; Groesbeck, 1961; Harris and Sipay, 1975; Holstein, 1972; Koob, 1946; Zintz, 1978). Although it remains to be demonstrated that metaphors actually are an obstacle to comprehension, many of the instructional proponents have provided information about the existence of metaphor in children's texts. If a review of children's materials should prove that metaphor is only nominally represented, neither instructional time nor research energy may be justified. In the present review, objective research showing the number of metaphors present in children's materials was combined with subjectively selected examples of metaphors in order to demonstrate that children of all ages frequently encounter metaphors in their reading.

Basal reading series have been investigated several times for the presence of metaphor or "figurative language" in general. Adkins (1970) analyzed one unspecified third grade reader and found forty-five idiomatic and figurative expressions in just thirty-eight pages of text. Arter (1976) examined the Ginn 360 reading series, and found nine instances of nonliteral language for each 1000 words of text in the fifth grade reader. The primer contained fourteen metaphors in a total text of 5600 words. By evaluating third, fourth, and fifth grade basal reading and social studies texts, Groesbeck (1961) determined that there

were an average of 582 "figurative expressions" in the third grade texts, 837 in the fourth grade, and 1337 in the fifth grade. Although comparisons among series disclosed some inconsistencies in the number of expressions, in all cases the number was substantial and increased across grade levels.

Others who have examined social studies texts have discovered that metaphor is prevalent there, too. Arter (1976) reported that in three fifth and sixth grade social studies texts, metaphoric language occurred at the rate of five instances per 1000 words of text. Carter (1977) reported a study by Mackey in which a seventh grade, state adopted history text yielded nineteen different types of figurative expressions. The types are not clearly specified, but examples from the Mackey study included a description of the city of St. Augustine, Florida as "Spain's window on the Atlantic," and a description of vines "as big as a man's thigh."

Ortony (1976) cites the following metaphors referring to Ghandi from a sixth grade social studies text: (1) "He looked into the face of a two thousand year old despair and stared it down," and (2) "Physically, he was a slender little man, but morally he was a giant."

Additional examples are easily found in children's reading materials. From the SRA 111a Lab Kit, a selection about icebergs intended for intermediate grade readers (Reed and Bronson, 1964) contains two extended metaphors and several simple metaphors. The iceberg is first compared to a floating mountain while a second extended metaphor likens icebergs to a large bowl. Bits of ice are referred to as "pointed

sharks teeth." Icebergs are said to act like "poorly made glass."

Foundering icebergs "roar."

A third grade basal reader provides a story about the ecological imbalance created by the introduction of foreign animals (Laycock, 1976). The animals are discussed as if they were entering a new "neighborhood." The ecological imbalance is called a "chain reaction." The good ideas "were filled with nasty surprises." Animals are "shuffled and re-shuffled," as well as "transplanted."

An intermediate grade social studies text (Educational Research Council, 1975) contains an extended metaphor comparing the rotation and revolution of the earth to a clock. The earth goes around and "it tells, or causes, days and years."

Another primary social studies text (Oswald, Chapin, and LaRaus, 1976) discusses beliefs, in an extended metaphor, in terms of a thread. Beliefs "weave together the other parts of the culture." A large portion of the text refers back to this metaphor. Another large section of the text is devoted to a comparison of air to an ocean, to various transportation vehicles, and to a blanket wrapped around the earth. Rain is said to "hammer" India. Water "creeps" across sand. The earth's surface is described as a "lumpy potato." In addition to the metaphors found in the expository selections, the text contains a number of highly metaphorical poems (e.g., "Wind is like a fierce brown bear . . .").

Both empirical studies and subjective analyses indicate that children do, frequently, encounter metaphors of various forms and types. Commonly used educational materials contain enough metaphors to justify

their further study. Children's literature, though not well documented, may be assumed to contain as many or more metaphors of varying forms and types. This study was intended to further the knowledge about what happens when children encounter similar metaphors when they are reading to understand and to remember.

Descriptions of Metaphor

As previously explained, metaphor has recently stirred interest among linguists, philosophers, psychologists, literary critics, and educators. Such metaphoricians, to use Booth's (1978) term, have variously addressed the following questions: What is a metaphor? What is its function in language and instruction? How is a metaphor comprehended? How and why is a metaphor produced? The disciplines and the individual researchers differ in (1) the degree to which each question is addressed and (2) the degree to which the proffered answers provide necessary and sufficient supporting documentation. Consequently, a position is no sooner taken than it is criticized both from within the same discipline and from those in other disciplines. Reviewers of this literature may well agree with Fraser's comment on the state of the art when he suggested that metaphors are the black holes in the universe of language. "We know that they are there, many prominent people have examined them, they have had enormous amounts of energy poured into them, and sadly, no one knows what they are" (Fraser, 1977, p. 16).

It would be a relatively easy task to review this literature if each discipline maintained one easily identified position. However, metaphor theories are defended and criticized within disciplines

(intradisciplinarily) as well as across disciplines (interdisciplinarily). The defenders of a specific theory often base their theories of metaphor upon larger, more overriding theories of language and thought. The critics may then attack the broader-based theory or the specific theory of metaphor. Critics may offer an alternative theory or simply criticize an existing one. Alternatively, proponents of a theory of metaphor may or may not address the relative merits of earlier theories. The review of these various theories of metaphor will therefore be organized by theory, rather than by discipline or individual investigator.

Five general views of metaphor will be examined: (1) the two major opposing views of linguistic theorists, (2) a theory of a generative semanticist, (3) the case grammar approaches, (4) the interactive theory, and (5) the comparison theory. These theoretical approaches to metaphor, and their criticisms, have been considered because they explain the underlying theories at issue relative to instruction and utility of metaphor in education. The lack of agreement among metaphor theorists as to the complexity of metaphor comprehension has been used as a rationale for instruction in and infrequent use of metaphor in education (Miller, 1976). Similarly, the same disagreement has been used to support the qualified use of metaphor in written and oral instruction (Ortony, 1976). Further, the theoretical approaches to metaphor should be examined in relation to the presently proposed study. Both the comparison theory and the interactive theory offer the educator positive rationales for the use of metaphor and hope that the metaphors may be comprehended in the way they were intended.

Two Major Linguistic Views of Metaphor

Transformational grammarians have figured prominently in the debate over metaphor. Two preeminent positions exist. First, the "selection restriction violation" school offers a theory which is assumed to encompass metaphor. This theory has a main tenet that selection of a word or words restricts further selections as dictated by the internalized semantic and syntactic rules of the competent speaker. A violation of these semantic and syntactic rules may result in production of a metaphor. A second position, advocated by the "speech act--pragmatic deviance" group, disputes the claims of the selection restriction violation group and maintains instead that the pragmatics of the situation dictate whether a metaphor is produced. The pragmatics of the situation, according to the speech act group, must include an intention on the part of the speaker to produce a metaphor.

Mathews (1971), a supporter of Chomsky and a believer in the selection restriction violation theory, described the conditions for distinguishing a metaphor from a nonmetaphor and, further, accounted for how the hearer understands a metaphor. His view is that metaphors are understood by competent language users who transform anomalous sentences into literal, well-formed paraphrases. An anomalous sentence is recognized by the listener when semantic or syntactic rules are perceived as violated--thus creating a selection restriction violation. An anomalous sentence is perceived by the listener as strictly anomalous under this proposed system when no literal interpretations seem possible. Mathews postulates that the nature of the features applicable to metaphoric terms are such that selection restriction violations will de-emphasize

some features and highlight others during the search for the literal paraphrase. Consider, for example, the metaphor "man is a wolf." Certain features violate selection restrictions, i.e., can be attributed to wolf but not man. Thus, [+ canine, + quadrupedal, + tail, + hairy] are de-emphasized. Since [+ count, + animate, + mammal] are common features to both man and wolf, features [+ vicious, + predatory, + nocturnal] are interpreted as the literal paraphrase of the metaphor.

Hoffman (1977), a psychologist, questions the usefulness of such an explanation of metaphor. He rejects the theory that metaphor can be understood by a search for literal features. He attempted to analyze the semantics of people's interpretation of seemingly anomalous sentences taken directly from the poetry of e.e. cummings. Subjects were asked to paraphrase 25 unrelated lines in their own words while expressing as much of the meaning of the lines as possible. Only six percent of the words in the subjects' interpretations were taken from the experimental lines. Ninety percent contained well-formed sentences. About thirty percent of the interpretations violated selection restrictions and were metaphorical. The interpretations were significantly longer than the original source materials. Hoffman states that ". . . people rely upon world knowledge and metaphorical devices in interpreting anomalous sentences, rather than relying upon mechanically applied linguistic rules" (p. 5). Such a position, therefore, suggests that literal paraphrase may not be the result of a reader's encounter with a metaphor. Rather, the data suggests that some processing occurs and that the result may be a metaphor different from the one that the writer wrote.

Philosophers, psychologists, linguists, and educators offer two additional and more pointed criticisms of the selection restriction violation view (cf. Fraser, 1977; Guenther, 1975; Lowenberg, 1975; Searle, 1977; Van Dijk, 1975). This group is united not only in its criticism of the selection restriction violation theory, but also in its acceptance of the "speech act" theory. In their criticisms, they focus on context. They first cite examples of anomalous or metaphoric utterances which are not anomalous or metaphoric in context. An example of the former, "His eyes are pearls," is understood literally when the context suggests that the speaker refers to a stuffed animal. The statement "The old rock is becoming brittle with age" (Reddy, 1969), perfectly well formulated and containing no selection restriction violation, is understood metaphorically when the speaker is referring to an elderly professor emeritus. The selection restriction violation theory does not adequately explain such phenomena. A second criticism is that feature analysis may not provide sufficient information for the interpretation of metaphor. This is exemplified by the following assertion: "Sally is a block of ice" (Searle, 1977). The features of unemotionality and unresponsiveness are applied to Sally in the interpretation of the metaphor, although they are not features of a block of ice at all.

The speech act theorists offer an alternative view. Based upon Grice's "Conversational Postulates" (1975), the following three generalizations are offered in reference to metaphor: (1) a metaphorical utterance is not produced unless it is intended by the speaker to be produced as a metaphor, (2) a metaphorical utterance is not understood unless it

is understood as a metaphorical utterance, and (3) a unifying principle appears to underlie all metaphors.

The speech act theorists identify three unifying principles of metaphor comprehension. The first suggests that when the listener recognizes that the utterance is false if taken literally, s/he looks for an utterance meaning which differs from the sentence meaning. A second principle is that the listener attributes "quality" (honesty) to the speaker. Thus, upon hearing a metaphorical utterance, the listener may search for salient, well known, and distinctive features of one metaphorical term which may be attributed to the other. The third principle is that the listener will then see which additional properties of the one term are likely or even possible to attribute to the other. Searle (1977) offers eight nonexhaustive and optional principles by which a metaphorical utterance may be interpreted, given that the three most generally used methods listed above fail to produce understanding. This speech act view of metaphor assumes both that the context in which someone speaks and the way in which the sentence is spoken will allow for predictable interpretations by the listener. The meaning of the utterance will be understood to be different from the literal meaning of the sentence. The hearer will appropriately respond to the interpreted rather than the literal meaning.

Cohen (1977) points to a serious philosophical difficulty for the speech act theorists who want to explain metaphor in terms of the speakers' intended meaning. He claims that metaphoricalness and other "special characteristics" of utterances are properties of sentences rather than utterances. Specifically, Cohen claims that the metaphoricalness of

"Tom is a ball of fire" is preserved under transformation to indirect discourse (e.g., Tom said Mary is a ball of fire), while other utterances do not preserve their special character under similar transformation. For example, Cohen maintains that the apology-making character of "I am sorry" is not preserved in "Tom said he was sorry" which is simply the report of an apology. Thus, Cohen claims that metaphor may not be simply reduced to a variety of speech act. Although this may be true philosophically, linguistically it is a little far-fetched. Metaphoricalness is a respectable linguistic characteristic of language, apology-making is not. Therefore, the crux of the criticism is of questionable validity.

Sadock (1977) offers a linguistic criticism of a different point. To the conjecture that one responds to the meaning of a figurative utterance rather than to what is actually said, Sadock responds that almost any response is, on occasion, appropriate to almost any utterance. He offers the following dialogue in support of his contention: "Is today Monday?' 'Well, this is Paris.'" He states that ". . . much research indicates that the [appropriate response] criterion is simply false" (pp. 20-21).

It appears that the transformational grammarians, in their original theories of metaphor and as their theories evolved, have not satisfactorily resolved the questions surrounding metaphor. They have failed to explain fully why or how a metaphor is produced in the first place, how it is comprehended when it is produced, or how it functions as an integral part of the language system.

Generative Semantics and Metaphor

The generative semanticists do not deign to criticize the positions that transformational grammarians have taken regarding metaphor. Rather, as Frenzt (1974) claims, they simply have taken the stance that the theories do not explain language in general nor have they effectively analyzed the specific phenomenon of metaphor. Frenzt, as a spokesperson for the generative semantics movement, does not address metaphor in terms of its function in language. Metaphor is, instead, used as a means of refuting the theories proposed by transformational grammar theorists.

According to Frenzt (1974), the ". . .critical point in the dispute between Classical and Generative Semantics theorists is whether there is empirical evidence supporting the legitimacy of deep structure as a necessary linguistic concept" (pp. 125-126). Although he espouses the generative semantics point of view, he claims that (1) the generality of the arguments made by the group are limited by the specificity of their examples, and (2) no general sentence type has been discovered which could be analyzed only from their perspective.

Frenzt has suggested that metaphorical sentences may qualify as a general sentence type, analyzeable only from a generative semantics perspective. He hypothesized that if a metaphor's vehicles were transformed into implicit semantic constituents, such a transformational process might be indirectly reflected in an unusual amount of semantic saliency for the vehicle term, i.e., much of the meaning of the metaphor would be contributed by the vehicle alone. Preliminary results supported this hypothesis, and Frenzt claims, the theory of generative semantics.

Frentz's work has not been subjected to criticism. His original assumption that transformational grammar is incapable of dealing with metaphor is at variance with transformational grammarians' own views, as evidenced by the extensive literature already discussed. His hypothesis rests upon the original assumption that metaphor can support generative semantic theories. Therefore, the contribution of generative semantics to an understanding of metaphor and, concomitantly, the contribution of metaphor to generative semantics, remains to be demonstrated.

Case Grammar and Metaphor

The case grammar approach to language in general and metaphor in particular is a fairly recent but promising phenomenon. Fillmore's (1968) case grammar notions may help to specify the kind of relationships existing between conceptual groups underlying noun phrases. These grammar categories, when restrictions are violated, may be the key to the description, explanation, and sufficient conditions of metaphor (Matter and Davis, 1975). Some researchers are exploring case grammar, but very little has been written which specifically addresses metaphor relative to case grammar. Lambert (1969) analyzed metaphors and their impact on language using an expanded and modified version of Fillmore's case grammar. Specifically, she found it necessary to incorporate a consideration of verb cases in her analysis. It appears from her analysis that Fillmore's case grammar may be inadequate in its present developmental form to account for metaphor.

Chafe (1970) has offered an alternative case grammar which may prove useful to those seeking an understanding of metaphor. The grammar

has not been used in conjunction with metaphor at this time. Chafe's grammar offers an advantage in that verbs, as well as nouns, restrict selection of additional lexical categories. In addition, he has postulated post-semantic processes, labeled literalization, which potentially hold promise for metaphor theorists' investigations. Earlier theories do not specifically permit such post-semantic processes.

Interactive Theory of Metaphor

One of the most highly respected views of metaphor is known as the interactionist view. This view has been defended by interdisciplinary scholars (Richards, 1936), philosophers (Black, 1962, 1977; Haynes, 1975), psychologists (Koen, 1965; Paivio, 1971, 1974, 1977; Verbrugge and McCarrell, 1973). Richards (1936) coined the terms tenor (that which is being discussed), vehicle (the figurative term which describes the tenor), and ground (that which the topic and vehicle have in common) in order to make discussion of the components of metaphor simpler and the interaction more explicit. Interactionists assert that in a truly interesting metaphor, the vehicle qualifies the tenor, and the ground of the metaphor must be determined by the reader. During the ground-seeking process, the meaning of both the tenor and the vehicle interact to create meanings which transcend both. Richards (1936) stated that metaphor is ". . . a borrowing between and intercourse of thoughts, a transaction between contexts" (p. 94). As such, metaphor offers an avenue for the advancement and enhancement of thought and language which may be useful to educators. Richards' impact upon modern metaphor theorists is extensive in that not only his terms, but his ideas relative to metaphor, provide thought-

provoking questions for interactionists and comparativists alike forty years after the issues were first proposed.

Even within the interactionist ranks, there is some dissension. Black (1962, 1977), a philosopher, did not dismiss the general notion of interaction but he did dispense with the "inconvenient fiction" of two ideas interacting. Rather, he states that a metaphorical statement has two distinct subjects--the principle subject and the subsidiary subject. The principle subject, or focus, is the anomalous word or words; the subsidiary, or frame, is the surrounding literal sentence. While on the surface it may appear that Black's "frame" may be analogous to Richards' "topic," Black (1962) has maintained that such a comparison of these terms is most inappropriate given the entirely different perceptions of metaphor. Specifically, Black maintains that the frame extends the meaning of the focus, though the two sets of thoughts act together. Metaphorically associated items are thus seen through the "filter" of the focus. For example, in "society is a sea," "sea" is the focus and the rest of the statement is the frame which changes in emphasized meaning as a result of the interaction with the focus (Black, 1977).

Haynes (1975) reiterates that interactive metaphor ". . . is not mere comparison, but the whole eureka process which, in bringing together the hitherto unconnected gives a new insight which belongs to neither" (p. 273). Haynes believes that the creative leap required by metaphor makes it a necessary and often sufficient mode of learning and conceptual change. Since man is perceived by Haynes as rational, purposive, and continually open to perceive new impressions which modify previous knowledge, metaphor is purported to be instructionally useful.

Paivio (1977) expressed his interactionist views by comparing metaphor to a solar eclipse: metaphor highlights new and subtle aspects of the tenor and vehicle while obscuring the commonplace. His explanation of how metaphor is comprehended is called the dual-coding hypothesis (Paivio, 1971, 1974, 1977). This hypothesis assumes that imagery and verbal association are ". . . cooperatively involved in language and thought, including metaphor processing" (Paivio, 1977, p. 12). Imagery and verbal association are independent but interconnected systems designed for storage and recall of "stimulus information." The imagery system presumably deals with information from the perceptual world: concrete objects as well as integrated events. The verbal system deals with linguistic information. The two systems work in conjunction with one another. The imagery system allows for efficient information storage and the verbal system keeps search and retrieval on track. The two systems, according to Paivio, interact in metaphor comprehension to aid in finding the metaphoric ground in long-term memory.

Ortony (1977b) criticizes two points in Paivio's dual-coding hypothesis. First, as Paivio describes the interacting systems, abstract ideas having no image-evoking value would be processed by the linguistic system. However, most integration supposedly takes place within the imagery system. Ortony feels it is unlikely that, as described, the linguistic system could achieve necessary integration of metaphors containing abstract ideas. Ortony offers "abstract representational systems," schema, as a possible alternative to Paivio's two systems. Next, Ortony points out that the dual-coding hypothesis does not make any clear distinction between literal and nonliteral comparisons. Ortony asserts that

there is no adequate differentiation between processes required for understanding a simple comparison and understanding a metaphor in Paivio's analysis. Ortony believes that comparisons are processed differently than the novel conceptions of metaphor.

The interactionist view is not one, easily identified perspective on metaphor; in fact, there is substantive dissension within the ranks of the interactionists. Paivio's views contrast with those originally proposed by Richards and modified by Black. Where such dissension exists, it could be assumed that the theory is not totally adequate as an explanation of the phenomenon of metaphor.

Comparison Theory of Metaphor

A version of the comparison theory of metaphor was originally advanced by Aristotle (Poetics) and the theory has faded in and out of favor, in various forms, ever since. The position seems to be favored by psychologists more than by other disciplines (e.g., Billow, 1977; Gardner et al., 1975; Gardner and Winner, 1978; Ortony, 1975, 1976, 1977a, 1977b; Ortony, Reynolds, and Arter, 1977; Ortony et al., 1978; Skinner, 1957; Winner et al., 1976; Winner and Gardner, 1977). The comparison view of metaphor is, briefly, that metaphor compares two essentially unlike things: one a literal item actually discussed and one a figurative item to which the first is compared. It is not assumed that interaction changes, limits, or modifies the meaning of the two terms, although comparison theorists often believe that commonality must be determined for the two terms.

Ortony, in collaboration with his colleagues (Ortony, 1975, 1976, 1977a, 1977b; Ortony et al., 1977; Ortony et al., 1978), has written a series of papers addressing metaphor. He has consistently maintained that (1) a metaphor must be contextually anomalous and (2) a metaphor differs from true anomaly in that its tension can in principle be eliminated. Ortony uses Richards' terms (topic, vehicle, tension, and ground), to refer to the components of metaphor. The metaphor's components are recognized as being a part of a metaphor when it seems they are incompatible with the surrounding context. Thus, a whole sentence metaphor such as "The old rock is becoming brittle with age" (Reddy, 1969) would be recognized as metaphorical in an anomalous situation, yet permits a literal interpretation in nonanomalous context. According to Ortony, when the reader recognizes that a statement is anomalous in its context, comparability of the topic and the vehicle is sought, i.e., tension elimination processes occur. A logical extension of Richards' interaction theory would be that this process is the search for the ground. If the ground is not determined, the tension eliminated, the statement may be considered true anomaly--at least for that reader. Ortony states that the role of comparison is the tension elimination process; comparison may be the means of comprehension rather than the purpose of it.

Ortony (1977b) also asserts that there is a distinction between "recognition" metaphors and "discovery" metaphors. This distinction may prove useful in identifying the instructional utility of various novel metaphors. In a recognition metaphor, the reader is presumed to know enough about the topic to recognize that what is being implied about the topic is true. For example, in "encyclopaedias are gold mines" (p. 9),

most readers would be expected to recognize that what is being said is true. In the discovery metaphor, on the other hand, the listener may know little about the topic and in comprehending the metaphor, discovers something new, or at least makes inferences about something previously unknown. For example, the metaphor "Jimmy Connors' manners are a cess-pit" (Ortony, 1977b, p. 24) will probably be correctly interpreted. This interpretation will probably also allow the reader to discover new information. Such discovery metaphors may be beneficial in the processes of instruction and learning. Ortony states that discovery metaphors "... are one of the cornerstones of insight" (p. 24). It seems likely that teachers could find use for a method that specifically allows students to use knowledge they already have to better understand new information.

Work in the area of schema, briefly described in the first chapter, lends credence to Ortony's instructional utility point of view. Surprisingly, though, support came early from the behaviorist school. Skinner (1957) commented that the discovery type of metaphor "... is the most useful when no other response is available. In a novel situation to which no generic term can be extended, the only effective behavior may be metaphorical" (p. 98). Skinner considers metaphor merely a matter of transferring an old reinforced response to a new stimulus which shares qualities with the old stimulus.

Ortony (1975) has specifically addressed the issue of metaphors in educational writing. His position is that metaphors are necessary (and not just nice) in written instructional materials, or "educational writing." His assertion rests upon three theses. In the first, the compactness thesis, Ortony postulates that metaphor allows the reader to

make use of knowledge about the world (cf. Hoffman, 1977) in language comprehension. This knowledge may be assumed by the writer, who is then relieved of the responsibility to describe minute details. This process of filling in details is called particularization. Metaphor allows large chunks of information to be readily transferred, i.e., metaphor constrains and directs particularization. For example, in the metaphor "He dived into the icy water like a fearless warrior," readers are directed to those features of fearless warriors which can be transferred to divers. These features are transferred in a chunk, more compactly and efficiently than the more explicit and lengthy lists of adjectives which might be applied.

The second, the inexpressibility, thesis posits that metaphor allows the expression of that which is otherwise inexpressible. In any given language, Ortony maintains, there are some things for which we have no means of expression. The root of Ortony's metaphorical example, "The thought slipped away," has no literal equivalent expression. However, Ortony does ignore the fact that his example does not require tension elimination processes since it has long been a dead metaphor. Nevertheless, other examples of inexpressibility compensated for by metaphor can be found (Emig, 1972; Green, 1971). It is suggested that noises from unknown sources can often only be described by means of a simile or metaphor. For example, a persistent, low-toned perseverating or vibrating noise may often be described as sounding "like the buzzing of a bee."

The compactness thesis and the inexpressibility thesis should interact to a great extent. That is, more than one feature and abstract features must be the raison d'etre of the metaphor. For example,

"oranges are the baseballs of the fruit-lover" attempts to transfer only one piece of concrete information--oranges are round--and is thus not to be confused with a proper metaphor.

The third thesis, called the vividness thesis, assumes that since chunks of information, related by background experiences, are transferred intact by metaphor, the metaphor may produce a strong emotive response. By utilizing perceived experiences to bind together emotive, sensory, and cognitive aspects of the metaphor's ground, metaphor makes the experience of recognition or discovery a particularly vivid one.

Miller (1976) rejects Ortony's claims for the use of metaphor in educational writing. He maintains that metaphors ". . . are typically used to gloss over matters which cannot be well explained or clearly specified . . . [and] are often used in a misleading way to play upon emotions or to carry an argument by means of distortion and overemphasis" (p. 174). Although it may appear that the first argument concedes the inexpressibility point to Ortony, Miller suggests that metaphors are not effective alternatives to attempted explanation. If metaphor is to be viewed as a method of transferring chunks of information about A to B, it may also be accused of inviting misunderstanding or lack of precision according to Miller. Each reader may transfer his own peculiar chunks of information. (Miller ignores the fact that readers will impose their own knowledge structure on what they are reading, whether the information is stated metaphorically or through literal paraphrases.) If a writer can express an insight via a metaphor, Miller claims, he can surely paraphrase it. What the paraphrase loses in compactness, it will gain in

clarity and precision. Clarity and precision take precedence over the vividness that metaphor offers to learners.

Sticht (1977) indirectly addresses Ortony when he cautions that the use of metaphor in educational writing has two dangers: (1) learners may not recognize that they are to shift to metaphorical (creative) modes of thought from cognitive-interactive (content-oriented) thought, and (2) written metaphor does not allow for instructional "unpacking" for heterogeneous groups of students. Unpacking is a term used by metaphoricians to denote the process of explaining a metaphor after it has been used. It is a method of reducing the tension of the metaphor for the reader. An illustrative example comes from Tversky (1977). ". . . An essay is like a fish Like a fish, an essay has a head and a body and it occasionally ends with a flip of the tail" (p. 349).

In general, however, Sticht supports the qualified use of metaphor in the instruction/learning process. He postulates that with adult literacy students, at least, the repeated use of metaphor may strengthen the powers of analysis and synthesis.

Ortony (1976) responded to critics' concerns by stating that any potentially powerful pedagogical tool can be misused. Metaphors are appropriately used in various situations in educational writing: as introductions to new concepts, as summaries, as comparisons (as in the electricity/water flow comparison). Metaphors are often suitably unpacked by educational writers in order to prevent misunderstanding.

In addition to the concern expressed by the comparisonists themselves, the interaction/comparison debate continues. Haynes (1975) accused Ortony of restricting himself to the simple comparison view of

metaphor. The purpose of educational uses of metaphor is to promote comprehension. The most interesting metaphors educationally, she claimed, are the interactive variety which permit the eureka process. Ortony (1976) countered that Haynes drew too narrowly the confines of metaphor. Arter (1976) suggested that the interaction view of metaphor may really only represent various instances of comparison. In support of this view, she pointed to Perrine's (1971) classification of the four forms of metaphor. It seemed to her that only Form 1 metaphors (those having both tenor and vehicle stated) would be considered by interactionists as uninteresting metaphors of comparison. ". . . The examples that the interactionists give to illustrate the process of interaction . . . could be merely examples of the other three kinds of comparison. If this is true, then the 'eureka' aspect of interactive metaphors . . . is really only the result of discovering what the real vehicle and/or tenor of the metaphor is" (p. 12).

The differences between interactionists and comparisonists will certainly not dissolve in the face of this suggestion by Arter. However, for the purpose of this study, the distinctions between the two views will not be accepted as critical. It is probably true that for educational purposes, the four forms of metaphor made possible by the comparison view may serve both pedagogical and research goals. On the other hand, the eureka effect supported by the interaction view holds some promise for educators wishing to stimulate student thinking.

In general, the numerous, varied views and descriptions of metaphor may well lead one to the conclusion that a precise description of

metaphor is beyond the capability of literal language. Paivio (1977) has called metaphor a solar eclipse. Fraser (1977) has commented that ". . . metaphors are the black holes in the universe of language" (p. 16). An accurate description of metaphor, as described in the literature, seems to require, therefore, a metaphor about metaphor, suitably unpacked of course. The state of the art in the study of metaphor is like an electrical storm. It is at once energetic and illuminating. But the illumination is invariably short-lived. A proponent of a theory of metaphor, whether linguist, psychologist, philosopher, or educator, is open to attack both intradisciplinarily and interdisciplinarily. The serious researcher will find no theory which satisfactorily accounts for what a metaphor is, how it is produced, how it is comprehended or how it functions in a language. The one major agreement is that metaphors are produced and are comprehended. This small area of agreement may ultimately rest upon common intuition (Black, 1977). Although the present review may be considered abbreviated, it provides enough information to support Fraser's (1977) contention that ". . . sadly, no one knows what [metaphors] are."

Children's Understanding of Metaphor

The extensive theoretical sparring in the domain of metaphor has not resulted in the same degree of attention among empirical researchers. The question of whether metaphor is truly useful as an educational tool in aiding comprehension can be satisfactorily resolved by empirical research. Developmental psychologists (principally, Billow, 1975; Gardner et al., 1975; Pollio and Pollio, 1977; Winner et al., 1976) have

generally asked questions which peripherally address those of interest to educators. Specifically, they have investigated comprehension of metaphors without surrounding context. Gardner and Winner (1978) explicitly state that ". . . one must ensure that the metaphors are not being interpreted simply by attending to the context, in which case the metaphor is actually ignored" (p. 131). Psychologists interested in children and metaphor have been predominantly concerned with what level of cognitive development is necessary for understanding metaphor. Consequently, most research has been cross-sectional developmental in design, i.e., information regarding developmental capabilities is inferred from results gained by sampling from various representative age groups.

The research by developmental psychologists does not meet the needs of the educational community. Educators, perhaps prompted by a National Institute of Education (1975a) directive to ". . . identify and verify cognitive processes involved in deriving literal and figurative meaning from printed language forms" (p. 14), have recently begun to investigate metaphors in their larger contextual setting. This recent educational research directly addresses the issue of metaphors in natural language discourse. This new emphasis in research is in sharp contrast to earlier research by educators which presented only instructional paradigms (e.g., Groesbeck, 1961; Koob, 1946).

Cognitive-Developmental Studies of Isolated Metaphors

The cognitive-developmental studies of metaphoric understanding are similar in many ways. They all address the developmental trend in children's understanding of metaphor. The trend has been determined from

cross-sectional rather than longitudinal research. The findings all show that metaphoric understanding develops naturally with age or with school-related activities, i.e., the older the child, the better the comprehension of metaphor according to the preordained criteria established by the investigators.

However, the metaphors are presented to the children with little or no supporting context. Isolated metaphors are often obscure, nonsensical or nonmetaphorical. Limited context, when it is provided, is so highly metaphorical that it is unrepresentative of a natural language text. The syntactic structure is complex and contrived in order to support the metaphor, also making one suspicious of its representative qualities.

Finally, the tasks upon which researchers have based their developmental principles require highly developed metacognitive/linguistic skills. That is, because the research has involved only isolated metaphors and young children, investigators have been limited to various types of explanation tasks or oral multiple choice formats. Children may comprehend the metaphors, i.e., have the cognitive/linguistic skills necessary for the comprehension, but lack the metacognitive/linguistic skills necessary for assessment tasks. Retelling a story seems to be a skill which children do command (Goodman and Burke, 1972) but an isolated sentence provides little information with which to interact and retell. The tools used for assessing comprehension in these cognitive-developmental studies pose a serious threat to the internal validity of the studies.

Since the cognitive-developmental studies of metaphoric understanding are similar in many ways, the discussion will be organized for

convenience around the dependent variable, the tool used to assess comprehension. There are three types of dependent variables used in these studies. In the first type, children are asked to explain the use of a metaphor, i.e., how a metaphoric term may be applied. In the second type of research, children are asked to explain the meaning of a metaphor. The third measure used to assess comprehension is basically a multiple choice format. Studies of each of these dependent variable types will be reviewed and criticized. To reiterate, discussion of these studies will be undertaken because they focus upon children's understanding of metaphor. It is recognized that not every facet of the studies is directly applicable to the one which is proposed. The discussion will be organized for convenience around the dependent variable.

Asch and Nerlove's (1960) study appears to be the only extant example of the first type of study. The researchers specifically addressed themselves to the development of double function terms in "upper-middle class" children, aged three through twelve. Double function terms such as "sweet," "hard," and "soft" refer to both the physical properties of things and the psychological properties of people. The second usage may be considered metaphorical (Pollio and Pollio, 1974). The children in the study were first shown an array of objects exemplifying the physical property of the terms. They were asked to identify the object which matched each term. Then, subjects were asked if people were cold, sweet, hard, etc. Finally, the experimenters attempted to determine whether children could explain the connection between the usage of the term in reference to a physical property and to a psychological trait.

They found that comprehension and explanation of double function usage follows a developmental course. Young children generally understand and use the terms strictly in reference to objects until the age of six. Seven and eight year olds often seemed to understand and use the terms in their psychological sense but apparently see no connection between the two terms. Pollio and Pollio (1974) have suggested that this may be because children of this age may have learned the terms as separate lexical entries, much like homonyms.

Only eleven and twelve year olds were said to understand the dual nature of the terms. The investigators do not specify what constituted adequate explanation of how the terms could be applied metaphorically. The ability to explain why a term may be applied metaphorically in a certain context is perhaps beyond the ability of most language sophisticated adults, and is certainly beyond the ability of children. As described earlier, there is no agreement among linguists, psychologists, philosophers, and educators regarding why a term may be used metaphorically. Thus, children's ability to use language about language and thought (metalinguistic/cognitive knowledge) is probably not developed to the degree necessary for discussion of double function terms. Since children do not have these abilities, it is fortunate that other researchers have not chosen to replicate the Asch and Nerlove comprehension assessment technique. Recent investigators have generally asked children to explain what an isolated metaphor means, also a task requiring highly developed metalinguistic/cognitive skills.

Among developmental psychologists, there has been a tendency to associate the development of metaphoric understanding with Piagetian

developmental levels. Billow (1975) studied children's ability to comprehend two types of metaphor: Similarity-metaphor and Proportional-metaphor. A Similarity-metaphor is defined as one type in which the substitution and its reference are classified together on the basis of a similarity or shared attribute. For example, in "hair is spaghetti," the attributes of "mixed-up or thin and long" are the basis of the analogy between the reference, hair, and the substituted word, spaghetti. In a Proportional-metaphor, four or more elements of the sentence are related proportionally. Using an example from this study, Billow argues that in "My head is an apple without any core," three stated elements must be complemented by an implied fourth term to form the proportion: (head:apple) : (brain:core). Several criticisms of this scheme seem possible. First, the quality and the degree to which the metaphors are representative of those that children would encounter is questionable. Billow does indicate that the sentences are gathered and "adapted" from anthologies of children's poetry. Second, the two types of metaphors do not seem mutually exclusive. "The stars are a thousand eyes" is classified by Billow as a Similarity-metaphor, although "My head is a coreless apple" could easily be derived from the Proportional-metaphor example. Third, some of the isolated metaphors used in this study are rather obscure ("Summer's blood is in ripened blackberries") and the purported proportions are not always clear and distinct ("Dreams passed in a parade;" "Death waves a pale flag"). Explaining the meaning of such isolated metaphors would appear to be extremely difficult. The analysis and conclusions must be evaluated in light of these methodological considerations.

Billow studied fifty "bright normal" boys ranging in age from five to thirteen. He is the only metaphor investigator to administer Piagetian tasks to determine level of cognitive development in this subjects. He found a strong relationship between Proportional-metaphor comprehension as measured by an explanation task and formal operational thinking as measured by a task of combinatorial reasoning. When metaphorical statements were accompanied by pictures (a type of context), five year old boys were able to explain metaphors about 30% of the time. Seven year olds could explain metaphors about 75% of the time and eleven year olds were correct in their explanations almost every time. Concrete operational thinking was determined not to be necessary for some (Similarity) metaphorical understanding. Critics of Billow's study, notably Ortony, Reynolds, and Arter (1977) suggest that the Proportional-metaphors are more complex in structure and assume more conceptual knowledge of the world. Therefore, the ability to understand the proportional-metaphors may be related to more than just cognitive development. Further, they point out that the oral explanation task required metalinguistic/cognitive skills which may have been beyond the grasp of the younger children. This does not indicate that the linguistic/cognitive skills necessary for comprehension of metaphor are lacking, since the children may simply not have been given an opportunity to display their knowledge.

These criticisms may also be applied to the study of an educator, J. W. A. Smith (1976). Smith studied the ability of upper socioeconomic sixth and eighth graders to explain metaphors taken from "fifth grade curriculum literary materials." Subjects from Alberta, Canada, were asked to explain the "passage" and then specifically the metaphors. Six

passages of highly metaphoric language were selected for study. The passages ranged from one to three sentences in length. In fact, the one sentence "passage" contained sixty-nine very complexly structured words. The very complexity of the sentence would make it difficult to understand and explain even if it contained "literal" language only. Only one of the metaphors in each passage was selected for intense study. Two of the literary metaphors follow; one is from Thurber's The 13 Clocks and one is from Grahame's The Wind in the Willows (metaphor underlined):

The Princess Saralinda was tall, with fresias in her dark hair and she wore serenity brightly like a rainbow. It was not easy to tell her mouth from the rose, or her brow from the white lilac. Her voice was like faraway music and her eyes were candles burning on a tranquil night. (Thurber, 1950)

The 'poop-poop' rang out with a brazen shout in their ears, they had a moment's glimpse of an interior of glittering plate-glass and rich morocco, and the magnificent motor-car, immense, breath-snatching, passionate, with its pilot tense and hugging his wheel, possessed all earth and air for the fraction of a second flung an enveloping cloud of dust that blinded and enwrapped them utterly, and then dwindled to a speck in the far distance, changed back into a droning bee once more. (Grahame, 1954)

Smith determined that all Piagetian levels from egocentrism to formal operational thinking were exhibited in the responses. Further, it was speculated that the children exhibited more immature responses than would be expected because the "new cognitive domain" of metaphor taxed their thinking. It is not clear precisely how the responses were scored and placed into categories, but Smith states that ten high-scoring and ten low-scoring protocols were selected from the eighty available to demonstrate the differences. All low-scoring protocols were drawn from sixth graders and all high-scoring protocols were attributed to eighth graders. The study is not without faults. The validity of a one to

three sentence context is questionable. Again, the explanation task may interfere with interpretations about the understanding of metaphor.

Gardner et al. (1975) combined a production task with a multiple choice task in order to avoid the problems inherent in the explanation tasks. Subjects were given eighteen "stories" comprised of either (1) an incomplete sentence, such as "He looks as gigantic as . . .," (2) the incomplete sentence preceded by two neutral sentences, or (3) the incomplete sentence preceded by two sentences designed to encourage production and selection of a metaphoric ending. There was ultimately no difference in the number of metaphoric productions and preferences for the three "story" types. The incomplete sentences contained one of six common adjectives (e.g., short), their antonyms (e.g., tall), and stronger, less commonplace adjectives (e.g., gigantic). Subjects were first asked to produce their own endings and then to show a preference for one of four examiner-prepared responses: a literal response, a conventional response, an appropriate response, and an inappropriate response. An example of the literal response is "He looks as gigantic as . . . the most gigantic person in the whole world." A conventional response would be "He looks as gigantic as . . . a skyscraper in the center of town." An appropriate response, according to the investigators, is exemplified by "He looks as gigantic as . . . a double-decker cone in a baby's hand." An inappropriate response is "He looks as gigantic as . . . a clock in a department store."

The results of the preference portion of this study show an upward trend in preference for an appropriate metaphorical response. The four year olds chose the literal option far more often than any other;

the conventional option was chosen less often, but significantly more often than either the appropriate or inappropriate responses. Eleven year olds chose the conventional response significantly more often than any other; the appropriate response, the literal response, and the inappropriate response were selected less often but in that order of frequency. The fourteen and nineteen year olds chose conventional and appropriate responses with approximately the same frequency and significantly more often than literal and inappropriate responses.

The literal responses show a sharp downward trend from age seven to eleven and then decrease through age nineteen. Conventional responses increased sharply from seven to eleven and then decrease in a curve through age nineteen. The appropriate responses were not generally selected by children between the ages of seven through nineteen. Although the multiple choice format of the comprehension assessment does seem more desirable than explanation of isolated metaphors, the task still requires a command of memory which may be beyond young children. Thus, this study and the ones which follow do not conclusively negate the possibility that children are capable of understanding metaphor.

A report by Winner, Rosentiel, and Gardner (1976) offered hypotheses about developmental metaphorical competence. These hypotheses were based upon Piagetian research as well as their own earlier research. The hypotheses were tested using an explanation task or multiple choice, "preference," format. There were sixteen metaphors of two types used in the study. There were eight isolated metaphors containing double function terms (e.g., "After many years of working at the jail, the prison guard had become a hard rock that could not be moved"). Eight others

contained cross-sensory terms (e.g., "The smell of my mother's perfume was bright sunshine").

The investigators suggested a priori three developmental levels of pre-metaphoric understanding which preceded genuine metaphoric understanding: magical, metonymic, and primitive metaphoric. Lending validity to these hypothesized response types is the fact that Hisamoto (1975) independently arrived at similar developmental levels. In the Winner et al. (1976) study, a "magical" response would be one in which the metaphoric sentence would be accepted at face value and a magical word invented to explain the metaphor. For example, the response "Her perfume was made out of the rays of the sun," would be classified as magical. A "metonymic" response is defined as one in which children might invent a situation in which the two terms of the metaphor may sensibly be interpreted literally (e.g., "The guard worked in a prison that had hard rock walls"). "Primitive metaphoric" responses are ones in which the child focuses upon an incidental aspect of one of the terms in order to place both terms in the same realm. "The guard had hard, tough muscles" is classified as a primitive metaphoric response. The "genuine metaphoric" response is the sophisticated, genuine interpretation (e.g., "Her perfume had a wonderful smell").

One hundred and eighty "lower-middle class" children aged four through fourteen were asked to show comprehension of metaphors in either an oral multiple choice task or an oral explanation task. Multiple choice options were randomly given to the subjects orally and offered all four types of possible responses: magical to genuine metaphoric. Children's oral explanations of the meanings of metaphors were coded

into one of the four response categories. Results of the multiple choice task indicate that seven year olds most often had "magical" responses, seven and eight year olds "metonymic," some eight year olds "primitive metaphoric." Twelve year olds were more likely than ten year olds and ten year olds more likely than eight year olds to provide the genuine metaphorical response. The explanation task proved more difficult. Six year olds were often unable to complete the task. Ten year olds often gave totally inappropriate responses. Generally, there was a steady increase with age of the genuine metaphoric response.

The problems with explanation tasks have already been discussed in relationship to studies by Billow and Smith. An oral multiple choice task is also difficult for children, especially in this case where the investigators required the child to repeat his preference verbatim. To accomplish this, the choices were repeated until each subject gave a verbatim response. The repetition of the preferred item obviously required a highly sophisticated degree of linguistic competence in addition to a well-developed memory. Gardner and Winner (1978) recently report, however, that they showed children pictures which typified each of the four response types. Such an activity, they maintain, eliminates the need for highly developed metalinguistic/cognitive skills; however, even the use of the pictures does not fully remove a degree of skepticism on the part of the reviewer. Since Gardner and Winner's procedures are not fully described, it is still possible that some metalinguistic/cognitive skills were called upon in the interview. The younger children may not have understood the task, the depictions, or the metaphors. Each seems, at this point, equally probable. The burden of proof regarding this

recent claim remains with the investigators. Nevertheless, younger children still tended to choose the magical response under these pictorial conditions. The findings lend additional support to Winner and Gardner's hypotheses regarding developmental trends in the understanding of isolated metaphor.

Gardner and Winner (1978) are continuing their research in the area of metaphoric understanding. Although their most recent research is not fully reported at this time, their initial results have provided information about one new and interesting phenomenon. They are suggesting that preliminary findings indicate ". . . that metaphors are more readily grasped when relations are presented in simile, riddle or analogy forms" (p. 132). This new finding is limited to situations where full context is not available; an objective of the present study is to determine whether these preliminary findings may legitimately be generalized to situations where similes, or explicitly-cued metaphors, are embedded within text.

In another study, by Pollio and Pollio (1977), a written multiple choice format test was developed in order to assess children's understanding of metaphor. The test combined both novel (N) and dead (D) metaphors produced by children in an earlier study (Pollio and Pollio, 1974). The test was ultimately comprised of ten novel and ten dead metaphors and exhibited good psychometric properties. The four alternatives offered in the written test were a correct literal response (*), two incorrect literal responses (I), and an incorrect metaphoric response (M). Examples of the items follow:

- (D) 1. I went into the kitchen and ate up a storm.
- (*) a. I ate a lot.
 - (M) b. I drank some white lightning from the refrigerator.
 - (I) c. I ate so much it rained.
 - (I) d. I like to eat when it's raining.
- (N) 2. I saw a coffin and was scared. I walked slowly toward it. I was amazed my feet were brave enough to take me there.
- (*) a. I did not think I would have the courage to do it.
 - (I) b. My new sneakers made me feel I could do anything.
 - (M) c. My feet have a mind of their own.
 - (I) d. Somehow I was pulled to the coffin against my will.

Subjects were 149 children in grades four through eight. The novel metaphors were found to be more difficult in general than the dead metaphors. Children chose more wrong (equally metaphoric and literal) responses for the novel metaphor items. There was an increasing ability to choose the correct literal response across grades four through seven. The grade eight comprehension scores were unexpectedly a little lower than those at grade seven. This decrease in scores is explained away as a test ceiling effect, since the items were originally composed by children in grades three through five.

This study reinforces the contention that understanding metaphors may be developmental, and in this case novel metaphors are singled out as more difficult than dead metaphors. Still, the limited context situation does not permit extension of the results directly to the classroom situation. Although the unique idea of using some children's productions as test items for other children holds some promise, it is difficult to know

whether the dead metaphors were intended to be produced as metaphors. Similarly, the novel metaphors may have been intended to be understood literally. It should be recalled that some theories of what constitutes a metaphor rely upon speaker/author intent and the context of the situation (cf. Grice, 1975). Pollio and Pollio (1977) ignore this possibility. In addition, the adult researchers who constructed the multiple choice test items imposed their interpretations of the "correct literal response." Such imposed restrictions obscure children's own interpretation capability. Error analysis and further discussion with the children who served as metaphor authors and metaphor readers would have provided an interesting glimpse at their perceptions of their choices, and ultimately, at children's processing of metaphor. Such interaction with subjects is impossible when the instruments are designed for large group administration.

It is obvious that the foregoing studies do not bear directly upon the present study. They are offered in such depth because they do address, from developmental psychologists' perspective, the issue of children's understanding of metaphor. The findings and conclusions from studies conducted under such laboratory conditions may have little relevance to teachers searching for information about how their students may be expected to respond when they encounter metaphors in their reading.

The usefulness of the studies to developmental psychologists themselves is even somewhat questionable. The studies contradict each other on several counts. The general trend suggests that as the child increases in age, the ability to understand metaphors also increases.

There appears to be no distinction between developmental competence in the area of metaphor comprehension and developmental competence in the area of comprehension in general, i.e., as children's conceptual and world knowledge increases with age, comprehension naturally increases. Furthermore, the specific ages at which children can understand metaphor differ according to various specific studies, holding the dependent variable (comprehension) constant. The "best" measure of comprehension relative to isolated metaphors has not been found and likely will never be found; a reliable and valid measure of comprehension may be the key to more uniform results. At this time, one can only surmise that something important differs across the studies. The children studied have differed in socioeconomic status and/or ability; the types, forms and/or the specific metaphors studied have differed; the methods of scoring and analysis differ; and, finally, there is little similarity in the experimental conditions. Which of these differences are affecting the ambiguous research findings cannot be specified at this time. All that is clear is that the studies do differ in important but as yet unspecified ways. Further, it is clear that, at least at this time, few implications for educators can be drawn from studies addressing metaphor in isolation.

The research has been included in this review because the questions in the area of children's understanding of metaphor have been predominantly asked by developmental psychologists in isolated, laboratory conditions. Education does not, however, occur under laboratory conditions; thus readers do not encounter metaphors in isolation. A review of these studies is pertinent to this study for two reasons. First, it is imperative that educators realize that studies of metaphors in

isolation have no consistent findings that can even suggest fruitful areas of research that will have implications for educators. A second reason for including these studies is to emphasize that efforts to examine metaphors in a limited, isolated fashion have failed to clarify the issues relative to metaphoric understanding. This is further justification for examining metaphors in a meaningful contextual setting.

Children's Comprehension of Contextually-embedded Metaphors

Few empirical studies of metaphoric comprehension using a full text have been forthcoming. Several reasons are responsible for this void in the literature. The first, alluded to earlier, is that metaphorician/developmental psychologists are reluctant to allow context to muddy the issue of comprehension (Gardner and Winner, 1978). Empirical studies using adult subjects have shown that context does interact with metaphor comprehension in a predictable way: the more context provided, the less problematical the comprehension of metaphor (Ortony, 1977a; Ortony et al., 1978; Pollio and Smith, 1977; Rumelhart, 1977). This contention is also supported by metaphor theorists (Brewer, Harris, and Brewer, 1976; Gardner and Winner, 1978; Perrine, 1971). Thus empirical studies have predominantly centered upon metaphors apart from their supporting context.

The second reason that metaphors have not been studied in context is related to a theoretical controversy affecting design considerations. Seemingly, the assessment of the effects metaphors have on comprehension should be a relatively simple matter. Comprehension of a text containing metaphors may be compared to comprehension of an equivalent text without metaphors. The controversy centers around the question of whether an

equivalent nonmetaphoric text can be constructed. Theorists have generally held that literal language cannot be substituted for metaphoric language without changing the context and power of the passage (Black, 1962; Koen, 1965; Lowenberg, 1975; Matter and Davis, 1975; Ortony, 1975; Shibles, 1974). Researchers venturing into the realm of comprehension of metaphoric text have either assumed equivalency (Cunningham, 1976) or relied upon adult concensus of perceived equivalency (Arter, 1976; Tepaske and Pearson, 1978).

The third problem relates to selection of a measurement tool for the dependent variable. The task must result in a reliable score which is extremely sensitive to slight differences in comprehension which may occur in response to metaphoric language. It should allow some flexibility on the part of the researcher to probe children's responses, especially the rationales for what appear to be errors in comprehension. It is mandatory that an assessment tool be chosen that gives the subject every opportunity to demonstrate his/her competence in the area of metaphor comprehension. Response formats used in previously described studies do not appear to meet these requirements. These requirements are not met by the studies described here.

An intensive review of relevant literature reveals only three studies which specifically address the question of how metaphor in text affects children's comprehension. These studies, all recent, will be reviewed in chronological order for convenience. The first study, by Cunningham (1976), assessed comprehension by the "cloze" procedure. He found significant differences in comprehension between metaphorical and nonmetaphorical equivalent passages as measured by cloze. Arter (1976)

found no significant differences in comprehension of equivalent passages using a written free recall and a multiple choice test. Tepaske and Pearson (1978) found that metaphoric statements were more readily recalled from a passage than nonmetaphorical equivalent statements. These three most relevant studies will be reviewed, with their contradictory findings, in chronological order following a brief overview of national assessments.

Of a more general nature, but still addressing children's comprehension of contextually-embedded metaphor, are two national assessments of literature knowledge and preference. The assessment of metaphor comprehension is an incidental concern in these studies, but they nevertheless provide an indication, on a national scale, of children's ability to interpret metaphoric passages. The National Assessment of Educational Progress included a brief assessment of metaphor comprehension among the other literary appraisals. It offers an index of children's metaphor comprehension abilities across several age groups and throughout the United States. A smaller study by Terry (1972) of poetry preferences also has some bearing upon the abilities of children to understand poetic metaphors. The national assessments will be reviewed first, briefly, and in relationship to metaphor passage comprehension only.

As stated, national assessments of literature provide some information about children's ability to comprehend metaphor. The 1970-1971 National Assessment of Educational Progress (Grindstaff and Muller, 1975) assessed 98,016 nine, thirteen, and seventeen year olds as well as young adults. One of the assessments was that of comprehension of eight contextually-embedded metaphors. Comprehension of metaphor showed

significant gain across all school-aged levels; adults did not continue to gain in ability to comprehend metaphors. This finding supports those of developmental psychologists. One might suggest that the multiple choice format of the NAEP assessment tool could be expected to produce these findings. Although subjects indicated an increase in comprehension of metaphor, it is conceivable that such increases are due to increasing familiarity with testing procedures. Grindstaff and Muller postulate that the gains made between ages thirteen and seventeen may be school-related, although they do not explain how or why that may be.

Terry (1972) attempted a smaller assessment study, specifically of children's poetry preferences. One hundred thirteen poems were played on a tape recorder, ten to twelve a day, to 1276 children in grades four, five, and six. These children indicated their likes and dislikes on a modified Likert-scale. Children of this age generally disliked poems containing "figurative language" and poems depending upon imagery. Marston (1975) responded to these findings by suggesting that the younger children, who enjoyed the poetry more, might be responding to the literal level of the poems. Older children who do not understand the complexity of the poems may reject them as being childish. If this is the case, the children may avoid interaction with poetry or other reading materials containing metaphors. This early avoidance could have important implications for metaphor researchers since metaphor comprehension might then later become the "new cognitive domain" Smith (1976) suggested. It should be noted in this regard that Arter (1976), as will be explained later in this chapter, found no differences in the interest ratings of metaphoric and nonmetaphoric passages among sixth grade students.

One study which was specifically designed to distinguish differences in comprehension between metaphoric and nonmetaphoric passages similar in content is offered by Cunningham (1976). He constructed two fifteen-sentence, 200-word passages: one highly metaphor-embedded and one containing no metaphors. All vocabulary was limited to "familiar" words from the Dale-Chall Readability Formula list. Cloze tests were constructed from the passages. The fiftieth word and each succeeding fifth word was deleted. In all, twenty-five deletions occurred. The last thirty words of text were not modified. Subjects were 190 sixth grade children in seven classrooms "in the only elementary school of a middle Georgia county." Each subject's task was to replace the deleted words. Scoring was for exact replacement only.

There was a significant difference in cloze scores, favoring the nonmetaphoric passage. The metaphorical passage may be judged, however, as highly and unnaturally metaphorical, limiting the generalizability of the results. Specifically, the 200-word passage contained eighteen metaphors, and many addressed different domains within the same metaphor, i.e., the passage contained mixed metaphors. In addition, unexpected results occurred from an attempt to determine how well the passages matched the student's reading ability. Cunningham found that even the nonmetaphorical passage may have been too difficult for the sixth graders. He used the following, somewhat arbitrary, standards for classifying cloze results: 0-39%, frustration level; 40-56%, instructional level; 57-100%, independent level. He found that only nineteen percent of the students read the nonmetaphoric passage at the independent level, forty-three percent at the instructional level, and thirty-eight percent at

the frustrational level. The metaphor passage obviously proved even more difficult. Although cloze procedure is purported to be a comprehension measure, its reliability has been seriously questioned (Vaughan and Meredith, 1978), and the reading level scores used by Cunningham are not those generally accepted as the most valid (Bormuth, 1977). This technique required the children to produce metaphors rather than to show understanding of them. It is difficult to assume that children knew they were supposed to embed metaphors into the text.

Arter (1976) hypothesized that metaphors in a passage would facilitate comprehension and increase interest in the passage. She prepared two equivalent 800-word descriptive passages on the topic of the Sasquatch. One passage contained (Form 1) metaphors and similes and one contained equivalent literal language. She prepared a multiple choice test containing fact questions, inference questions, and incidental fact questions directly addressing the manipulated sections of the passages. Written free recalls were also assessed by scoring the number of idea units correctly recalled. The first thirty-two vocabulary subtest words from the Stanford Achievement Test were given in order to determine a "verbal ability" score. Finally, an interest rating scale was developed and given to the subjects. One hundred forty-three sixth graders from Los Angeles, California and Urbana, Illinois participated in the study.

There were no significant differences in interest ratings between subjects reading metaphoric and nonmetaphoric passages; furthermore, there were no significant differences between scores on the multiple choice test. A low verbal ability group did no better on the incidental fact questions than their counterparts who received the literal passage.

The written free recall protocols provided little information. Only an average of ten percent of the idea units in the passage were recalled by the subjects. Adult ratings of the importance of idea units correlated with frequency of children's written free recall. The adult ratings also indicated that units with metaphors were perceived as more important than units without metaphors.

Arter concluded that her multiple choice items were unreliable and invalid. She suggested that the written recall situation was inappropriate for her sixth grade subjects. The results of her study did not change her view that metaphor facilitates comprehension; rather, Arter attempted to explain how the methodological flaws confused the issue. She suggested several directions for new research efforts.

Arter suggested several improvements to her own generally unsuccessful study. First, the topic of the passage should be one which is novel to subjects but which allows them to use existing conceptual knowledge. Specifically, she suggests a passage on cricket, where "game" schema would be activated. She stated that, although students said that they had no knowledge of the Sasquatch in a yes/no question prior to the study, students did use prior knowledge in responding to the multiple choice test. Second, the vehicles of the metaphors must be known to the experimental population. She concluded that her own results were partially the result of unknown vehicles, rather than inability to understand metaphors in general. She proposed a large scale study of potentially useful vehicles. These would be available when constructing metaphoric passages for future studies. Third, the multiple choice format should be abandoned because of the difficulty in designing

reliable and valid items. Rather, free recall should be utilized. If children are to be used as subjects, oral free recall is suggested. The National Institute of Education (NIE, 1975b) supports this suggestion for free recall as the preferred means of measuring comprehension. Finally, Arter suggested that adult subjects be used in initial research because they exhibit greater understanding of the tasks involved, have little or no difficulty in understanding specific vehicles, and stay on task.

Tepaske and Pearson (1978) similarly constructed two equivalent descriptive passages containing a number of Form 1 metaphors and similes. Sixth grade students' and adults' recall of the passages was assessed. Probes were applied after the free recall was completed. The investigators first compared the differences resulting from scoring the "statements recalled" with the "propositions recalled." They found that, although propositions recalled produced higher scores, the differences did not affect the overall results of the study.

In analyzing the results, they found that the sixth grade children recalled more of the metaphoric propositions (mean of 4.3 propositions) than the equivalent literal propositions (mean, 1.9 propositions). Even so, the children recalled only about one-half of what the adult subjects recalled. The children who read the literal passage improved their metaphoric recall by a mean of only one proposition following probes. Children who read the metaphor passage improved significantly, resulting in a total metaphoric recall score of 7.2 propositions, or an average of only two less than the adults. Adults improved with probes under both metaphor and literal conditions, with metaphor passage

readers maintaining the higher mean scores. Overall, there was not a significant difference in the number of incidental propositions recalled across the literal and metaphoric passages. Adults recalled significantly more (mean 21.2) incidental propositions than the children (mean 13.1). Probes did not significantly improve recall of incidental propositions, nor were the probes designed to elicit incidental propositional information.

Tepaske and Pearson concluded that recall of passages containing metaphors is superior to the recall of a passage containing equivalent information but no metaphors. They point out that this is only true if the vehicles of the metaphors are clearly understood by the readers. Adults recalled more information of all types than children, possibly because the vehicles were clearly understood by the adults and probably because the metacognitive processes of adults are more fully developed.

Educators' research, though not extensive in the area of metaphor comprehension, has produced more favorable results than that of psychologists. The NAEP gives some indications that children aged nine and above do understand metaphors. Terry's study indicates that intermediate grade children do not like metaphoric poetry and Marston suggested this may be because they do not understand it. More directly, Cunningham's study showed that metaphors were less likely to be produced in a cloze situation than nonmetaphoric language. Cunningham was looking for exact replacement of deleted words. However, children may be expected to have difficulty in second-guessing an author's intention to use a metaphor. Though Arter was disappointed in her results, her research

showed only that there was no significant difference between metaphoric and nonmetaphoric passage comprehension. Tepaske and Pearson showed that metaphoric propositions were more readily recalled than nonmetaphoric equivalent propositions.

This research by educators is in sharp contrast to that of psychologists both in intent and in findings. Psychologists have continually found that, when metaphor is presented in isolation, children have comprehension difficulties. Attempts at ecologically valid research by educators has not provided conclusive results and thus is not totally satisfactory. Furthermore, only Form 1 metaphors have thus far been addressed and those certainly not extensively. The passages studied to date have been specifically constructed to contain metaphors, thereby limiting the generalizability of the results to such artificial constructions. Additional research is recommended by all contemporary metaphor investigators.

Summary

Metaphor exists in language. Although very few areas of agreement can be found in searching the theoretical literature on metaphor, metaphoricians do agree that metaphors (whatever they are) are produced and are usually comprehended by competent language users. There is some evidence to suggest that metaphors serve certain functions in language which only they seem able to serve. Thus, it is not surprising that the language of children's reading materials contains numerous examples of metaphors of all forms and types. This finding justifies the attention that metaphor has received from developmental psychologists and

educators. Although the research findings advanced by psychologists have few direct applications for educators, the general trend relative to metaphor comprehension is consistent and notable. In general, the younger the child, the greater the difficulty in understanding isolated metaphors. Limited research by educators of contextually-embedded metaphors has thus far produced contradictory findings in terms of metaphor comprehension in general. Specific types of metaphors have not been addressed. This proposed study attempts to provide additional clarification of the relationship of metaphor to children's comprehension.

CHAPTER 3

DESIGN OF THE STUDY

This experimental/descriptive study was designed to investigate the effects on reading comprehension of three types of metaphors. Specifically, the study was designed to assess the differences in recall among four versions of a descriptive essay. The purpose of this chapter is to present: (1) a description of the sample, (2) a description of the development of the instruments, (3) a description of the preassessment evaluation, (4) the procedures for scoring the protocols, (5) a design for the analysis of the data, and (6) a summary.

Sample

Subjects used in this study were sixth grade students enrolled in two schools in Tucson Unified School District One in Tucson, Arizona. Each school contained four sixth grade classrooms. Sixth grade subjects were selected for three related reasons. First, prior research has tended to investigate metaphoric competence and instruction in the intermediate grades (Grosbeck, 1961; Holstein, 1972; Pollio and Pollio, 1974; Sweet, 1974; Terry, 1972). A second reason is that much of the prior research has concentrated specifically upon sixth grade subjects (Arter, 1976; Cunningham, 1976; Horne, 1966; Smith, 1976; Tepaske and Pearson, 1978). Third, past research has indicated that understanding of metaphor may be related to level of cognitive development (Billow,

1975). Sixth grade subjects have been used in assessment of metaphor comprehension in the past; thus, sixth grade subjects offer the greatest possibility of obtaining results which may be compared to those of earlier studies.

Subjects for the preassessment evaluation and the experimental study were selected in the following manner.

1. For convenience, the investigator determined to collect data from one of the school districts located in Tucson, Arizona. The Tucson Unified School District One is the largest district in Arizona, containing 78 elementary schools with a total enrollment of 29,731 students, including 3,934 sixth graders. The district is located in a city (population 500,000) in Southern Arizona. All racial, ethnic, and economic groups are represented within the district boundaries; thirty-two percent of the population is labeled "minority" according to U.S. Department of Health, Education, and Welfare guidelines. A high number of bilingual (Spanish-English) students were enrolled in district programs.

Achievement tests results for each sixth grade classroom in Tucson Unified School District One were evaluated. All "average" classrooms, those with a class mean score between stanines four and six, were identified. Classrooms not falling into this category were eliminated in order to (a) insure to a greater degree the comparability of the experimental and preassessment evaluation samples and (b) avoid the potential problem of an atypical sample.

2. Six classrooms were randomly selected from the previously identified group for participation in a preassessment evaluation. Two classrooms were randomly assigned to a sentence completion task intended to assess students' existing knowledge of the experimental passage topic. The remaining four classrooms were used to determine the appropriateness of the directed probe comprehension items for the four versions of the passage.

All selected teachers elected to participate in this phase of the study. Principals and children were cooperative.

3. Eight additional classrooms in two schools were randomly selected from the originally identified group. Fifty-six subjects were randomly selected from these classrooms to be members of the experimental sample. Forty subjects actually participated in the study. Four subjects were selected to participate in a pilot study of the materials. The additional twelve subjects were selected in order to guard against the possibility of subject loss due to transfer, extended illness, or other external factors beyond the control of the experimenter.

Both principals and all teachers contacted agreed to participate in the study. Several parents refused to consent to the participation of their children in the study. The predominant reason established for this refusal was extended illness and excessive absenteeism immediately prior to the request for permission to participate in the study.

Table 1 provides a ready reference and overview of the pre-assessment evaluation and experimental subgroup samples.

Table 1. Description of Student Sample Subgroups

Sample Subgroup	N	Purpose	Method
Preassessment Evaluation I	50 (2 Classes)	Assessment of prior knowledge of passage content	Group Administration
Preassessment Evaluation II	101 (4 Classes)	<ol style="list-style-type: none"> 1. Assessment of appropriateness of directed probes 2. Assessment of comparability of four experimental passages 	Group Administration
Experimental Study	40 (randomly selected from 8 classrooms)	<ol style="list-style-type: none"> 1. Assessment of experimental passage recall 2. Assessment of metaphor recall 	Group Administration

Data were collected during the months of February and March of 1979. The initial data collection dates coincided with the annual "Fiesta de los Vaqueros," and rodeo parade. Still, many students expressed no knowledge of the experimental passage topic, Appaloosa or "spotted" horses. Many students lived on "ranchettes" which are zoned for horses. The investigator, and it is assumed some subjects, passed at least one Appaloosa horse on the way to the schools.

Individual interviews were conducted in private, unoccupied classrooms or in library alcoves. The conditions were, in general, conducive to quiet study. Subjects were randomly assigned to one of the four passage groups in the following way: forty small slips of paper, each containing a letter denoting one of the four passages, were placed in a small bag. Each subject selected one of the letters, thus establishing which of the passages was to be read.

Development of the Passages

The proposed experimental passages have been adapted from a selection entitled "The Polka-Dotted Horse" by Doreen Bush taken from a 1976 Highlights: The Monthly Book for Children (Bush, 1976).

Selection of the Passage

The original passage was a descriptive essay about the types, history, and uses of Appaloosa horses. From the original passage, four experimental passages were designed to serve as the independent variables in this study. The original passage was selected (1) as representative of materials sixth grade children would be likely to find in their classrooms or library and (2) for its suitability for

independent reading. In order to meet these objectives, the passage was selected by means of the following criteria:

1. The Fry (1968) readability level of the passage should not exceed sixth grade level.
2. Concepts should be fully developed within the passage. The concept load should not exceed that appropriate for sixth grade subjects (Kintsch and Vipond, 1977).
3. The passage should contain a minimum of 250 words in order to allow subjects full use of intuited macrostructure rules (Kintsch and Van Dijk, 1978), i.e., a fully developed, structurally sound passage of sufficient length (to provide an opportunity for use of conceptual knowledge about what an expository passage should contain) was selected.
4. Interest in the content of the passage should not be higher for one group of subjects than another. According to available information about children's reading interests, animal stories or animal-related nonfiction are universally liked by children and were thus preferred (Johns, 1974; McKay, 1971; Pi Lambda Theta, 1974; Simmons, 1961; Terry, 1972).
5. The passage should contain metaphors and similes, or reasonably allow for their embedding.
6. The passage should be expository rather than narrative in nature. Information in an expository passage is more easily assessed and thus held constant across the four experimental passages.

An extensive search of (1) basal readers, (2) social studies texts, (3) supplementary reading and social studies materials, and (4) typical children's periodicals yielded many instances of metaphors and explicitly-cued metaphors. However, few essays met all six selection criteria. "The Polka-Dotted Horse" not only met the six criteria but offered a further stylistic advantage in that the author offered in many cases both a metaphoric and a literal description of the Appaloosa.

This stylistic convenience permitted the researcher to retain the author's original language throughout the passages. The Combined and Explicated Metaphor Passage is the original passage. Slight modifications were made in order to control the mode of information presented in the metaphor, explicitly-cued metaphor, and literal passages. Specifically, no more than twelve of 103 propositions contained in the passages were controlled. Two sentences were eliminated entirely from the original passage because they introduced a new concept ("The Pony of the Americas") which was not then further developed.

Types of Metaphor

Three types of contextually-embedded metaphor were selected for investigation and contrast with a literal language passage containing the same information. Four passages were constructed which present information through one of the three types of metaphor or literal language only. The four types of passages were (1) a Metaphor Passage (Passage M), (2) an Explicitly-cued Metaphor Passage (Passage E), (3) a Combined and Explicated Metaphor Passage (Passage C), and (4) a Literal Passage (Passage L).

The Metaphor Passage (Appendix A) contained twelve target metaphoric propositions. These novel metaphors represent all four forms of metaphor as postulated by Perrine (1971). "[Leopard] Appaloosas are colored with large spilled drops of chocolate on a white tablecloth," is an example of a metaphor drawn from the Metaphor Passage.

The Explicitly-cued Metaphor Passage (Appendix B) contained twelve target similes and other tension-reduced metaphors such as, "[Leopard] Appaloosas look as though someone spilled large drops of chocolate over a white tablecloth."

The Combined and Explicated Metaphor Passage (Appendix C) contains a combination of the metaphors and explicitly-cued metaphors found in the first two experimental passages. In addition, three of the metaphors are explicated, or "unpacked" for the reader. For example, the passage contains the following unpacked metaphor. "[Leopard] Appaloosas are white with large brown or black spots all over their body. It looks as though someone spilled large drops of chocolate over a white tablecloth." The Combined and Explicated Metaphor Passage contains metaphors as they were presented in the original passage.

The Literal Passage (Appendix D) did not contain any of the three types of metaphor discussed above. Metaphoric language was replaced by literal language which, according to adult consensus, contained the same information. For example, "[Leopard] Appaloosas are white with large brown or black spots all over their body." In most cases, the literal language was taken directly from the original version of the passage.

Description of Metaphors in Passages

Evidence of the nature of the metaphors included in the experimental passages was sought. Perrine's (1971) classification system was used in the evaluation of the forms of metaphors in the Metaphor Passage. Since Perrine claimed that similes may only be Form 1 metaphors, and since the Combined and Explicated Metaphor Passage contains propositions which are found in the other passages, the Metaphor Passage was used as the base passage for assessment of the forms of metaphor included in the study. There are twelve metaphoric propositions in Passage M. Six of the metaphoric propositions are Form 1 metaphors, where the topic and vehicle are both explicitly stated in the text. Three of the metaphoric propositions are Form 2 metaphors in which only the topic is named. Two of the metaphoric propositions are Form 3 metaphors, i.e., only the vehicle is stated in the text. One metaphoric proposition contains neither an explicit topic nor vehicle and is representative of Form 4 metaphors. Perrine implies that these propositions are representative of the proportions of each form of metaphor to be found in natural language discourse.

Since the study was intended to investigate the effects of metaphor upon comprehension, a consensus of opinion was sought regarding the novelty of the metaphors in the passages. Dead metaphors, or idioms, would have complicated the explication of the results. Three doctoral students studying metaphors determined that the twelve metaphors were novel. In addition, the metaphors were not found in any of the commonly used dictionaries of American usage and idioms (e.g., Whitford and Dixson, 1973).

Comparability of Passages

Comparability of the four experimental passages was assessed in five ways. In order to facilitate the comparison, each passage was determined to contain 103 propositional units (cf. Thorndyke, 1977). Where necessary, the propositions determined in the Metaphor Passage (Appendix A) formed the base for the propositional analysis of the Explicitly-cued Metaphor Passage (Appendix B), the Combined and Explicated Metaphor Passage (Appendix C), and the Literal Passage (Appendix D). Specifically, if adding information in the case of Passage E resulted in the creation of an additional proposition, that proposition was considered a part of the preceding proposition. For example, Proposition Number 21 in the Explicitly-cued Passage is actually two propositions, but they were treated as one for the purposes of this study. In the case of unpacked (literal equivalent) propositions in the Combined and Explicated Metaphor Passage, the equivalent information is presented as an additional proposition with the same number and an alphabetical designation. For example, Proposition Numbers 10 and 11 comprise one sentence. Equivalent literal information is presented in the previous sentence, which is designated as Proposition Numbers 10a and 11a. Treatment of a newly created proposition in this manner facilitates comparison across the four passages (cf. Arter, 1976).

In the first assessment of comparability, each of the propositions containing a metaphor in Passage M, an explicitly-cued metaphor in Passage E, and a combined and explicated metaphor in Passage C were identified and starred as targets. Metaphoric propositions account for approximately thirteen percent of each of the four passages. Passages

M and C contained twelve metaphoric propositions each. Passage E also contains twelve metaphoric propositions, three of which are explicated or "unpacked."

Each proposition was given a number from one to 103. This number was called the Proposition Number. The target metaphoric propositions had the same Proposition Number in Passages M, C, and E. The target propositions of the Metaphor, Explicitly-cued Metaphor, and Combined and Explicated Metaphor Passages fell within the first 300 words of text.

In the second assessment of comparability, the readability according to the Fry (1968) Graph for Estimating Readability was evaluated for each of the four experimental passages. All passages proved to be at the fifth grade level in readability.

Third, number of words in each passage was assessed. Passage M contained 553 words. Passage C contained 581 words. Passage E was comprised of 586 words. The Literal Passage contained 551 words.

Fourth, as a part of the preassessment evaluation, adult consensus was sought regarding the equivalency of information in each of the target propositions across all four presentation modes. Specifically, nine doctoral students in reading were asked whether the controlled target propositions were equivalent in the information they contained. The students were encouraged to offer suggestions for improvement where equivalency was questionable. The literal level passage had been generated with the assistance of several graduate students at The University of Arizona, using, in most cases, language from the original passage. Two of the three metaphoric passages

were developed in a similar manner. The third metaphoric passage, Combined and Explicated, was the original passage.

Finally, another component of the preassessment evaluation determined the comparability of the information in the four experimental passages. One hundred sixth grade subjects read one of the four passages and the same twenty-five directed comprehension probes. No significant difference in scores supported the contention that the information contained in the four passages was comparable.

Preassessment Evaluation

The purpose of the preassessment evaluation was three-fold: (1) determination of student's prior knowledge of the content of the passages, (2) assessment of the comparability of the passages, and (3) assessment of experimental subject's understanding of the vocabulary used in the metaphors. Although each of the preassessments could have had far reaching implications relative to the continuation of the study, it was determined that no changes in the planned study should be made until all four phases of the preassessment were completed.

The preassessment evaluations took place in four different classroom settings. Two classrooms of sixth grade students, selected as described earlier in this chapter, were used in the first preassessment evaluation. Four sixth grade classrooms and one class of doctoral students were used in the second. The experimental subjects' teachers participated in the initial phase of the third. The experimental subjects' classrooms were originally slated to participate in the final phase of the third preassessment evaluation. Ultimately, only the

experimental subjects participated in the final phase of preassessment. Table 2 contains a reference and overview of the Preassessment Evaluation.

There were several procedural features common to each setting and related to the introductory comments for each task. Introductory comments were given both orally and in writing to the students in each class. The general purpose and background of the study were explained. Students were assured that no names would be used when the study was reported. No grades were given for participation. A short sample of the task to be performed was provided in each case.

Prior knowledge of the information contained in the experimental passages was assessed by having sixth grade students in two classes respond to a series of twenty-five (sentence completion) directed comprehension probes. (Appendix E contains the introductory comments, sample task, and assessment materials.) These probes are discussed fully as dependent variables later in this chapter. The fifty students in this group did not receive any of the experimental passages. One point was given for each appropriate response according to the information available in the passage.

Results indicated that children, similar to those in the experimental population, were not familiar with the information presented in the passage. The range of correct responses was 0-8. The mean was 2.6; the standard deviation was 1.65. No probe elicited more than one response from the students. At the time of this first preassessment, the examiner determined that the children apparently had no idea of what an Appaloosa might be. The children were becoming very frustrated with the task and their level of cooperation was diminishing. The examiner

Table 2. Description of Preassessment Evaluation Sample Subgroups

Subjects	N	Purpose	Method
Sixth Graders	50 (2 classes)	Assessment of prior knowledge of passage content	Group Administration
Sixth Graders	101 (4 classes)	1. Assessment of appropriateness of directed probes 2. Assessment of comparability of four experimental passages	Group Administration
Doctoral Students	9	Assessment of comparability of four experimental passages	Group Administration
Experimental Subjects' Teachers	8	Assessment of subjects' knowledge of metaphor vehicles	Group Administration
Pilot Study Subjects (Sixth Graders)	4	Assessment of experimental conditions	Individual Interview
Experimental Subjects	40 (randomly chosen from 8 classrooms)	Assessment of subjects' understanding of metaphor-related vocabulary	Individual Interview

explained that an Appaloosa is a horse and this explanation restored a cooperative atmosphere. This explanation further explains why ninety-four percent of the respondents correctly answered the first probe ("An Appaloosa is a"). Once this additional information was given, 42% of the children were able to establish that an Appaloosa has spots. Thirty-two percent of the children were able to surmise that the horses are usually used for riding. No other response could reliably be predicted.

In another phase of the preassessment, adults' perception of the comparability of information contained in the four passages was assessed. Nine doctoral students in the Department of Reading were asked to assess the equivalency of the information in the target propositions across the four passages (Appendix F). Where these adults perceived a lack of equivalency in the information across passages, they were asked to indicate which passage differed and to suggest a change which would result in equivalency. Inter-rater agreement of equivalency according to Scott's π was determined to be .82 (Flanders, 1966). Concern was expressed that the literal equivalent propositions lacked "potency" and suggested changes included the addition of adjectives to increase specificity and impact. Specifically, it was suggested that ". . . Appaloosas were better than ordinary horses" to be changed to ". . . Appaloosas were far superior to ordinary horses." The adjective "greedy" was suggested as an addition to "More and more white men. . . ." The doctoral students further suggested that ". . . Appaloosa was a good breed of horse" be changed to ". . . the Appaloosa was an excellent breed of horse." All of these

suggested changes were incorporated into the experimental study passages, and are reflected in the Appendices.

To further assess the comparability of the four experimental passages, the passages were randomly assigned to 103 students in four classrooms. The passages were accompanied by the sentence-completion directed probes previously mentioned. The students were directed to read the statements, to read the passage, and then to respond to the statements while referring to the passage; paraphrased responses were encouraged. One point was given for each proposition correctly given by the students. (See Appendix G for introductory comments; Appendices H, I, J, and K contain the passages.) Results indicated that the four passages were equivalent in the information they contain, as measured by student responses across the four passages. The sample size, means, standard deviations, and range of the total scores are reported in Table 3.

Table 3. Preassessment of Information Equivalence: Student Scores.

Passage	n	Range	Mean	Standard Deviation
M	28	8-30	22.2	6.66
E	25	6-29	21.85	6.01
C	25	5-31	20.68	6.9
L	25	13-30	22.8	4.74

An analysis of responses to each probe and informal discussion with subjects resulted in three changes in the wording of the probes. Specifically, "The third type of Appaloosa's color pattern is. . ." was changed to "The Raindrop Appaloosa's color pattern is. . . ." The probe "What the white men did to the Appaloosa was. . ." was changed to "As for the Appaloosas, the white men. . . ." "In appearance, Appaloosas are generally. . ." was changed to "Appaloosas generally look. . . ." It was determined during the experimental study that this last probe was still weak in its power to elicit expected responses. Other probes were found to be satisfactory. The probes, as they were presented in the experimental study, are found in Appendix L.

Students' knowledge and understanding of the specific vocabulary used in the metaphors was assessed because Arter (1976) and Tepaske and Pearson (1978) have suggested that students' lack of familiarity with the specific metaphoric vehicles used in their studies may have inhibited comprehension. Arter (1976) and Tepaske and Pearson (1978) restricted their studies to Form 1 metaphors where both the topic and the vehicle are stated. All four metaphoric forms were assessed in this study, i.e., not all topics and vehicles are named in the passages. Assessment of investigator-inferred topics and vehicles would be inappropriate since children may infer different items. Therefore, an assessment of the specific language comprising a metaphor was attempted. Initially, experimental subjects' teachers were asked to check one of the following categories for each of the words specified (Appendix M): (1) students will definitely understand the word, (2) students will probably understand the word, (3) not sure, (4) students will probably not understand

the word, (5) students will definitely not understand the word. An evaluation of the responses revealed that the average response was 1.59, indicating some degree of certainty that students would understand the specific vocabulary items in the metaphor.

Teacher judgment was sought initially in order to better justify the use of the passages in the experimental study. Later, when the experimental subjects were identified, students in those classrooms were to be given a similar task. Teachers were to ask their students to indicate their knowledge of each of the sixteen specific vocabulary items. In this way, the vocabulary items would not be associated with the investigator or with the experimental passages. However, difficulties with the administration of a large group task in the experimental classrooms prohibited this method of preassessment. Since the assessment of knowledge relative to the metaphoric vehicles was considered critical in the study, the investigator determined to assess individuals' knowledge during the interview session. It became apparent during the pilot of the experimental conditions that (1) the preassessment of vocabulary items acted as a recall device or as an aid to information search (Estes and Vaughan, 1978) during the reading of the experimental passages, (2) the metaphoric vocabulary list did not contain any equivalent items from the Literal Passage. Thus, the Literal Passage readers did not have access to the same number of recall cues. Therefore, the student vocabulary preassessment instrument was modified for the experiment to include twenty-six items (Appendix N). Three distractors and equivalent literal vocabulary items were added.

In the initial phase of the experimental interview, students were told that the investigator wanted to identify what they knew about some vocabulary items. Each word was pronounced in isolation by the examiner. The students were directed to (1) use the word correctly in an orally presented sentence, (2) draw an appropriate picture, (3) orally give a synonym, (4) orally define the word, or (5) tell the investigator "I don't know." Any item which evoked the fifth response was given a second time at the completion of the vocabulary preassessment. This procedure often resulted in a correct response.

The results from the student vocabulary preassessment indicated that students generally had some knowledge of each of the words used in the metaphors and in the literal equivalent sentences. Ninety-nine percent of the students' responses were correct. Students generally had an unexpected but correct response to "crystal." They tended to think of crystal as a rock formation rather than as a household item. Students were often initially reluctant to respond to "superior," generally thought of it in terms of military hierarchy, and at times equated it with excellence. The word "precious" was similarly avoided by subjects. This word was the next most likely to produce the "I don't know" response initially. Still, only three students finally missed the item. Interestingly, one student told the examiner it was her baby cousin's name.

The final preassessment was a pilot study of the experimental conditions. Four subjects from the same group as the experimental subjects were randomly assigned to each of the four passage conditions. Extensive probing of the students served to reinforce information gained from earlier preassessment evaluations. The pilot study did not result

in any changes to the experimental conditions; as indicated, modifications in the vocabulary preassessment instrument occurred as a result of the pilot.

The Experimental Study

The investigator administered the instruments on an individual basis to forty sixth-grade students. Ten subjects read each version of the passage. Each student was given an explanation of the general background and purpose of the research; each was told that his/her participation was voluntary and that names would not be used in reports of the study. All interviews were held in unused classrooms or in the library of the schools.

Some introductory remarks and questions were designed to put the child at ease. Specifically, the children were asked for preferred name, age and birthdate, schools attended, school subjects liked and disliked. They were asked if they knew anything about Appaloosa, or polka-dotted, horses. All information was recorded by the investigator. Subjects were then asked to complete a short sample exercise which included all the phases of the experimental conditions. This exercise required the children to read a short selection on the topic of Patterned Carp, complete a simple maze, recall the selection, and respond to three directed probes. Positive reinforcement for all their efforts was provided. (See Appendix O for a complete description of the introductory remarks and experimental directions.)

During the experimental interview session, students were asked to read silently to understand and to remember as much as they could.