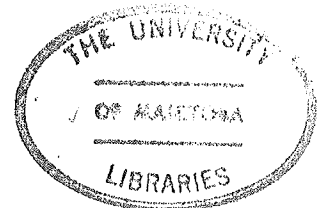AN INVESTIGATION INTO THE READING

COMPREHENSION OF ANAPHORIC SUBSTITUTIONS

AT THE SECOND GRADE LEVEL

by

Shirley M. Stefanson

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Education in the Department of

Curriculum and Humanities, The University of Manitoba

October, 1984

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ABSTRACT

The purpose of this study was to investigate the reading comprehension of anaphoric substitutions at the second grade level. The main questions of this study were: 1) What substitutions do second grade students comprehend in their reading? 2) Does a relationship exist between students' reading ability and their ability to comprehend different categories of anaphoric substitutions? 3) What influence does the availability of passage for referral have on the reading comprehension of anaphoric substitutions?

The sample, representing a middle class suburban population, was drawn from four grade two classes. It consisted of forty-five randomly selected subjects, fifteen at each of the three reading ability levels; below average, average and above average.

The <u>Test of Comprehension of Anaphoric Substitutions</u> was individually administered to all subjects in June of 1984. This test consisted of nine reading passages and nine questions which tested nominal, verbal and clausal anaphoric substitutions. Various passages of the test were made available or unavailable to the subjects during the questioning portion of the test. In addition, the subjects were interviewed upon completion of the test.

Once the data was collected, two-way analyses of variance were applied and the results were analyzed. On the basis of the findings of the statistical analyses,

the following main conclusions were drawn:

1. Students near the end of grade two appear unable to comprehend anaphoric substitutions in their reading.

2. Various categories of substitutions are more difficult to comprehend than others.

3. Students of above average reading ability have better comprehension of anaphoric substitutions than do those of average reading ability and students of average reading ability have better comprehension than do students reading below grade level.

4. Student's performance is better when the passages are available for referral. This is especially true for students reading above grade level. Above average students seem to be aware of comprehension deficiencies and therefore are more likely to refer back to the text for assistance; average and below average readers are less inclined to look back or may not have appropriate strategies to retrive information from a readily available reading passage.

ACKNOWLEDGEMENTS

the writer to devote the necessary hours to the completion

of the study.

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CHAPTER 1

NATURE OF THE STUDY

In the process of educating children, one of the main concerns is developing the ability to read. A child who has reading difficulties is at a great disadvantage in the educational school system, therefore researchers and educators continue to investigate causes of reading problems. From such investigations, anaphora has been identified as one possible source of children's reading comprehension difficulties (Durkin, 1981).

Anaphora is a linguistic structure that refers to previously mentioned or implied text. The most familiar kind of anaphora is the pronoun and its antecedent.

example: Mary drank all the milk.
She was thirsty.

This pronoun-antecedent relationship, referred to as reference anaphora, is probably the most widely recognized type of anaphoric structure but it is definitely not the only important type or the most problematic.

There are many forms of anaphora found in children's reading materials. This study is based on Halliday and Hasan's (1976) categorization of anaphora: reference, substitutions, ellipses, conjunctions and lexical. This investigation addresses itself to the anphoric subsitutions which are comprised of nominal, verbal and clausal substitutions. The following items have been identified as anaphoric substitutions by Halliday and Hasan:

<u>Nominal Substitutions</u>: one, ones, same
   Do you like the new chairs?
   No I like the old <u>ones</u>.

<u>Verbal Substitutions</u>: do
   Did you go to the concert?
   No, but Sally <u>did</u>.

<u>Clausal Substitutions</u>: so, not
   Todd is in the bicycle race.
   <u>So</u> is his brother.

NATURE AND SIGNIFICANCE OF THE PROBLEM

Anaphoric structures are found in great frequency in reading instructional materials. The authors of these reading materials, in attempting to reduce reading comprehension problems, have attempted to control the level of difficulty by such devices as readability formulae. Unfortunately such measures of determining the reading difficulty of a text are inadequate in that they utilize vocabulary and only one type of syntactic control, sentence length, as a basis for measurement when studies have demonstrated a definite relationship between syntactic structures and reading comprehension and that the syntactic complexity of a sentence can contribute to the difficulty of a text.

Herin lies one of the major reasons in considering anaphora as a potential source of reading comprehension difficulties. Short sentences using seemingly simple vocabulary are deemed to have low readability. Yet many of these short, seemingly simple sentences contain anaphoric devices which add to the syntactic complexity and hence the difficulty of the passage.

Consider for example, the following reading passage. It has a low readability of 2.0 but also contains a number of anaphoric devices identified by underlining:

> Sue and Mary went to the store. They saw a lady in the store. She was holding cookies and cakes. She was talking to the baker. He looked angry.
>
> "These cookies are old. They taste bad. I want some fresh ones," said the lady.

Although the above passage does not appear difficult, the underlined anaphora requires the reader to infer or substitute, demanding recall of the original referent. Further, there is some question as to whether young readers are able to understand that "ones" (anaphoric substitution) refers to a noun mentioned two sentences back and if readers are not able to comprehend this type of anaphora then the comprehension is affected in spite of the seemingly low readability score.

Such anaphoric structures are found throughout the elementary instructional reading material, yet instructional programs give anaphora very little attention. Durkin questions whether this "reflects too little knowledge about their (anaphora) pervasiveness in our language or perhaps insufficient appreciation of their difficulty." (Durkin, 1981, p.35) Regardless of the reason, anaphora and its comprehensibility is in question and information regarding what anaphoric structures children are able to comprehend would make a significant contribution to

the teaching of reading.

In spite of anaphora's frequency in reading materials, studies investigating children's reading comprehension of texts containing anaphoric devices are very limited. While some categories of anaphora have been investigated, the majority of research in this area has focused on reference anaphora. To date, there has not been any research dealing with elementary school children's ability to comprehend anaphoric substitutions.

In view of the current interest in anaphora, the limited amount of research available, and the pervasiveness of anaphora in elementary instructional reading materials, further research in this area is warranted.

THE PURPOSE OF THE STUDY

A review of the literature indicated that further research in anaphora is essential for a fuller understanding of anaphora and its effect on reading comprehension. The purpose of this study was to investigate second grade students' comprehension of anaphoric substitutions. While substitutions were examined by Dutka (1979), her study dealt with college students and utilized only nominal substitutions. This study addresses all three sub-groups of substitutions (nominal, verbal, and clausal) at the second grade level and concerns itself with the following questions:

1.   What substitutions do second grade students compre-

hend in their reading?

2. Is there a relationship between their reading ability
    and their ability to comprehend different types of
    anaphoric substitutions?

3. What influence does the availability of the passage
    for referral have on the reading comprehension of
    substitutions?

These questions are considered under six null hypotheses.

RESEARCH HYPOTHESES

Hypothesis #1: There will be no effect for reading
ability on the overall results of the Test of Comprehen-
sion of Anaphoric Substitutions (TCAS).

Hypothesis #2: There will be no significant differ-
ence in the results of the three sub-tests of the TCAS.

Hypothesis #3: There will be no interaction between
the three TCAS sub-tests and the reading ability.

Hypothesis #4: There will be no effect for the avail-
ability of passage on the overall results of the TCAS.

Hypothesis #5: There will be no effect for reading
ability on the modified results of the TCAS.

Hypothesis #6: There will be no interaction between
the availability of passage and the three reading ability
groups.

DEFINITION OF TERMS

1. Anaphora: Anaphora is the repetition of words or

phrases (Oxford Dictionary). Halliday and Hasan (1976) confine it to backward reference only.

2. <u>Anaphoric Substitution</u>: A substitution is the replacement of one item by another and may take the form of a noun, verb or clause. The following is the list of items that occur as subsitutes:

```
nominal:  one, ones, same
verbal:   do
clausal:  so, not (Halliday & Hasan, 1976)
```

3. <u>Reading Ability</u>: For this study, reading ability is defined by the subjects' reading scores on the <u>Metropolitan Reading Test</u>, Primary Form H, 1971.

4. <u>Average Reader</u>: An average reader is defined as a student whose reading score falls within five months of his grade placement.

5. <u>Above Average Reader</u>: An above average reader is defined as a student whose reading score falls beyond five months of his grade placement.

6. <u>Below Average Reader</u>: A below average reader is defined as a student whose reading score falls below five months of his grade placement.

7. <u>Comprehension of Anaphoric Substitutions</u>: Comprehension of anaphoric sbustitutions is determined by their performance on the <u>Test of Comprehension of Anaphoric Substitutions</u> (TCAS) which calls for the identification of the referent of the anaphoric substitution by means of an oral response which is recorded verbatim.

8. <u>Availability of Passage</u>: The availability of passage
   for referral arises when the subject is permitted
   to refer back to the passage for assistance in answer-
   ing a question in the TCAS. An unavailable passage
   occurs when the reading material is hidden from the
   subject while answering the question.

LIMITATIONS OF THE STUDY

1. The findings can be generalized only to that popula-
   tion similar to the subjects in the study in socio-
   economic level and to students in the second grade.

2. As the study was under the direct control of the
   investigator, it may have been unconsciously biased.

ASSUMPTIONS OF THE STUDY

1. A performance of 7/9 (77.7%) on the TCAS is assumed
   to indicate satisfactory comprehension of substitu-
   tions.

OVERVIEW OF THE STUDY

This study was designed to investigate the reading
comprehension performance of anaphoric substitutions by
second grade students.

The first chapter deliniates the nature of the problem.
A review of literature reporting related theory and research
is found in Chapter 2. Chapter 3 outlines the design
and procedure utilized to gather data for the study while

Chapter 4 contains the analysis of that data. Chapter 5 consists of the summary, discussion, conclusions and implications of the study.

CHAPTER 2

A REVIEW OF RELATED LITERATURE

INTRODUCTION

Reading comprehension has been a popular topic for educational research for many years. Studies and theories abound in this area and the research encompasses a large number of factors that are related to comprehension difficulties.

Anaphora, a linguistic structure that refers to previously mentioned or implied text, has been identified as one possible source of children's reading comprehension difficulty, however research on anaphora is sparse: only recently, reading researchers have focused attention on anaphora and its effect on comprehension.

Since anaphora has been so little researched, despite its frequent occurrence in elementary school texts, the review of the related literature will include some of the contributions from a variety of disciplines. Knowledge from other areas helps to clarify the studies involving anaphora and reading comprehension and "by bringing together research on anaphora from various disciplines, a more sophisticated view of its comprehension process may emerge to the benefit of reading researchers and theoreticians alike." (Webber, 1980, p.142) Thus, pertinent literature from English linguistics, cognitive science, artificial intelligence, child language development and

reading will be reported as a basis to the understanding of children's reading comprehension of anaphora.

ANAPHORA IN THE ENGLISH LANGUAGE SYSTEM

In 1970, Menzel pointed out that research in anaphora will be delayed because "anaphora is partly syntactic and partly semantic, so that grammarians feel that any solution of the problem must await a systematization of semantics, which today is far from being realized." (Menzel, 1970, p. 97)

Six years later, Halliday and Hasan reported on the systematic qualities of anaphora in <u>Cohesion in English</u> (1976). Their careful examination of the relationship between anaphora and its antecedents and the role and function of anaphora in the text, facilitated the understanding of anaphora as a possible cause of comprehension difficulties.

Halliday and Hasan (1976) defined anaphora as language devices for linking together parts of the text which are structurally unrelated. The relationship between anaphora and its antecedents is termed "cohesive ties."

> Cohesion occurs when the interpretation of some
> element in the discourse is dependent on that
> of another. The one presupposes the other,
> in the sense that it cannot be effectively de-
> coded except by recourse to it. When this hap-
> pens, a relation of cohesion is set up, and
> the two elements, the presupposing and the pre-
> supposed, are thereby at least potentially inte-
> grated into the text. (Halliday & Hasan, 1976,
> p.4)

In studying anaphora's role in the language system, Halliday and Hasan found that anaphora signals meaning continuity in the text: it systematically relates to other parts of the text. The form of the anaphoric structure determines the range of possible referents, thus facilitating the reader's choice of appropriate inferences. Halliday and Hasan categorized anaphora on the basis of the nature of the relation and the form of the expression. Five categories resulted: reference, substitution, ellipse, conjunction, lexical.

<u>Reference</u> is a systematic relationship in meaning, comprising of personals, demonstratives and comparatives. These anaphoric structures refer back to an entity which enters into the discourse a second time.

Examples:

    a) John moved to a new house.
       <u>He</u> had it built last year.

    b) John's house is beautiful.
       <u>His</u> wife must be delighted with it.

    c) That new house is John's.
       I didn't know it was <u>his</u>.

In these examples, "he" and "him" signal identity of references to "John".

<u>Substitution</u> differs from reference in that it relates "linguistic elements" rather than semantic.

Examples:

    a) Do you want to ride this bike?
       No, I don't want to ride <u>it</u>. (Reference)

    b) Do you want to ride this bike?

No, I want to ride the big <u>one</u>.
(Substitution)

<u>Ellipses</u> are similar to substitution but differ in that they are "substitutions by zero". Ellipses refer to something that is understood but not stated. Examples:

a) Do you like the new toys?
   No, I like the old <u>ones</u>. (Substitution)

b) Three toys were on the floor.
   A fourth Ø was in the box. (Ellipse)

c) Have you been playing with the toys?
   Yes, I have. (Ellipse)

<u>Conjunctions</u> comprise a category of anaphoric expressions that carry greater meaning than the first three categories. Conjunctions represent "a different type of semantic relation, one which is no longer any kind of search instruction, but a specification of the way in which what is to follow is systematically connected to what has gone before." (Halliday & Hasan, 1976, p.227) Conjunctions are divided into four groups: additive, adversative, causal and temporal. Each expresses logical relations as illustrated below:

Example:

For the whole day he climbed up the steep mountain-
side, almost without stopping.

a) <u>And</u> in all this time he met no one. (Additive)
b) <u>Yet</u> he was hardly aware of being tired. (Adversative)
c) <u>So</u> by night time the valley was far below him.
   (Causal)
d) <u>Then</u> as dusk fell, he sat down to rest. (Temporal)
   (Halliday & Hasan, 1976, p. 238-239).

Finally, <u>lexical</u> is broken into two subgroups of reiteration and collocation. A reiteration is often a synonym or near synonym and is similar to reference for a "lexical item refers back to another to which it is related by having a common referent." (Halliday & Hasan, 1976, p. 278)

Example:

a) I turned to the ascent of the peak.
         the <u>ascent</u>
         the <u>climb</u>
         the <u>task</u>   is perfectly easy
         the <u>thing</u>
         <u>It</u>. (Halliday and Hasan, 1976, p. 279).

Halliday and Hasan also refer to collocation which occurs in the context of other related lexical items such as days of the week and is not listed in the same manner as the previous categories.

It is important to note that Halliday and Hasan's categorization is not a heirarchy, for the difficulty of a particular anaphoric structure depends not only on the anaphora itself but also on the surrounding context and the reader's knowledge. The "cohesive structure" of the text however can be analyzed using a method developed by Halliday and Hasan which was demonstrated by Gutwinski (1976). Referring to anaphora as a guide to text comprehension, Gutwinski's research supported Halliday and Hasan's method of analysis and revealed that there are definite patterns in anaphora. Most importantly, his work provided evidence of the relationship between anaphora and discourse

structure.

Based on Halliday and Hasan's analysis and Gutwinski's
patterns, there is evidence of a strong relationship be-
tween cohesive structures or anaphora and text coherence.
"Cohesive elements (anaphora) are the features of the
language which enable the speaker or writer to express
in the surface structure of a text, the logical relations
at the level of deep structure." (Murphy, 1979, p.60).

ANAPHORA AND COGNITIVE PROCESSES

Since anaphora appears to be an immensely complicated
phenomenon involving syntactic and non syntactic factors,
an attempt to understand the process of text comprehen-
sion and the influence of the context in which the anaphoric
expression is embedded is examined.

Schema theory has been reported as one possible frame-
work for understanding how syntactic and non-syntactic
factors affect the comprehension of anaphora. Webber
stated that the task of "identifying what the text makes
available for anaphoric reference and how it does so"
has been largely overlooked in much of the research. (Webber,
1978, p.1). Pronouns do not just replace nouns, for the
antecedent of an anaphoric expression could fall into
any one of Webber's categories, such as "individuals,
sets, stuff, events, activities, actions, states, proposi-
tions, generics, prototypes and descriptions." (Webber,
1978, p.15).

To be able to identify or "construct", possible antecedents requires complex cognitive processes or abilities. Because when the antecedent is not mentioned in the text, it must be inferred. When investigating the comprehension of anaphora requiring inference skills, it must be kept in mind "that people might vary as to the amount of effort they will expend inferring an antecedent or referent or as to whether they will expend any effort at all" further complicating the examination of anaphora. (Webber, 1980, p.151).

Since anaphora can refer to something in the reader's head by means of inference, information on the manner in which knowledge is organized and the process involved in text comprehension is beneficial to the understanding of anaphora.

Bransford and Johnson (1973) and Collins, Brown and Larkin (1977), proposed a model-based view of text understanding drawing upon theories developed in the areas of cognitive science and artificial intelligence. These theories claim that the organization of knowledge is represented in data structures called frames, scripts or schemata. For the purpose of this discussion, only the term "schemata" will be used with the following definition:

> Schemata are data structures for representing
> generic concepts stored in the memory. They
> exist for generalized concepts under objects,
> situations, events, sequence of events, actions
> and sequence of actions. Schemata are not atomic.
> A schema contains as part of its specifications,
> the network of interrelationships that is believed
> to generally hold among the constituents of

the concept in question. (Rumelhart and Ortony, 1977, p.10).

All schemata are composed of numerous variables, allowing a reader to retain a concept that has been introduced along with its variables and the relationships among them. With this flexibility, schemata can accommodate a vast range and amount of knowledge to which anaphoric expressions are referred, enhancing "an author's ability to refer to entities not explicitly presented in the text, as well as the reader's ability to correctly resolve anaphora which based upon the surface structure alone would be ambiguous." (Murphy, 1979, p.38)

The schemata theory has drawn support from Charniak (1975) and Webber (1978) while Frederickson (1975) and Collins (1977) confirmed that comprehension requires an overall understanding of concepts and that learners must draw upon previously acquired schema in order to facilitate learning. Haviland and Clark (1974), Kintsch (1974), Paris (1975) and Moeser (1976) have provided further evidence in support of the original work of Bransford and Johnson, in considering "linking" as one semantic aspect of comprehension: they demonstrated that linking clarifies text that would appear ambiguous at a syntactic level, and that linking takes place in children and adults alike.

More recently, John Nix attempted to develop a system of linking "to characterize the inter-propositional links

that are crucial to using prior world knowledge to consti-
tute a paragraph as something distinct from a string of
sentences." (Nix, 1978, p.80). In developing his frame-
work he assumed reading comprehension to be an act in
which the reader must utilize his/her prior world know-
ledge when linking together the propositions in the text
in order for it to make sense. Using anaphoric pronouns
as the links under investigation, Nix used ten third grade
students, assuming that as they encountered the text,
they would consider syntactic factors prior to the use
of semantic factors. However in his results, he discovered
that his subjects processed the semantic information regard-
less of its necessity or relevance.

In conclusion, such a process model may have been
premature for the steps that a reader uses to process
the resolution of anaphoric pronouns could not be inferred
from the data compiled by Nix.

Regardless of the framework used to understand the
role of syntactic and non-syntactic factors in the compre-
hension of anaphora, the fact that memory plays an impor-
tant role must be considered. In Chafe's theory of con-
sciousness, he eludes to this fact. He claims that only
entities which are in the consciousness of the learner
can be referred to by anaphoric expressions. This con-
sciousness has a limited capacity and certain items are
pushed out as new ones enter in. Many factors influence
whether or not the item remains in the learner's conscious-

ness and whether or not it is retrievable when called upon by an anaphoric structure.

Haviland and Clark (1974) support Chafe's work. In order for a concept to be inferred, it must be accessible in the memory and it also has to be activated and brought into the short term memory. A child's memory span as witnessed by Lesgold (1974) is limited and therefore, the length that the antecedent is from its referent may present varying degrees of difficulty. If the antecedent is only implied and not stated in the text, even more difficulty arises.

ANAPHORA AND CHILDREN'S LANGUAGE DEVELOPMENT

Language development studies have reported that the understanding of anaphora depends on the individual's ability to apply syntactic rules. Anaphoric pronoun references were investigated by Chomsky (1969), Maratsos (1973) and Chipman and de Dardel (1972).

Carol Chomsky's study, The Acquisition of Syntax in Children from Five to Ten, set the stage for language studies examining children's ability to understand anaphoric references. She based her work on the premise that syntactic structures that are at variance with general language patterns, will be more difficult and will be acquired late in language development.

Chomsky studied forty children, ranging in age from five to ten years, and their interpretation of pronominal

references in three different structures:

    Structure 1:   pronoun is in main clause, precedes NP
                     He found out that Mickey won the race.

    Structure 2:   pronoun is in subordinate clause,
                     precedes NP
                     After he got the candy Mickey left.

    Structure 3:   pronoun is in subordinate clause,
                     follows NP
                     Pluto thinks he knows everything.
                     (Chomsky, 1969, p.104).

Sentences using the three different structures were read to the children who were then required to answer anaphoric comprehension questions. Only the first structure blocked co-reference, for the antecedent for "her" is not to be found within the sentence, whereas in structures 2 and 3 "he" can refer to the subject of the sentence. Therefore structure 1 was termed as more complex and it was hypothesized that it would be learned late in the children's language development. Results showed that the children did not demonstrate mastery of the rules governing co-reference until about 5-6 years of age. Though the study has limited application for the understanding of anaphora, it did demonstrate that the ability to identify the antecedent is the basis of anaphoric comprehension.

    In 1973, Maratsos tested children's ability to interpret sentences in which emphatic stress provided the cue to the correct antecedent. The following sentences illustrate the effect of emphatic stress:

    1. John hit Harry, and then Harry hit him.
      (unstressed)   him=Harry

2. John hit Harry, and then Sarah hit <u>him</u>.
   (stressed)   him=John   (p.1 & 2)

Maratsos tested one hundred and six subjects at the ages of three, four and five by having them act out sentence pairs with the use of toys. The investigation showed that the correct interpretation of the unstressed pronoun is high, with a response accuracy of .87 for age three, .83 for age four and .93 for age five. On the other hand, accuracy for stressed pronouns improved from .4 for three years of age to .78 for five years of age.

It was concluded that correct comprehension of stressed pronouns lags behind unstressed, for correct interpretation of stressed pronouns violates children's natural cognitive strategies. It was also found that this skill improved with age and experience.

In yet another study, Chipman and de Dardel (1972) tested children's comprehension of the pronoun, "it". The subjects of their investigation were forty-two children, ranging in age from 3.3 to 6.11. The children were presented with the following materials: a chunk of clay (collective noun), a box containing five marbles (count noun), a box containing twenty marbles (count noun) and bits of plastercine chocolate of varying size (collective and/or count noun). They were instructed as follows:

1. There is clay there. Give <u>it</u> to me.
   (Correct response = all the clay)

2. There is a box with 5 marbles. Give <u>it</u> to me.
   (Correct response = box plus marbles)

3. There are 20 marbles in the box. Give <u>it</u> to me.
   (Correct response = box plus marbles)

4. There is chocolate there. Give <u>it</u> to me.
   (Correct response = all the chocolate)

All four tasks improved with age. The collective noun (clay) represented the highest success rate with 30% of the three year olds responding correctly to 90% of the six year olds. Most difficult was the collective and/or count noun (chocolate) for only two subjects at ages five and six responded correctly. Chipman and de Dardel concluded that comprehension of anaphora may be influenced by both cognitive and linguistic development.

The studies cited above offer some insight into children's comprehension of anaphora; Chomsky dealt with syntax, Maratsos experimented with emphatic stress, and Chipman and de Dardel studied the range of antecedents for an anaphoric expression. These studies, focussing on oral comprehension showed that children exhibit some competence in regard to anaphora at an early age, however it can not be assumed that the same is true for reading comprehension.

ANAPHORA AND READING COMPREHENSION

Educators have long recognized that reading comprehension involves, "the ability to follow the organization of a passage and to identify antecedents and find references in the passage." (Davis, 1941, p.23). It was thought however, that the comprehension of anaphora occurred at

a relatively early age. Some recent reading research focussing on the influence of anaphora on comprehension has indicated that children do <u>not</u> acquire this understanding as early as once thought.

One of the first studies focussing on anaphora was conducted by David T. Chai in 1967. He tested college sophomores and children from grades eight, seven and five. All subjects were presented with key pronouns that had more than one possible antecedent. He discovered that the college students could easily resolve the antecedents, followed by grade eight students. More difficulty in resolving the proper antecedent was witnessed in grade seven subjects. The grade five children were unable to resolve pronominal ambiguities, and anaphora in this case, was attributed as the cause of ambiguity.

Dutka (1979) studied the relationship between anaphoric nominal substitutions and reading comprehension with older subjects: eighty students enrolled in teacher certification courses and ninety-two college freshman who were identified as seeking assistance in improving their reading skills. Dutka found the ability to figure out what is replaced by a substitution is a factor in reading comprehension. Resolving the antecedent substitution is not a simple task because it requires sophisticated syntactic, semantic, evaluative and inferential skills.

Dutka's study also found that the substitution was most difficult when the factors of length and distance

were applied. "An antecedent which lies far away from its substitute may not still be present in the working memory of the reader as the substitute is read" (Dutka, 1979, p.14) and if it is not available for retrieval when meaning is called for, comprehension is brought to a halt.

In 1970, Bormuth, Manning, Carr and Pearson attempted to arrange the difficulty of anaphoric structures into a heirarchy for purposes of planning reading comprehension instruction. Sixty fourth grade students were given short paragraphs to read and a multiple choice format was used to assess their comprehension of the anaphoric structures. The results showed a significance between structure variation with an accuracy range of 64.5% for pronouns to 86.8% for proclauses. This study demonstrated that anaphora may be a cause of reading comprehension difficulty, for a relatively low level of accuracy was found in a number of categories and the study "included only those anaphora having antecedents fully contained in the sentence immediately preceeding the one containing the anaphoric expression." (Bormuth et al, 1970, p.351). On the other hand certain limitations were noted. Only two items were used to assess each anaphoric type; the researchers do not offer any rationale as to why one anaphoric device would be expected to be more complex than another and they do not provide any information on the types of errors the children typically made. Further, the multiple choice format placed constraints on the chil-

dren's responses. Secondly, the taxonomy of anaphoric structures for the study was adopted from Menzel (1970) who had categorized anaphora solely on the basis of surface structure. By using such a taxonomy it was assumed that the difficulty of an anaphoric structure is independent of the linguistic context in which it is found. This can not be ignored in the analysis of anaphora however, for there is a wide range of antecendents and sentence structures in which anaphoric expressions can be found. (Refer to Table 2.1).

In an attempt to overcome some of the limitations in the study by Bormuth et al., Lesgold (1974) examined the validity of syntax as the basis for a heirarchy. Since different anaphoric expressions occur in different semantic contexts and the same anaphoric structures can be found in a variety of different syntactic and semantic contexts, Lesgold hypothesized that a heirarchy based only on syntax may be inadequate. Controlling for the number of semantically plausible answers and for the "amount of processing required to get from a syntactic passing of a sentence to an underlying cognitive representation" (Lesgold, 1974, p.334), Lesgold used three test items for each anaphoric structure and recorded the children's oral responses to the test questions. Being unable to replicate Bormuth's findings, Lesgold concluded that "at present, the use of difficulty orderings for syntax without regard to semantics is not likely to lead to improved instruction in comprehension." (Lesgold, 1974, p.338).

TABLE 2.1

ANAPHORIC STRUCTURES AND SENTENCE EXAMPLES

Pro-clause, so . .	Joe may go. If <u>so</u>, we will .
Pro adverb	He works in the cellar. It is cool <u>there</u>.
Relative pronouns	The man <u>who</u> lives next door makes . . .
Pro-verb, so-do	Joe likes tennis. <u>So</u> <u>does</u> Bill.
Deleted modifier	The small boy came. <u>This</u> <u>boy</u> is . . .
Noun phrase demonstrative	The black horse belongs to Joe. <u>That</u> is his . . .
Numeric pronominal	Several men went fishing. <u>Two</u> caught . . .
Inclusive pronoun	Joe, Bill and Mary went to the show. <u>All</u> enjoyed . . .
Deleted noun	There are ripe and green apples. The green <u>∅</u> are mine.
Pro-verb, so-be/have	Joe is sick. <u>So</u> <u>is</u> Bill.
Negated pronoun	Bill and Joe went shopping. <u>No</u> <u>one</u> bought . . .
Clause demonstrative	Joe is stuck in the mud. <u>This</u> leaves us . . .
Semantic substitute	Those steel towers are antennas. These <u>objects</u> are . . .
Personal pronouns	Joe left the room. <u>He</u> had . . .

(Bormuth et al., 1970, p. 351)

Lesgold's work indicated that difficulty in reading comprehension is not a result of <u>isolated</u> anaphoric words, for semantics have to be considered along with syntax and that anaphora appears to contribute to children's reading comprehension difficulties.

Richek also investigated children's reading comprehension of anaphora. In 1977 she designed a study with even more rigorous controls then that of the two previously discussed studies by controlling for sentence kernels, length and parallelism. Choosing two hundred twenty grade three students as subjects, the ability to comprehend paraphrase sentences containing alternate anaphoric forms was tested. Examples of the three anaphoric forms used in the study are:

1. noun: John saw Mary and <u>John</u> said hello to Mary.

2. pronoun: John saw Mary and <u>he</u> said hello to her.

3. null: John saw Mary and <u>Ø</u> said hello to her. (Richek, 1977, p.147).

The results showed a heirarchy with noun forms being the easiest and null forms being the most difficult. No interaction among kernel, length and parallelism was found. On the other hand, Richek found that the sentence affected the difficulty for the interaction between the anaphoric expression and the linguistic context results in varying sentence complexity: "the two or three sentences constructed from each frame have been found to be similar in difficulty; sentences constructed from different frames have been found to be relatively dissimilar in difficulty." (Richek, 1977, p.334).

John B. Barnitz, in 1980, researched children's ability to comprehend the pronoun "it". Subjects of his study

were English speaking children from the second, fourth

and sixth grades. The study made three linguistic compar-

isons:

    1. <u>Referent Type:</u> a) noun or noun phrase
                             b) clause or sentence

    2. <u>Reference Order</u>: a) that the referent proceeds
                                the anaphora
                             b) that the referent comes
                                after the anaphora

    3. <u>Referent Distance</u>: a) "it" and its referent
                                 are in the same sentence
                             b) "it" and its referent
                                are in separate sentences.

He hypothesized that in each of the three categories men-

tioned, (a) would be the easiest for the children in his

study. His findings validated his hypothesis for referent

type and referent order but failed to confirm the category

of referent distance.

The conclusion from this study is that some anaphoric

devices do affect children's reading comprehension and

that pronoun referent structures indicate a developmental

trend, though "some of these structures may be problematic

even through the elementary grades." (Barnitz, 1980, p.287).

His work indicated the need for more research into the

study of children's ability to comprehend anaphora.

<u>SUMMARY</u>

In summary, the review of the literature indicates

that research on the effect of anaphora on reading compre-

hension is limited and that the need for further research

exists. It also demonstrates that information from a variety of other disciplines is not only beneficial to the understanding of anaphora and reading comprehension but also illustrates the vast complexity of this phenomenon. From the studies reported however, it can be concluded that anaphora is a factor in reading comprehension and the younger the reader, the more difficult it is to comprehend the anaphoric devices in reading. The type of anaphoric structures comprehended by elementary school children and at what ages this comprehension occurs is a question that largely remains unanswered.

Another conclusion to be made from the review of the literature is that the majority of the research in this area has investigated anaphoric devices of only one type. Reference has been the main focus of attention and little work has been attempted with the other four types as categorized by Halliday and Hasan (1976).

The purpose of this paper is to investigate children's comprehension of substitution anaphora. Substitution was studied by Dutka but she utilized only nominal substitution with college students as her subjects. This study addresses all three sub-groups of substitution: nominal, verbal and clausal, all aimed at answering the following questions:

1. What substitutions do second grade students comprehend in their reading?

2. Is there a relationship between their reading ability

to comprehend different categories of anaphoric sub-

stitutions?

3. What influence does the availability of passage for

referral have on the reading comprehension of ana-

phoric substitutions?

CHAPTER 3

DESIGN AND PROCEDURE OF THE STUDY

DEVELOPMENT OF THE TEST OF COMPREHENSION OF ANAPHORIC
SUBSTITUTIONS (TCAS)

Since an investigation into the comprehension of
anaphora required a testing instrument and since none
was available, the investigator undertook the task of
developing a Test of Comprehension of Anaphoric Substitu-
tions.

Prior to selecting reading passages for the test,
grade two reading materials were carefully studied. Both
basal reading series and supplemental reading materials
were scrutinized to familiarize the investigator with
the language patterns used in the reading materials of
the students.

Once several passages were chosen, the Spache Read-
ability Formula was applied and passages reading at approx-
imately a 2.9 level were chosen for the test. Of the
nine reading passages comprising the TCAS, three tested
nominal anaphoric substitutions, three tested verbal ana-
phoric substitutions and three tested clausal anaphoric
substitutions. The substitutions were underlined in each
passage and three different styles of questions were selected
to test the anaphora.

These passages were then field tested on twenty aver-
age grade two students. The vocabulary and sentence struc-

ture was found to be compatible with the students tested.
From this field test, sentence completion was chosen as
the best method of testing the anaphoric substitutions
and a parallel form was developed. Form B followed the
same sentence structure and concept load as Form A with
identical readability. The two forms were then field
tested to ensure their equality. Two heterogeneous grade
two classes were chosen. Each class received a different
form of the test. The results of the field testing revealed
that both forms were indeed parallel. Thus the instrument,
the Test of Comprehension of Anaphoric Substitution, was
ready for inclusion in the pilot study.

PILOT STUDY

Purpose

The pilot study was conducted for purposes of working
through the procedures to be used in the actual investiga-
tion. This included the administering and scoring of
the TCAS, the format and types of questions to be asked
in conjunction with the TCAS and the timetabling.

Subjects

Fifteen grade two subjects were selected for the
pilot study from a school representing a middle class
suburb of Winnipeg. Each student was identified as a
below average, average or above average reader by the
school resource teacher.

Procedure

Each subject was tested individually by the examiner. The subjects orally read the passages and answered the sentence completion following each passage.

The investigator recorded the subjects' responses verbatim along with any other observations. Upon completion of the TCAS, all subjects participated in an interview which was transcribed verbatim. Scoring and analyzing were also developed during the pilot study.

THE RESEARCH STUDY

Sample

Forty-five grade two students were chosen from four classes within one suburban school division. The sample was drawn from one hundred and four students who were tested on the primary form of the Metropolitan Reading Achievement Test. From the scores, the students were categorized as below average, average and above average readers. Fifteen students from each category were then randomly chosen as subjects for the research study.

Materials

The Test of Comprehension of Anaphoric Substitution (TCAS) contained two equal forms with nine items in each form. Of the nine items, three tested each of the three types of substitutions. (See Appendix A)

In addition to the two forms, there were also two procedures for allowing the subjects to respond. One allowed students to look back to the reading passage for assistance in answering the question. These were referred to as available passages for referral. Other passages were identified as unavailable for referral.

Since the order of presentation and different measures was a possible concern, the Latin Squares procedure (Blumberg, 1983) was applied to the test. This procedure allowed for variance in the order of presentation of the items to ensure that the order of presentation would not affect the results of the study. This method counterbalanced the availability of passages for referral and the two forms. Therefore the forms and the order of presentation were not a factor in this study.

Procedure

Since the individual passages of the TCAS were at a grade 2.9 reading level, early June was chosen as an appropriate time for the testing. Arrangements were made with the principals and teachers of the schools concerned. Times were then scheduled so that subjects could be individually tested in an area without distractions.

Once the subject entered the testing room, the examiner introduced herself and spoke briefly with the student explaining what was to transpire during the session. When the student was comfortable and relaxed, the test

began with an example. The example was given along with
the correct answer and an opportunity for the subject
to ask any further questions regarding the test. Then
the testing began.

Each subject was instructed to orally read the first
passage. Oral reading enabled the examiner to spot any
vocabulary problems that affect the understanding of the
passage.

The anaphoric substitution in each passage was under-
lined and following the passage was a sentence completion
question that the subjects were asked to read and answer.
Each subject then proceeded to complete the nine items
of the test in the same manner. The examiner recorded
all responses and also noted any difficulties or state-
ments that the students may have made during the reading.
The examiner also recorded her own observations of the
subjects during the test.

Once the TCAS was completed, each subject was asked
how he/she found the test and how he/she knew the answers.
All conversations were recorded by the investigator.
Any additional notes and observations were made when the
subjects left the testing area. Each total session took
approximately thirty-five minutes.

Scoring of the TCAS

As each subject was tested, the TCAS was scored on
an answer sheet. (Appendix B). The answer sheet enabled

the investigator to record the types of anaphoric substi-
tutions the student understood as well as how he/she re-
sponded on passages that were available or unavailable
for referral. The sheet was scored out of a total of
nine and sub-divided into three subtests.

Upon completion of individually testing all forty-five
subjects, the scores were compiled for statistical analysis.
A total of four hundred and five pieces of data were used
to analyze and test the first three hypotheses.

In order to analyze the effect of the availability
of passage, one piece of data was randomly dropped from
each subject's score. This modification of data, result-
ing in three hundred and sixty pieces of data, enabled
the investigator to work with an equal number of responses
for available and unavailable passages for referral.

Method of Analysis

The factors identified for this study were:

A) Between-Subject Factors:
   1) Reading Ability

B) Within-Subject Factors:
   1) Type of Test (Nominal, Verbal, Clausal)
   2) Availability of Passage

The study utilized a factorial design and consisted
of two separate two-way analyses of variance with repeated
measures on one factor and a Newman-Keuls Test of Differ-
ences Between Means.

CHAPTER 4

ANALYSES OF DATA

The purpose of this study was to investigate second grade students' comprehension of anaphoric substitutions. The specific questions for investigation were formulated into six null hypotheses.

These hypotheses were tested by means of statistical analysis. A two-way analysis of variance with repeated measures on one factor was applied to the data to test hypotheses one, two and three. Hypotheses four, five and six were tested by a second analysis of variance with repeated measures on one factor. All hypotheses were tested for significance at the .05 level.

The data collected for the first three hypotheses dealing with results of the Test of Comprehension of Anaphoric Substitutions, the three sub-tests of the TCAS and the three reading ability groups is reported in Table 4.1.

Table 4.1 consists of the number of correct responses each subject scored on the nominal, verbal and clausal sub-tests of the Test of Comprehension of Anaphoric Substitutions (TCAS) and the total score that each subject received on the test. It shows that there are three reading ability groups: A_1, A_2 and A_3, each consisting of fifteen subjects. The performance by each subject in the three substitutions under study: nominal, verbal, and clausal are indicated in columns three, four and five, with the total score appearing in column six.

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TABLE 4.1

THE NUMBER OF CORRECT RESPONSES ON THE

TEST OF COMPREHENSION OF ANAPHORIC SUBSTITUTIONS

Reading Ability Groups	Subject	Nominal Substitutions	Verbal Substitutions	Clausal Substitutions	Total Score
A_1 (Below Average)	1	1	0	2	3
	2	0	0	1	1
	3	1	1	0	2
	4	0	0	0	0
	5	1	2	2	5
	6	3	0	1	4
	7	0	1	0	1
	8	2	1	3	6
	9	1	0	2	3
	10	0	1	1	2
	11	0	1	1	2
	12	2	0	1	3
	13	1	0	0	1
	14	0	0	0	0
	15	0	0	0	0
A_2 (Average)	1	0	1	2	3
	2	1	1	2	4
	3	0	0	0	0
	4	1	1	1	3
	5	2	1	2	5
	6	2	3	2	7
	7	0	0	3	3
	8	1	1	1	3
	9	1	0	0	1
	10	0	0	0	0
	11	2	1	0	3
	12	1	0	1	2
	13	2	1	1	4
	14	1	1	1	3
	15	2	0	1	3
A_3 (Above Average)	1	1	1	2	4
	2	1	2	3	6
	3	2	1	3	6
	4	2	1	3	6
	5	3	2	3	8
	6	2	3	3	8
	7	1	0	2	3
	8	1	0	3	4
	9	3	2	3	8
	10	0	0	1	1
	11	2	1	3	6
	12	2	2	2	6
	13	1	1	2	4
	14	1	2	2	5
	15	2	0	2	4

Total Possible Score for each sub-test = 3
Total Possible Score for the TCAS = 9

Using the data reported in Table 4.1, a two-way analysis of variance with repeated measures on one factor was applied to test hypotheses one, two and three.

From the analysis, the average scores of each ability group and each sub-test was computed. Table 4.2 reports these means. Column one represents the reading ability groups and column two lists the average score for each of the ability groups in the nominal category. Column three represents the average scores on comprehension of verbal anaphoric subsitutions for each ability group, while column four lists the average score of comprehension in the clausal category. Column five indicates the average score for each reading ability group on the total Test of Comprehension of Anaphoric Substitutions.

TABLE 4.2

SUMMARY OF MEANS FOR THE

TEST OF COMPREHENSION OF ANAPHORIC SUBSTITUTIONS

Reading Ability Groups	Sub-Tests			Total
	Nominal	Verbal	Clausal	
Below Average	.80	.40	.0	2.2
Average	1.067	.733	1.133	2.933
Above Average	1.60	1.20	2.467	5.267
	3.467	2.333	4.600	

The results of the analysis of variance appears in Table 4.3.

TABLE 4.3

ANALYSIS OF VARIANCE

Source of Variation	SS	df	MS	F
Between subjects				
A (Reading Ability Groups)	25.644	2	12.822	11.05*
Subjects Within Groups	48.755	42	1.16	
Within subjects				
B (Tests)	12.844	2	6.422	13.98*
AB	3.911	4	.9777	2.13
B x subjects within groups	38.577	84	.459	

*Significant at the .05 level

The analysis of variance reported in Table 4.3 indicates that there is a significant difference among the three reading ability groups, a significant difference among the three categories of anaphoric substitutions tested and that there is no significant interaction between the reading ability groups and the three sub-tests of the TCAS.

Hypothesis 1, which stated that there will be no effect for reading ability on the overall results of the TCAS, was rejected. The F score of 11.05, illustrates that there is a significant difference in the results of the three reading ability groups.

Hypothesis 2, which stated that there will be no significant difference in the results of the three sub-tests

of the TCAS, was also rejected. The F score of 13.98 indicates a highly significant difference among the nominal, verbal and clausal anaphoric sub-tests.

Hypothesis 3, which stated that there will be no interaction between the three TCAS sub-tests and the reading ability, was accepted. The F score of 2.13 is not considered significant at the .05 level.

TABLE 4.4

THE NEWMAN-KEULS TEST OF

DIFFERENCE BETWEEN MEANS

Reading Ability Groups	A_1	A_2	A_3
Ordered Means	2.2	2.933	5.267
A_1		.733	3.067
A_2			2.334
A_3			
SB = .115	r=	2	3
$q^{.95}$ (r,84)		3.76	4.28
SB ($q^{.95}$ (r,84)		.43	.49
	A_1	A_2	A_3
A_1			*
A_2			*
A_3			

*Significant at the .05 level.

The differences between the means of the three reading ability groups were submitted to the Newman-Keuls Test of Difference Between Means. This test determined that not all of the means were significantly different from each other. The results as illustrated in Table 4.4 show that the above average group's mean is significantly different from both the below average and average reading ability groups' means but that the means of the average and below average groups are not significantly different from each other.

The second set of hypotheses concern themselves with the modified results of the TCAS in which the influence of the availability of the passages on the results is investigated along with the differences among the three reading ability groups.

The data collected to test hypotheses four, five and six is reported in Table 4.5. The first column indicates the same subjects as reported earlier in Table 4.1 with column two representing the number of correct responses made when the subject was not allowed to refer back to the passage when answering the anaphoric comprehension question. While the third column reports the results when subjects were allowed to refer back to the passage for assistance in answering.

Once again a two-way analysis of variance with repeated measures on one factor was applied to the data to test hypotheses four, five and six.

TABLE 4.5

THE NUMBER OF CORRECT RESPONSES ON THE

TEST OF COMPREHENSION OF ANAPHORIC SUBSTITUTIONS

CORRECTED FOR A BALANCE OF CONDITIONS

Reading Ability Groups	Subject	Unavailable Passages	Available Passages
A$_1$ (Below Average)	1	1	2
	2	1	0
	3	0	1
	4	0	0
	5	2	2
	6	2	2
	7	1	0
	8	3	3
	9	1	2
	10	1	1
	11	1	1
	12	0	1
	13	1	0
	14	0	0
	15	1	1
A$_2$ (Average)	1	1	2
	2	2	1
	3	0	0
	4	1	1
	5	2	2
	6	3	3
	7	1	2
	8	1	1
	9	0	1
	10	0	0
	11	1	2
	12	1	1
	13	2	2
	14	1	2
	15	1	1
A$_3$ (Above Average)	1	0	3
	2	3	3
	3	2	4
	4	2	3
	5	4	4
	6	1	2
	7	3	4
	8	0	1
	9	0	3
	10	0	3
	11	3	4
	12	2	4
	13	1	2
	14	1	3
	15	1	3

Total Possible Score = 8
Total Possible Score for Available or Unavailable = 4

Table 4.6 reports the average scores of each ability
group on the two variables of availability of passages
of the TCAS. Column one indicates the three reading ability
groups, column two lists the average score for each ability
group when the passages were unavailable for referral
and column three lists the average scores when the passages
were available.

TABLE 4.6

SUMMARY OF MEANS

Reading Ability Groups	Unavailable	Available	
Below Average $(a)_1$	1.00	1.07	1.04
Average $(a)_2$	1.13	1.40	1.26
Above Average $(a)_3$	1.53	3.07	2.30
	1.22	1.84	1.53

The results of the analysis of variance appears
in Table 4.7. They indicate that there is a significant
difference among the three reading ability groups,
a highly significant difference between the scores
on available and unavailable passages and that there
is a significant interaction between the availability
of passage and the reading ability groups.

TABLE 4.7

ANALYSIS OF VARIANCE

Source of Variation	SS	df	MS	F
Between Subjects	91.4	44		
A (Reading Ability groups)	27.3	2	13.65	8.94**
Subjects within groups	64.1	42	1.526	
Within subjects	31	45		
B (Availability)	8.7	1	8.7	28.5 **
AB	9.5	2	4.75	15.6 **
B x subjects within groups	12.8	42	.305	

*Significant at the .05 level
**Significant at the .01 level

On the basis of this anlysis of variance, hypotheses
four, five and six were rejected.

Hypothesis 4, which stated that there will be no
effect for the availability of passage on the overall
results of the TCAS was rejected since a highly significant
F score of 28.5 was computed from the data.

Hypothesis 5, which stated that there will be no
effect for reading ability on the modified results of
the TCAS was rejected on the basis of the F score of 8.94.
This score indicates that there is a significant difference
among the three reading groups.

Hypothesis 6, which stated that there will be no
interaction between the availability of passage and the
three ability groups was also rejected. The F score of
15.6 is significant at the .05 level, illustrating that
there is a definite interaction between the availability

of passage and the reading groups.

The differences between the means of the three reading ability groups were submitted to the Newman-Keuls Test to determine whether all means were significantly different from each other. The results as shown in Table 4.8 indicate that differences between A_1 (below average) and A_3 (above average) and A_2 (average) and A_3 (above average) differed significantly at the .05 level.

TABLE 4.8

THE NEWMAN-KEULS TEST OF

DIFFERENCE BETWEEN MEANS

Reading Ability Groups		A_1	A_2	A_3
Ordered Means		1.04	1.26	2.30
	A_1		.22	1.26
Differences Between Means	A_2			1.04
	A_3			
SB = .18		r=	2	3
$q^{.95}$ (r,42)			2.86	3.44
SB ($q^{.95}$ (r,42))			.51	.62
		A_1	A_2	A_3
	A_1			*
	A_2			*
	A_3			

*Significant at the .05 level.

The significance of the interaction between the availability of the passage and the reading ability groups was computed to determine if all three reading ability groups contributed to the interaction noted in hypothesis number six. An F score of 4.08 or greater was required for a significant interaction for each of the reading ability groups. Table 4.9 illustrates that only the above average group contributed to the interaction.

TABLE 4.9

SIGNIFICANCE OF INTERACTION COMPUTATIONS

Reading Ability Groups	F Scores
A_1 (below average)	.13
A_2 (average)	1.74
A_3 (above average)	57.7***

```
  * Significant at the .05 level
 ** Significant at the .01 level
*** Significant beyond the .01 level.
```

SUMMARY

The six hypotheses originally stated in Chapter One were tested in this chapter. All but one hypothesis was rejected on the basis of the statistical analysis.

It was found that the three reading ability groups varied significantly on the results of the TCAS and that there was a significant difference in students' comprehension of the three categories of anaphoric substitutions.

It is also evident from the findings that there is a significant difference in the performance of students on the TCAS when the passages were available for referral as opposed to when they were unavailable. There was an especially high difference between the performances of the above average reading ability students on available and unavailable passages for referral.

The results indicate that these second grade students have not mastered anaphoric substitutions.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to investigate second grade students' comprehension of anaphoric substitutions. More specifically, the study concerned itself with three main questions:

1)   What substitutions do second grade students comprehend in their reading?

2)   Is there a relationship between their reading ability and their ability to comprehend different categories of anaphoric substitutions?

3)   What influence does the availability of the passage during questioning have on the reading comprehension of anaphoric substitutions?

SUMMARY OF THE DESIGN

The sample for this study was drawn from a middle class suburban school division. It was comprised of forty-five grade two students, fifteen at each of the three reading ability levels: below average, average and above average.

The Test of Comprehension of Anaphoric Substitutions (TCAS) was developed, piloted and then individually administered to forty-five subjects. The test was composed of nine items, testing nominal, verbal and clausal anaphoric substitutions. During the procedure, the subjects were tested on available and unavailable passages for referral. Upon completion of the test, each subject was interviewed to elicit

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further information regarding children's comprehension of anaphoric substitutions.

SUMMARY OF THE FINDINGS

The findings were applied to the three main questions of the study. It was found that grade two students have not mastered the comprehension of anaphoric substitutions. Of the forty-five students tested, only three subjects met the criteria of 7/9 (77.77%) for mastery of substitutions. A perfect score was not obtained by any of the subjects in this study.

There was a relationship between reading ability and ability to comprehend anaphoric substitutions. The below average reading ability group scored the lowest with a mean of 2.2 correct responses. The average reading ability group attained a mean of 2.9 correct responses and the above average reading ability group performed the best with a mean score of 5.3. None of the mean scores met the criteria of 7/9 correct responses which would indicate mastery.

The results showed that the clausal category was highest in comprehensibility, followed by nominal and that verbal anaphoric substitutions proved to be the most difficult. The results however, did not show a significant interaction between the reading ability and the subjects' ability to comprehend different categories of anaphoric substitutions.

In addressing the question of availability of passage, the findings indicate that comprehension was aided when the

passages were available for referral. Most significantly, the above average reading ability group doubled the number of correct responses when the passage was available for referral. There was a significant interaction between the availability of passage and the reading ability groups.

LIMITATIONS OF THE FINDINGS

The above findings must be viewed in the light of the suburban middle class population used in this study.

CONCLUSIONS AND DISCUSSION

Bearing in mind the limitations of this investigation and of generalizing findings on the basis of one study, several conclusions are tentatively presented for consideration.

The study lends support to previous research which found that children do not comprehend anaphora in their reading by the time they enter school (Bormuth et al, 1970; Lesgold, 1974; Richek, 1977; Dutka, 1979; and Barnitz, 1980). It had been thought that children's understanding of anaphora, as witnessed in language studies, occurred by the age of five to six years, but the present study suggests that the difficulty continues as late as eight years of age. Children completing the second grade, do not appear to comprehend anaphoric substitutions in their reading. Regardless of reading ability, these students have difficulty comprehending anaphoric substitutions although those reading above grade level appear to have less difficulty.

In addition, the results of this study concur with Barnitz
(1980) who indicated a developmental trend in his research
of reference anaphora. It appears that the older the child,
the better anaphora is comprehended. Further, comprehending
anaphoric substitutions also improves with age. The question
remains however, as to the age when comprehension of anaphor-
ic substitutions is mastered. An earlier study by Dutka
(1979) found that even college students were unable to resolve
nominal substitutions in their reading.

Why these structures are so problematic to children's
reading comprehension is speculative at this point. Webber,
in reviewing research in artificial intelligence, psychology
and linguistics, suggested that "anaphora might easily be
a source of comprehension difficulties" in that it demands
"very sophisticated syntactic, semantic, pragmatic, inferen-
tial and evaluative abilities on the part of the reader."
(Webber, 1980, p.142). When reading an anaphoric substitu-
tion, the reader not only has to identify the word as a refer-
ent but must also be able to recall or infer its antecedent,
requiring complex cognitive processes which are not yet fully
understood. Durkin suggests that we are a long way from
this understanding and that "learning about children's ability
to process anaphora will not be an easy or quick process."
(Durkin, 1981, p.36).

This study suggests that the availability of the passage
for referral has an effect upon the comprehension of anaphoric
substitutions. When the reading passage was available for

referral, more test questions were answered correctly. This improvement suggests that it is difficult for second grade students to hold the necessary information in their memory and recall it when needed and that students need to be able to refer back to the passage to find the necessary information to answer questions regarding anaphoric substitutions. Further, this study revealed an interesting phenomenon regarding the referral to reading materials in that only the above average readers chose to use this option whereas the less able readers did not. The above average readers improved their comprehension 100% when they referred to the reading passage for assistance, indicating that the above average grade two students are aware of their lack of comprehension and have a strategy to assist this comprehension.

The interviews with the subjects provided further insight into this finding. The above average readers indicated an awareness that the information was retrievable from the reading passage. These students stated that they "knew the answer was somewhere <u>back</u> in the story" but were not always able to find it. Others related specific strategies they used to retrieve answers from the reading passage such as looking at the sentence immediately preceding the one containing the substitution or finding a noun in close proximity to the substitution to serve as the answer.

The average and below average reading ability students on the other hand, answered very quickly and rarely referred to the passage for any assistance. In the interviews many

revealed that they thought the questions were very easy, indicating no awareness of their lack of comprehension of the anaphoric substitutions. A few did say that they just didn't understand and that re-reading the passage did not help.

The interviews indicated that many grade two students do not realize that they have comprehension difficulties and do not have a conscious strategy to assist them in their reading comprehension.

It would appear that young readers associate problems in comprehension with unfamiliar words rather than the context, but Markman's investigation points out that:

> Certainly not all comprehension is limited to the
> process involved in understanding a single word,
> so it is not likely that all comprehension failure
> could be signaled by unfamiliarity. (Markman,
> 1977, p.986)

This study lends support to the concept that anaphoric substitutions are complex structures and are dependent upon context, which in turn requires constructive processing and that young students have not yet acquired these constructive processes for comprehending anaphoric substitutions.

Further, since substitutions are anaphoric in nature, they cannot be comprehended in isolation and instruction must be provided accordingly. Less able readers tend to answer quickly on the basis of the familiarity of the single word and do not seek the more complex meaning based on context. Because the substitutions; "one, ones", "same", "not", "so" and "do" are such common and familiar words, these stu-

dents are unaware that they need assistance and that they could find the answer in the reading passage. In contrast, some of the above average readers in this study appeared to recognize their comprehension failure, took more time for reflection and processing and then referred to the reading passage for assistance if needed or admitted their inability to find the answer.

Support is found in Markman's research (1977) which examined the question of how students become aware of their comprehension failure. She gave first and third grade readers instructions that were purposefully faulty. Information necessary to carry out the instructions were omitted. First grade students were unaware that the instructions were inadequate whereas third grade students recognized the faultiness. When the instructions were accompanied by a demonstration which reduced the need for mental processing, the children more readily realized that they did not understand. Markman concluded that "children's initial sensitivity to their own comprehension failure is due to a relative lack of constructive processing." (Markman, 1977, p.986).

The knowledge that one has failed to comprehend does not assure success in reading comprehension however; it is only the initial step. If the student does not have appropriate strategies for retrieval, comprehension can still be affected. A recent paper from the Illinois Centre for the Study of Reading discussed the importance of "students self-control and self-awareness of their own learning process."

(Brown, Campione and Day, 1981, p.14). Since research has indicated that many children do not successfully employ strategies to retrieve information from the text, Brown et al. reviewed various training studies aimed at promoting strategies to aid comprehension and concluded that training students in strategies for retrieval of information from the text does aid comprehension.

On the other hand, to simply remind the reader to look back to the text for information is not an adequate strategy. In the present study, it was found that only after prompting, did some of the less able readers re-read the passage. In spite of this reminder, they were still unable to answer correctly, suggesting that when they do look back at the reading passage, they do not know what to look for; they are not constructively processing the anaphoric substitutions. It can be concluded that the more able readers in the second grade attempt to use a strategy to retrieve information regarding anaphoric substitutions from the text.

Compounding this problem is the fact that some types of anaphoric substitutions are more difficult to comprehend than others. The results of this study demonstrate that clausal substitutions are the most easily comprehended, followed by nominal substitutions and that the category offering the most difficulty is verbal substitutions. The clausal and nominal categories vary only slightly in their degree of difficulty but verbal substitutions are significantly more difficult for students of the second grade. The study

did not attempt to uncover a hierarchy of the anaphoric substitutions for it is evident that all three categories depend on both the semantics and syntax of the passages in which they are embedded.

Though it is evident from the findings that various categories of substitutions do offer different degrees of difficulty, the reason for this variation was not investigated. Referring to research in the area of children's language development offers some explanation, however. Chomsky (1969) illustrated that language at variance with children's natural language patterns is more difficult to understand and Maratsos (1973) found that language structures that violate children's natural cognitive strategies are difficult to comprehend. Thus it is possible that the verbal category of anaphoric substitutions does not reflect the natural language patterns of children, thereby violating their basic cognitive strategies.

Another factor causing this difficulty may be sentence complexity as illustrated by Richek (1977). It is possible then, that the type of sentence structure required for each of the categories of anaphoric substitutions contributes to the difficulty of the substitutions itself.

The conclusions of this study indicate that anaphoric substitutions are a source of children's reading difficulty at the second grade level, that different categories of anaphoric substitutions present varying degrees of difficulty to second grade readers and that most of these students are

unaware of their own comprehension difficulties and do not possess some kind of strategy to overcome these difficulties. With these conclusions in mind, certain implications for the educational system in general, as well as for the teaching of reading specifically, can be drawn along with suggestions for further research.

IMPLICATIONS FOR THE EDUCATIONAL SYSTEM

1. Educators need to be aware that anaphoric substitutions increase the difficulty level of reading materials and that most readability formulae do not take anaphoric substitutions into consideration in determining the level of difficulty. Further, instructional materials need to be carefully examined for frequency of anaphoric substitutions, and their difficulty level re-evaluated on this basis.

2. There is a need for new readability formulae which take into consideration the different types of anaphoric substitutions.

3. In turn, publishers of children's reading materials need to take into account the frequency of anaphoric substitutions and their difficulty of comprehension when selecting materials for publication and designating them for various grade levels.

IMPLICATIONS FOR THE TEACHING OF READING

1. Teachers of primary students need to be aware of the

frequency of the three types of anaphoric substitutions
in the instructional reading materials and that anaphor-
ic substitutions are a source of reading comprehension
problems for young students.

2. Further, teachers need to become aware that different
anaphoric substitutions offer different degrees of compre-
hension difficulties. Since many students are unaware
that they have these difficulties, teachers need to
help their students in the comprehension of anaphoric
substitutions by direct teaching of each type of substi-
tution.

3. Upon encountering comprehension difficulties in their
reading of anaphoric substitutions, young students do
not know how to overcome their difficulties. Thus reading
teachers need to teach appropriate strategies that would
enable their students to successfully retrieve informa-
tion from the text and hence improve their comprehen-
sion of anaphoric substitutions.

IMPLICATIONS FOR FURTHER RESEARCH

Based on the findings of this study and the conclusions
discussed in this chapter, the following suggestions for
further research are offered:

1. This study should be replicated on grade two pupils
of other socio-economic levels to determine whether
factors other than age and reading ability level affect
the comprehension of the different types of anaphoric

substitutions.

2. This study should be replicated at different grade levels
    to determine when mastery of anaphoric substitutions
    occur and whether certain types are mastered sooner
    than others.

3. Since different categories of anaphoric substitutions
    offer different degrees of difficulties, this study
    should be replicated with more items in each category
    in order to shed further light on the varied degrees
    of difficulty and the possible reasons for these differ-
    ences.

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APPENDICES

APPENDIX A

TESTS OF COMPREHENSION OF

ANAPHORIC SUBSTITUTIONS

TEST OF COMPREHENSION

OF

ANAPHORIC SUBSTITUTIONS

(<u>FORM A</u>)

TEST SAMPLE

Mary and Ellen both got pretty new dresses for Christmas. Ellen also got a lovely watch from her grandmother. Now Mary wants <u>one</u>.

In the story, the word <u>one</u> means_____.

1.   The Jones Family were on their vacation. They stopped
at a park to have a picnic. The children played on the grass
while mother put the picnic basket beside a little stream.
It was cold and clear like all the mountain <u>ones</u>. They had
a very good time.

In the story, the word <u>ones</u> means_____.

2.   Cathy did the dusting for her mother every Saturday.
Today she had to dust three tables and then polish the silver.
After a little while her mother asked, "Have you dusted
everything?"

     "No," answered Cathy, "I've only <u>done</u> the first two
tables."

In the story, the word <u>done</u> means_____.

3.   Jack wrote a test at school and then set off for home.

He thought about the test as he walked slowly down the street.

When he finally got home his sister asked if he had

failed the test.

He looked at her for a minute and then said, "I hope

not."

In the story, the word not means_____.

4.   Bob and his father were both playing with the cars and

trucks that Bob had been given for Christmas. While they

were playing, a wheel broke off one of the cars.

"Look what happened to my brand new car," said Bob sadly.

"Well, I guess they just don't build toys the way they

used to do," answered his father.

In the story, the word do means_____.

5.   Martha was thinking about what she would like for lunch. There were hotdogs, sandwiches and hamburgers.

    After a few minutes she said, "I'll have an egg sandwich and a glass of juice."

    Her friend said, "I'll have the <u>same</u> but with a glass of milk."

In the story, the word <u>same</u> means_____.

6.   Two boys were waiting for their father to pick them up after the game. It was beginning to get dark and Frank could see that his brother was scared.

    "Don't worry Brian. Dad will be here soon," said Frank.

    "Yes, but supposing <u>not</u>. Then what will we do?" cried Brian.

In the story, the word <u>not</u> means_____.

7. Sally had invited all of her friends to her birthday party. All of them had promised that they would come.

When the day of the party finally came, everyone was there except for Jane.

Sally's mother saw how sad Sally looked and said, "It's all right. Jane will come if she said so."

In the story, the word so means_____.

8. Bill was a very good artist. He wanted to draw a card for his mother's birthday. He wanted it to be very nice so it could not be done in a hurry.

In the story, the word done means_____.

9.   Martha went shopping with her mother for some new clothes. She bought two pretty dresses and a new spring coat. The red dress was for a family party and the other <u>one</u> was for church.

In the story, the word <u>one</u> means_____.

TEST OF COMPREHENSION

OF

ANAPHORIC SUBSTITUTIONS

(<u>FORM B</u>)

1.   The baseball team wanted to practise for the big game.
They got a ball and bat to play with. Then they went to
play near an old building. It was dull and grey like all
the old ones. They all had a good time.

In the story, the word ones means_____.

2.   Brenda was writing a very hard test. Time was almost
up when the teacher asked, "Have you answered all the questions
on the test?"

    "I have done the first three questions but that is all,"
said Brenda unhappily.

In the story, the word done means_____.

3. Tom headed off for school on a very cold and snowy day.

"Tom didn't look too well this morning and I'm worried about him," said his father. "Do you think he's getting a cold?"

Mother answered, "I hope not."

In the story, the word not means_____.

4. Janet and her sister Carla were both in the school choir. The choir sang five songs in the school concert.

When they were finished Janet said, "What happened to you?"

"I don't know. The words just didn't come out the way they used to do," answered Carla.

In the story, the word do means_____.

5.   Susan and Mary got some money from their grandmother.
They decided to go to the toy store to buy something with
their money. There were dolls, balls, books and games.

Susan said, "I'm going to buy a beach ball and a counting
game."

Mary said, "I'll get the <u>same</u> but I'll buy a reading
game instead."

In the story, the word <u>same</u> means_____.

6.   Linda and Colleen borrowed their mother's necklace and
purse to play with. After they had played with them for
a long time, they started to clean up.

"Oh no, I can't see the necklace anywhere," cried Linda.

"Don't worry. We'll find it before mother gets home,"
said Colleen.

"Yes, but supposing <u>not</u>. What will mother say?" cried
Linda again.

In the story, the word <u>not</u> means_____.

7.   The grade four children wanted to get their teacher
a present. They collected the money and then three of them
agreed to meet at the store on Saturday morning.

On Saturday, only two of the children were at the store.
Sam had the money and he wasn't there yet.

Jim said, "Don't worry. Sam will be here if he said
so."

In the story, the word so means_____.

8.   Soon it would be Jeff's birthday. His friend Tom wanted
to plan a big party for him. There was a lot of planning
to do and it would take time to decide on everything. Tom
wanted the party to be great so it couldn't be done in a
hurry.

In the story, the word done means_____.

9.   Peter went to see the animals at the city zoo. There
he saw a big lion and two tigers. The old tiger was standing
proudly on a log while the other <u>one</u> was sleeping quietly.

In the story, the word <u>one</u> means_____.

APPENDIX B

SCORING SHEET

Name_____Ability Level_____

Responses on passages not permitting referral (Unavailable)

Nominal   Verbal   Clausal

1._____   2._____   3._____

5._____   4._____   6._____

9._____   8._____   7._____

Score _____
(Unavailable)

Responses on passages allowing referral (Available)

1._____   2._____   3._____

5._____   4._____   6._____

9._____   8._____   7._____

Nominal Score____   Verbal Score____   Clausal Score___

Score _____
(Available)

Total Score on the TCAS_____

APPENDIX C

INTERVIEW QUESTIONS

INTERVIEW QUESTIONS

Some or all of the following questions were asked each student upon completion of the Test of Comprehension of Anaphoric Substitutions. The number of questions asked any one individual depended upon their performance and/or their answers to previous questions. Occassionally, a student's response required further probing or questioning. Therefore additional questions, that are not recorded below, were sometimes necessary in order to gain information regarding children's comprehension of anaphoric substitutions.

Question #1: Did you think this test was easy or difficult? Why?

Question #2: How well do you think you did on this test? Why?

Question #3: Did you find it easier to answer the questions when you were allowed to look back at the story?

Question #4: How did looking back at the stories help you answer the questions? and/or Explain to me, how you were able to find answers in the stories?

Question #5: Why did you not look back or re-read the story to help you answer a question?

APPENDIX D

SUMMARY OF INTERVIEW COMMENTS

SUMMARY OF INTERVIEW COMMENTS

All student answers to the interview questions were recorded and organized into a summary. The following summary categorizes the responses according to the three reading ability groups. Within each group, many students were found to have similar responses although their exact words were not the same. These responses were then combined and categorized wherever possible.

Question #1: <u>Did you think this test was easy or difficult?</u> (45 responses)

The responses of the below average reading group revealed that:

7 subjects found the TCAS easy

6 subjects found the TCAS difficult, and

2 subjects were non-committal or unsure (neither difficult nor easy).

The responses of the average reading group revealed that:

4 subjects found the TCAS easy

6 subjects found the TCAS difficult, and

5 subjects were non-committal or unsure (neither easy nor difficult).

The responses of the above average reading group revealed that:

3 subjects thought the TCAS was easy

7 subjects thought the TCAS was difficult, and

5 subjects were non-committal or unsure (neither

difficult nor easy).

Question #2: <u>How well do you think you did on this</u>
<u>test</u>? (45 responses)

The responses of the below average reading group
indicated that:

    7 subjects thought they had done well on the TCAS

    1 subject thought his performance was adequate but

       not very good, and

    7 subjects thought they had performed poorly on the

       TCAS.

The responses of the average reading group indicated
that:

    6 subjects thought they had done well on the TCAS

    3 subjects thought their performances were adequate, and

    6 subjects thought they had performed poorly on the

       TCAS.

The responses of the above average reading group
indicated that:

    4 subjects thought they had done well

    5 subjects thought their performances were adequate, and

    6 subjects thought they had performed poorly on the

       TCAS.

Question #3: <u>Did you find it easier to answer the</u>
<u>questions when you were allowed to look back at the story</u>?
(45 responses)

    The responses of the below average group showed that:

    2 subjects thought that it was easier to answer when

the passage was available

8 subjects thought the available passages did not

make answering any easier, and

4 subjects were non-committal ("sometimes it helped

and sometimes it didn't").

The responses of the average group showed that:

5 subjects thought the availability of the passage

made answering easier

5 subjects thought that the available passages did

not make answering any easier, and

5 subjects were non-committal ("it didn't always

help but sometimes it did").

The responses of the above average group showed that:

10 subjects thought the availability of the passages

made answering easier

2 thought that the available passage did not make

answering easier, and

3 subjects were non-committal.

Question #4: <u>How did looking back at the stories</u>
<u>help you answer the questions</u>? and/or <u>Explain to me,</u>
<u>how you were able to find answers in the stories</u>? (29 responses)

(Students that had referred to the passages for assist-
ance in answering were asked this question. Generally
speaking these students had answered "yes" or "sometimes"
to question #3).

In the below average reading group:

5 of the subjects were unable to respond to this

question ("I don't know"), and

1 subject said that he "just found the answer in
the story." (6 responses)

In the average reading group:

5 of the subjects were unable to answer although
2 of them did try but could not come up with an
explanation

2 of the subjects indicated that they understood
the whole story better after reading it a second
time and hence they were able to answer to the
comprehension question. No real explanation was
given.

1 subject said "I can't remember how I got the answer
but it was in the story.", and

2 subjects indicated that reading the passage did
not help them yet both had earlier indicated that
questions from available passages were easier to
answer. (10 responses)

The students in the above average reading group were
very careful and did not answer this question too quickly.
After thinking about the question most students indicated
that various questions were easier to answer after re-reading
than other questions. They also stated that re-reading
did not help in all cases and that they found the answers
by different methods.

Of the subjects that indicated the questions from
the available passages were easier to answer than questions

from unavailable passages:

2 subjects stated they knew the answer was "back
in the story" but they couldn't find it

3 subjects said that they frequently found the answer
"just before the word" in the question indicating
that they thought the answer to the substitution
came just before the substitution in the passage

3 subjects indicated that re-reading helped them
remember the answer

1 subject indicated that he looked for another word
in the story to "take the place of" the substitution, and

1 subject indicated that she looked for a noun in
close proximity to the substitution.

Of the 3 subjects in the above average group that
were non-committal in answering question #3:

2 subjects indicated that they knew they should be
able to find the answer in the story but that it
wasn't always there, and

1 subject said that she looked for "the main idea"
to answer the question. (13 responses)

Question #5: <u>Why did you not look back or re-read
the story to help you answer a question?</u> (25 responses)

In the below average reading group, 14 students were
observed as not using the available passage for assistance
and were prompted to do so. Of these students:

6 subjects indicated that they already knew the answer
and therefore had no need to look back

2 subjects were unable to respond, and

6 subjects said that looking back did not help therefore they stopped re-reading the passages. (14 responses)

Of the 10 students in the average reading group who were hesitant to use the passages for assistance:

2 subjects indicated that re-reading the passage rarely helped

3 subjects indicated that the questions were too difficult so they did not bother to re-read unless asked to do so, and

5 subjects were unable to answer and typically shrugged and said "I don't know." (10 responses)

In the above average reading group only one student did not use the available passages for referral and he stated that he did not understand the questions. He thought the test was too difficult. (1 response)