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The relationship between co-referential tie comprehension and overall comprehension for second language readers

Demel, Marjorie Jean Cornell, Ph.D.
The Ohio State University, 1987

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UMI
THE RELATIONSHIP BETWEEN CO-REFERENTIAL TIE COMPREHENSION AND OVERALL COMPREHENSION FOR SECOND LANGUAGE READERS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Marjorie Cornell Demel, B.S., M.A.

* * * * *

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To My Parents
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Recent research has indicated that understanding how a passage is structured is an important factor in reading comprehension (B.J. Bartlett, 1978; Mandler and Johnson, 1977; Meyer, 1979, 1982; Meyer, Brandt, and Bluth, 1980; Rumelhart, 1975; Stein, 1979). More specifically, it has been clearly established that readers who are able to identify top- and mid-level structures of a passage are better able to understand the passage than are those readers who remember only a collection of details. An area of structure comprehension that has been relatively unexplored, however, is that of microstructure—that aspect of text structure that refers to the author's progression from given to new information. Included in the structure at this level is the use of certain linguistic cues that provide the reader with information about what the author expects the reader to be holding in memory. Of particular interest in the present study is the comprehension of co-referential pronouns (e.g., "he," "she," "they"), "semantically attenuate forms" (Bosch,
1983, p. 203) that are interpretable only through their relationships with other entities in the text. It is expected that comprehension of these forms would place a greater cognitive burden on a second language (L2) reader than on a first language (L1) reader. The primary focus of the present study, then, is to explore the role of co-referential pronouns in discourse and the relationship of co-referential tie comprehension with overall reading comprehension.

Three basic assumptions of the transformational grammar approach have served traditionally as guidelines for the study of pronominalization: (a) that an adequate theory of pronominalization can be arrived at through study of pronoun usage at the sentence level; (b) that pronoun usage is derived from an underlying or "deep" structure; and (c) that pronouns "stand for," or serve as substitutes for, noun phrases. Recent linguistic theory has pointed out that a theory based on these three assumptions is unable to account for all types of pronoun usage. Observation of pronouns as they are actually used in discourse, for example, indicates that pronouns can and do refer to entities from other sentences within the text.

Mackinac Island is a great place to vacation.

It is beautiful in the summer.
The adequacy of the "underlying structure" argument was called into question with sentences such as "The boy who deserves it will get the prize he wants" (Bach, 1970; Karttunen, 1971), in which the pronouns "it" and "he" can be derived only from phrases containing another pronoun. The "substitutional function" argument was proven insufficient with sentences such as "The man who gave his paycheque to his wife was wiser than the man who gave it to his mistress" (Karttunen, 1969), in which "it" designates not the "paycheque" explicitly mentioned in the text, but rather the second-mentioned man's inferred paycheque.

Most studies investigating pronoun comprehension in first language (L1) reading (Bormuth, Manning, Carr, and Pearson, 1970; Lesgold, 1974) have been theoretically based on the above-mentioned assumptions. In other words, they have examined whether subjects could identify what pronouns "stood for" within a sentence. Results from these studies have been "conflicting" (Richek, 1974).

Recent research in linguistics and reading comprehension recognizes that language has a dynamic quality: An author gradually reveals or develops a message to the audience, the reader. The reader's comprehension of the message depends, to a great extent, on the author's felicitous designation of concepts (Bloom and Hays, 1978, p.
1) that he or she expects the reader to access from previous text or experience. Among the guidelines that the author must follow in order to make designation of concepts clear to the reader is the Lakoff-Cole scale (Cole, 1974, citing and extending by one step Lakoff, 1968), which ranks designation of concepts from most- to least informative:

Proper name:

George Adams is on the phone again.

Definite description:

The furniture salesman is on the phone again.

Epithet:

That jerk is on the phone again.

Pronoun:

He is on the phone again.

Zero:

George Adams wants [e] to see you.

According to Bloom and Hays, there are two general rules for designation:

1. An expression when uttered designates the most arousable concept it can.

2. The expression that designates a concept on a
given occasion is the least informative that could then designate it successfully (Bloom and Hays, p. 28).

According to these guidelines, then, pronouns serve a function quite different from the substitutional role suggested by the transformational grammar assumptions. That pronouns are ranked low on the Lakoff-Cole scale (i.e., that they contain relatively little information) suggests that they are used to refer to concepts that the author assumes are readily accessible to the reader. Therefore, the reader's ability to link a pronoun with the concept referred to by the author is a critical component of the reading process.

The potential for communication difficulties between author and a second language (L2) reader with respect to pronoun comprehension is two-pronged: First, an author will, of course, designate concepts with "the least informative adequate expression" (Bloom and Hays, p. 32) deemed appropriate for a native reader. Because an L2 reader is likely to perceive those concepts in a manner based on his or her own cultural experience, the author's chosen means of designation may be inappropriate. Second, because languages differ with respect to level of demand made upon the reader/hearer in linking pronouns with discourse entities (Huang, 1984; Kameyama, 1985; Ross,
1982), L2 readers might approach the task of interpreting pronouns with expectations different from those of a native reader. In other words, the likelihood is increased that an L2 reader would encounter difficulties not encountered by an L1 reader.

In sum, recent views of pronoun usage suggest that pronouns provide important links in the "conceptual chain" of which a message is comprised. It is expected that an observation of how readers from different language backgrounds interpret pronouns might provide insight into the processes employed by L2 readers in integrating information designed for a native audience.

Overview

Because reading is a process involving the use of many interactive skills, one component cannot be studied in isolation. By the same token, an in-depth discussion of all of the reading skills would be an unmanageable topic for a research report of this length. Therefore, the present discussion will be limited to pronoun usage as a surface feature that serves to integrate information from the reader's background knowledge and from previous and succeeding text. Because Bernhardt's constructivist model (1986) accommodates these features, it will be used as the theoretical framework for the present study.
Chapter I is organized as follows: an explanation of how the constructivist reading model evolved from L1 reading models and a description of the model; a description of the prior knowledge component of the constructivist model; a discussion of a "sub-component" of the "intratextual perceptions" component, microstructure; a discussion of the microstructural feature of interest in the present study, co-referential pronouns in discourse; an explanation of potential pronoun comprehension difficulties for L2 readers; and a delineation of the present study's purpose and research questions.

Theoretical bases: The constructivist model and how it evolved:

Models for L1 reading can be characterized as either fundamentally perceptual or conceptual in nature. Perceptual or "bottom-up" models (Gibson-Levin, 1975; LaBerge-Samuels, 1974) describe reading as a process in which comprehension is achieved through finely honed word-recognition skills. Conceptual or "top-down" models (Goodman, 1976; Smith, 1971) emphasize the role of the reader's background knowledge in bringing meaning to text. Two models (Rumelhart, 1977; Stanovich, 1980) describe reading as an interaction of both perceptual and conceptual processes. According to the Rumelhart model, a
variety of knowledge sources simultaneously examine hypo-
theses in the "message center" (Samuels and Kamil, 1984, p. 211) in order to confirm or disconfirm those hypo-
theses. Stanovich's "interactive-compensatory model," like the Rumelhart model, describes the reading process as
both conceptual and perceptual. That is, the reader re-
lies on background knowledge as well as word-recognition
skills. The model is "compensatory" in that, when word-
recognition skills are weak, the reader relies primarily
on conceptual knowledge; when conceptual knowledge is
weak, s/he must extract more information from the printed
page.

Bernhardt's constructivist model, like the Rumelhart
and Stanovich models, is interactive-compensatory in na-
ture. It also provides for an interaction of both percep-
tual or "text-based" and conceptual or "extratextual"
components:

Text-based components include word recognition.
. . . , phonemic-graphemic decoding. . . , and
syntactic feature recognition. . . Extratext-
based components include intratextual perception
(the reconciliation of each part of the text
with that which precedes and succeeds), prior
knowledge (whether the discourse is sensible
within the reader's cognitive network), and metacognition... (1986, p. 105).

Bernhardt describes the interactive-compensatory nature of the model as follows:

The graphic of the model conceptualizes the interactive, multi-dimensional nature of these components. It is impossible to determine at which point in the reconstruction one component influences another one--prior knowledge can influence word recognition, but word recognition can activate prior knowledge, for example. Given this impossibility of determining where the cycle begins, for it will begin in different ways for different readers with different texts, the model is circular and interactive with one or a combination of components influencing one or a combination of other components (1986, p. 105).

The two components most directly related to the present problem are "intratextual perception" and "prior knowledge." "Intratextual perception" at the paragraph or "macrostructural" level pertains to the organization of ideas or main events; "intratextual perception" at the microstructural level pertains to surface features such as pronouns that form part of the conceptual chains in
discourse. Because manner of concept designation is dictated by the author's assumptions regarding the reader's state of mind, pronoun usage must be studied in the light of its interrelationship with the reader's prior knowledge. Therefore, the two model features under observation in the present study are the "prior knowledge" component and the "intratextual" sub-component, microstructure.

Figure 1
BERNHARDT'S CONSTRUCTIVIST MODEL
The prior knowledge component: reading as a constructive process:

Early research in the field of reading comprehension was characterized by its emphasis on how to make a text more comprehensible rather than how to prepare the learner to process the information from the text (Langer and Smith-Burke, 1982, p. ix). In the 1970s, however, the field looked to the area of cognitive psychology, which in turn looked to Bartlett's seminal work (1932), as well as Ausubel (1961) for a new view of the mind as an active agent in the thinking-learning process. According to this view, the mind does not simply absorb information but rather processes it. Rumelhart and Ortony, two proponents of this theory, state that

While originating from the senses, knowledge is not a blind record of sensory inputs. Normal people are not tape recorders, or video recorders; rather, they seem to process and reprocess information, imposing on it and producing from it knowledge which has structure (p. 99).

Smith, Carey, and Harste have described this knowledge structure or "schemata" as "a cluster of relatable concepts--a cluster moreover that tends to be changing most of the time" (1982, p. 24). Widdowson, in his
definition, explains how schemata account for the processing of information. He defines "schemata" as cognitive constructs which allow for the organization of information in long-term memory and provide a basis for long-term prediction. They are kinds of stereotypic images which we map on to actuality in order to make sense of it, and to provide it with a coherent pattern (1979, pp. 34-35).

Cognitive functioning as described by schema theorists is a fundamental aspect of the reading process. Anderson and Pearson state:

Whether we are aware of it or not, it is this interaction of new information with old knowledge that we mean when we use the term comprehension. To say that one has comprehended a text is to say that she has found a mental "home" for the information in a text, or else that she has modified an existing mental home in order to accommodate that new information (1984, p. 255).

Within a schema-theoretic framework, then, reading is perceived not as a receptive skill but rather as a constructive process in which the reader uses his/her own prior knowledge and experience to construct a message from the printed page.
Webber refers to the reader's constructed message as a "discourse model." She states:

... the [author] creates a message or 'discourse model,' a model of some situation which s/he attempts to communicate to a [reader]. Thus at one level, discourse is an attempt by the [author] to direct the [reader] in synthesizing a model. Informally, a discourse model is a structured collection of entities 'naturally evoked' by the discourse (1978, p. vii).

The "discourse entities," then, are objects, events, and propositions, specifically stated or implied, that form part of the discourse model. As the author creates a message, he or she refers to the discourse entities through a variety of means. The present study is based on the assumption that, in order to understand a text, a reader must have created a discourse model similar to that of the author's. It is also assumed that the creation of such a structure is dependent upon development of the appropriate microstructural underpinnings, such as pronoun--antecedent relationships.
Intratextual perception: Microstructure

The traditional view of microstructure is based on the "given-new" contract, which is one of the aspects of Grice’s Cooperative Principle (1967), a set of conventions that he thinks are necessary for successful communication. According to Clark and Haviland, (1977, p. 2), by adhering to this principle, a writer agrees to convey given information as "given" and "new" as "new." Although various linguists (Akmajian, 1973; Chafe, 1970; Halliday and Hasan, 1976; Jackendoff, 1972) use different terms to refer to this concept, and although they differ somewhat as to what differentiates given from new information, they all share two fundamental perceptions of the given-new distinction: (a) that it is a binary distinction and (b) that given information consists of information that has been explicitly introduced into the discourse. Chafe, for example, claims that "given" or "old" information should be restricted to "that knowledge which the [author] assumes to be in the consciousness of the addressee at the time of utterance" (1976, p. 30). The knowledge in the addressee’s consciousness is assumed to be present because the information has appeared earlier in the discourse.

Chafe’s notion of given-new information has been further refined by Prince (1982), who claims that the binary distinction does not account for all levels of
familiarity in a discourse. She claims that, in a communicative event (such as that between author and reader), the nonclairvoyant author must make certain predictions about what the reader knows in order to construct an effective message. Such decisions as lexical choice and whether or not to pronominalize are based upon assumptions concerning information accessible to the reader—either from the text or from the reader's previous experience.

Prince's taxonomy, which she refers to as "Assumed Familiarity" (p. 233), is ternary rather than binary. It includes sub-classifications of both new and given or "evoked" (p. 237) information. It also includes an "inferrable" (p. 237) category. This category is especially important for the study of pronoun usage because the binary systems, which claim that only given information can be pronominalized, have been unable to account for sentences such as

a. Harry threw up and Sam stepped in it
   (Douloueux, 1971).

b. I'm getting a permanent next week, and I think I'll have it cut, too.

Below is a list of examples of the Assumed Familiarity classification system:

a. Brand-new (unanchored):
   
   A violinist played at Mershon last night.
b. Brand-new (anchored):

   A violinist who graduated from here in '79
   played at Mershon last night.

c. New: unused (known to the addressee but
   not assumed to be in his or her consciousness
   at the time of utterance):

   I saw your father yesterday (Prince, p. 229).

d. Inferrable (noncontaining):

   I don't like my new hairdo. She cut it too
   short.

e. Inferrable (containing):

   One of the twins works at the science
   museum.

f. Evoked (textually):

   A violinist played at Mershon last night.
   He played a Bach number.

g. Evoked (situationally):

   You haven't lived until you've seen the
   sunset over Lake Superior.
Figure 2
PRINCE’S ASSUMED FAMILIARITY TAXONOMY
Microstructure: Co-referential ties

Halliday and Hasan (1976) explain text structure in terms of "cohesive ties," an interrelationship in which "one element is interpreted by reference to another" (p. 11). One type of cohesive tie is that of co-reference, which consists of a semantic relationship in which the presupposing element (a pronoun) is interpreted through its tie with another entity. In other words, this type of pronoun-antecedent relationship is one in which the pronoun serves to direct the reader's attention toward some presupposed discourse entity.

Wash and core six cooking apples. Put them into a fireproof dish (Halliday & Hasan, p. 2).

Them in the second sentence refers to (is anaphoric to) the six cooking apples in the first sentence. "Them," if it were to occur without an antecedent, would have no meaning other than "some plural entity." By using "them" rather than reiteration the author indicates that he or she expects the reader to be able to access the textually evoked "six cooking apples." Stated another way, the author uses "them" to "point" linguistically to the presupposed entity. If the author had used reiteration rather than the pronoun,
Wash and core *six cooking apples.* Put *six cooking apples* into a fireproof dish.

there is no indication that both phrases refer to the same six apples.

According to Halliday and Hasan, the relationship between "them" and "six cooking apples" is "a semantic relationship" (p. 32). There is a relationship of identity between the presupposing "them" and the presupposed "six cooking apples." In this respect a co-referential tie is different from the contrastive nature of a substitutional tie, as in:

Wash and core *six cooking apples.* Be sure to use tart *ones.*

According to Halliday and Hasan, there are three types of reference: personal, which includes the personal pronouns *he, she, it, they,* and *them*); demonstrative (*this, these, that, those*); and comparative (*other, same, identical, identically*) (pp. 38-39). All of these types of reference can be classified endophorically or exophorically. *Endophoric reference* pertains to that category of cohesive ties in which the presupposed entity can be recovered from the text, either anaphorically or cataphorically (p. 33). "Anaphoric reference" pertains to that type of tie in which the presupposed entity precedes the
pronoun in the text (p. 33), as in

Teresa loves computers; she plays computer games constantly.

Cataphoric reference pertains to instances in which the pronoun precedes the presupposed item (p. 33):

Because she loves computers so much, Teresa subscribes to 5 or 6 computer magazines.

The presupposed entity may be a concrete object (such as "cooking apples") or a proposition, as in:

I can't stand it. He is constantly interrupting me!

The presupposed entity may also be inferred:

Mary became a violinist because she thought it a beautiful instrument (Webber, 1978, p. 1-16).

Other linguists offer a different perspective from that of Halliday and Hasan. Bosch (1983) and Kameyama (1986) are less concerned with word order and classify as anaphoric any pronoun that refers to a presupposed entity, regardless of whether that entity precedes or succeeds the pronoun or is inferred from the text. Bosch states that all languages contain three modes of pronominal reference:

a. non-referential purely syntactic mode (SP-occurrences)
b. referential deictic mode (DP-occurrences)
c. referential anaphoric mode (AP-occurrences)

SP occurrences, according to Bosch, consist of those pronouns that "are purely syntactic devices and cannot be interpreted with any significant amount of freedom: their interpretation is fixed by the syntactic structure of the sentence in which they occur" (p. 113). Examples of SP occurrences are reflexive pronouns:

Julius hurt himself (p. 61).

DP-occurrences represent those co-referential relationships in which a pronoun or noun phrase (NP) calls attention to an entity not yet "in focus" (p. 114), such as

Look at that!

AP-occurrences or anaphorically functioning pronouns represent those types of pronominal relationships in which the antecedent is assumed to be in focus, i.e., already in the mind of the reader. In other words, an anaphorically functioning pronoun refers to a salient entity from the discourse. This entity is accessible from either a "context model" (CM), or "background knowledge" (BK). Bosch defines "context models" as "(representations of) mental models [author] and [reader] build of their environments." CMs are subsumed under BKs, which are formed by stereotypical assumptions made about "objects, . . . , processes, actions, persons, etc." (p. 66).
According to Bosch, a reader's constantly changing context models parallel the development of a message in discourse. For example, the interpretation of a sentence such as "The man on the beach is still asleep" (p. 85) is dependent upon a previously constructed CM of "a man on the beach." Without that previous CM "presupposition failure" (p. 85) occurs.

Other linguists (Lyons, 1979; Morgan and Sellner, 1980; Webber, 1979) maintain that the pronoun-antecedent relationship is not one in which the pronoun refers to its antecedent but instead one in which the pronoun and antecedent are co-referential with each other. For example, concerning the previously mentioned pair of sentences:

Wash and core six cooking apples. Put them into a fireproof dish.

Morgan and Sellner state that them refers not to the "apples" as a linguistic entity but as an image in the minds of the author and reader. The images of "six cooking apples" and "them" are different: In the former phrase the apples are unpeeled and unwashed, but "them" refers to an image of peeled and washed apples. Lyons states:

The basically deictic component in an anaphoric expression directs the attention of the addressee to a certain region of the text or co-text
and tells him, as it were, that he will find the referent there. But it is not of course the referent itself that he will find in the text or co-text. What he will find is some appropriate antecedent, which will identify the referent for him, typically by naming or describing it (1979, p. 97).

This view is consistent with current linguistic thought, which holds that discourse has a dynamic quality, and with current psycholinguistic thought, which holds that reading is a creative process in which the reader constructs an interpretation of the written message. Because many of the authors cited use the term "anaphora," however, "anaphora" as well as "co-referent" will be the terms used in the present study.

Widdowson provides an excellent illustration of the process of discourse comprehension through usage of the appropriate schemata, making inferences, accessing the appropriate concepts, and tracing a co-referential tie.

You know St. Mary's. Well, I live in the street on the other side of the graveyard. Number 12. It has a green gate. (1979, p. 42)

This text is taken from an explanation of where the speaker/author lives. The explanation is directed toward a person who does not know where the speaker/author's
house is but does know where St. Mary's (Church) is. The addressee’s comprehension of the message depends upon an awareness that churches have graveyards. (That the speaker/author uses "the" rather than "a" with "graveyard" indicates that he or she perceives "graveyard" as inferable information.) Also important for the comprehension of this passage is that houses have numbers but that graveyards do not. But what of "it"? In order for the addressee to understand the message, he or she must reason that "it" refers not to "graveyard" but instead to the speaker/author's house, #12, which has a garden with a green gate and is on the other side of the church graveyard. The addressee has arrived at this conclusion through an interaction of thought processes involving location of a co-referential tie and a knowledge of gardens, houses, and churches. Interestingly, in order to understand the passage, the addressee must realize that "it" refers to the inferred "house" with the (also inferred) garden, rather than to the explicitly stated "graveyard," even though graveyards can also have gates.

The above passage provides an excellent example of the interaction of reading-process components as depicted by Bernhardt's constructivist model. That the perceptive reader must select an inferred antecedent rather than one of the many possibilities from the text presents an
intriguing problem: How do application of schemata and knowledge of co-referential ties interact so that, of all the possible antecedents available, one is selected over another?

The problem of co-reference for the L2 reader

For purposes of the present study it is assumed that an author uses a co-referential pronoun because of certain assumptions that he or she makes about the state of mind of the reader. Because pronouns by their very nature convey a limited amount of meaning and must presuppose another entity, their use makes greater cognitive demands on the reader than would a designator from higher on the Lakoff-Cole scale.

It is quite likely that L2 readers differ in their expectations of pronouns. Huang (1984), Kameyama (1986), and Ross (1982) have suggested that languages can be classified according to the extent to which they allow the use of a zero pronoun. Kameyama posits that pronoun usage in all languages is controlled by both syntactic and pragmatic constraints. She refers to the syntactic constraint as a "syntactic overtness requirement" (SOR) and the pragmatic constraint as "zero anaphora permissibility" (ZAP). She claims that "SOR and ZAP are 'two sides of a coin' in that the absence of SOR simply means the maximum
ZAP and the minimal ZAP corresponds to the strongest SOR" (pp. 7-8). According to her analysis, the grammatical systems of those languages with strong SOR "must have overt subject and object phrases even when their reference is conceptually redundant" (p. 6). The grammatical systems of languages without strong SOR allow zero anaphora "whenever the reference is immediately recoverable in discourse" (p. 8). Kameyama's ZAP typology can be summarized as follows: Type I languages (e.g., English and French) have a strong SOR and therefore permit zero pronouns only under very narrow circumstances, such as in

I would like (e) to see you tomorrow.

Type II (e.g., Spanish and Arabic) consists of those languages in which pronouns may be eliminated when the information that they convey is contained elsewhere in the text (such as in verb inflection).

Did you see Craig?
Sí, lo vi.
Yes, him (e) saw.
Yes, I saw him.

Examples of Type III languages are Oriental languages such as Chinese, Japanese, and Korean. These languages would allow zero pronoun usage in exchanges such as the following:

Did you see Craig?
Yes, (e) saw (e).
Type IVa languages (e.g., Afrikaans) include those in which there is no zero pronominal:

*Dit spyt my.*
(It regrets me.)
I'm sorry (p. 23).

Type IVb languages (e.g., Polynesian) allow third person zero pronominals:

*Kai hakahoki mai te ki mai Tire.* .
Neg. return here the say from Chile
No word came back from Chile (p. 25).

What these differences imply is that L2 readers might differ in the degree to which they expect the topic of a discourse to guide pronoun usage. Speakers of Type III languages seem to find pronouns unnecessary as long as the topic does not change. When the main topic or even a detail topic changes, pronouns must be used to indicate that change (Hinds, pp. 165-166). English, an SOR-dominated language, always demands grammatical subjects and frequently uses pronouns to fill those “slots.” Therefore, there is a less reliable relationship between pronoun usage and change of topic. It is expected that L2 readers accustomed to one type of system might have difficulty adjusting to the target language system.
The importance of co-referential tie comprehension in the reading process must not be underestimated. Webber states:

First, if a reader cannot handle an anaphoric expression as the writer intended, there is no way that he or she can correctly update his or her discourse model in response to it. Second, as recent research in artificial intelligence, psychology, and linguistics has shown, choosing between possible antecedents may demand very sophisticated syntactic, semantic, pragmatic, inferential, and evaluative abilities on the reader's part (1980, p. 142).

The present study:

The recent emphasis on reading as a communicative event places increased importance on the structure of text as a medium of communication. Of interest in the present study is whether L2 adult readers are able to locate co-referential ties, and, if so, if that ability is positively correlated with overall comprehension scores.

The following is a summary of the research questions:

1. Is there a relationship between level of English proficiency as measured by matriculation level and overall reading comprehension?
2. Is there a relationship between L1 anaphoric system and overall reading comprehension?

3. Is there a relationship between level of proficiency in English as measured by matriculation level and the ability to locate co-referents of pronouns in a text?

4. Is there a relationship between L1 anaphoric system and the ability to locate co-referents of pronouns in text?

5. Is there a relationship between overall reading comprehension as measured by an immediate recall protocol and co-referential tie comprehension for L2 readers?

6. Is there a relationship between overall reading comprehension as measured by an immediate recall protocol and co-referential tie comprehension for both L1 and L2 readers?
Chapter II

REVIEW OF LITERATURE

Objective

The purpose of this research project is to assess whether there is a relationship between overall reading comprehension and the ability to locate co-referential ties in discourse. It is assumed that decisions concerning selection of co-referential ties are based, to a large extent, on decisions made regarding the discourse model that the reader has constructed. Also, it is assumed that the type of anaphoric system of a reader's native language may affect pronoun comprehension in the second language. In order to address all of these issues, this chapter is divided into three sections: a review of how L2 readers utilize prior knowledge to construct meaning from text, a review of intratextual studies in first- and second language reading, and a brief discussion of a language background study. The intratextual studies section includes discussions of macrostructure and microstructure. The "microstructure" section includes a discussion of the given-new concept, followed by
explanations of pertinent research, and a discussion of studies that relate what is known about given-new strategies to comprehension of pronouns in discourse.

The use of prior knowledge in building a discourse model

Steffenson et al (1978), Johnson (1981, 1983), Perkins (1983), and Bernhardt (1985) found that L2 readers do demonstrate evidence of constructing discourse models as they read. In the Steffenson and Johnson studies cultural knowledge played a major role in shaping those discourse models.

Steffenson et al found significant differences in recall protocols of adults of differing cultural backgrounds. Indian and United States adults were asked to read two personal letters: one describing an Indian wedding and one describing a United States wedding. Information from the protocols showed that the subjects had projected their own conceptions of particular wedding conventions onto the traditions of the target culture.

Johnson (1978, 1981) also examined the effects of cultural background on reading comprehension. In her 1978 study she found that providing English-as-second-language (ESL) subjects with cultural information about the text topic significantly improved reading comprehension scores. In her 1981 study, in which she compared reading
comprehension scores of Iranian and American subjects, she found a significant main effect for cultural origin of the story. No main effects for syntactic and semantic complexity were observed for Iranian subjects, though they were observed for Americans, who experienced difficulty in understanding the adapted texts of foreign origin. This finding indicates that L1 readers rely more heavily on the more explicit information conveyed in complex sentences when knowledge of passage content is weak.

Perkins conducted a study in which subjects representing four ESL proficiency levels were required to determine whether target sentences had been reproduced verbatim from a previously read text. Sentences presented to subjects were categorized as "true inference" (TI), "false inference," (FI), "true sentence" (TS), and "false sentence" (FS) (pp. 21-22). All but the beginning-level group falsely recognized more TIs than any other sentence type. These results indicate that L2 readers do contribute to the meaning of a text, but that at lower levels of proficiency readers are more "text-bound" and therefore less able to construct meaning.

Bernhardt (1985) found that American subjects had difficulty comprehending stories about post-war Germany. She concluded that lack of prior experience with the topic was a contributing factor to the subjects' tendency to
make initial wrong decisions and then construct a discourse model based on those decisions. Results from these studies lend support to Webber's view that L2 readers, like L1 readers, construct a discourse model as they read. The results also lend support to the commonsense notion that discourse models constructed by subjects of differing cultural backgrounds will reflect those differences.

Carrell (1983) found that advanced-level ESL and native subjects comprehended a novel passage better than a familiar one. (The "familiar" passage concerned washing clothes; the "novel" passage was a description of a man singing and playing the guitar while a woman at an apartment window listened via a loudspeaker held up by balloons.) The experimenter's explanation of this perplexing result was that more salient information may be more readily recalled.

Lee (1986) replicated Carrell's experiment with the exception that he required subjects to write their recall protocols in their respective native languages rather than in the target language. Results from Lee's study showed a more complex interaction of background knowledge with other components than did the Carrell study. Lee interpreted the difference in findings from the two studies as attributable to the "process/product distinction."
Comprehension is the process; the score on an assessment task is the product" (1986, p. 353). He stated that "Assessing comprehension with a target language task may limit learners' ability to demonstrate what they comprehended" (p. 353). Lee's findings have called into question any studies whose comprehension measures have been produced in the target language.

Hudson investigated the effects of "induced schemata" on L2 readers. He found that, whereas beginning-level subjects were aided by the provision of background knowledge, advanced-level subjects were not. He concluded that advanced-level subjects are more proficient at constructing meaning from text and are therefore less dependent on extrinsic factors. Comparisons between groups in this study should be interpreted with caution, however, because different passages were used for each level.

Taken together, results from the Steffenson, Johnson, Perkins, Bernhardt, and Carrell studies indicate that L2 readers do construct meaning from text but that, under certain circumstances, they are not aided by the provision of background knowledge. This inconsistency suggests that although the provision of prior knowledge does, in the majority of cases, have a significantly positive effect, it may be overridden by other factors. Results from Lee's study (1986) indicate, however, that those studies whose
subjects were required to construct their recall protocols in the target language (e.g., Steffenson, Johnson, and Carrell) need to be replicated with the requirement that subjects construct their recall protocols in the native language.

**Intratextual structure: Macrostructure**

The study of macrostructure is of special concern in L2 reading research because a reader who can reconstruct the main ideas or "gist" of a passage presents evidence of (a) the ability to construct a discourse model similar to that of the author and (b) comprehension of the conventions of discourse in the target culture. Carrell conducted two studies in which she investigated L2 readers' comprehension of formal schemata or macrostructure. One of the studies dealt with comprehension of story schemata and the other with various types of expository prose.

Carrell (1984) presented stories to L2 adults under two types of conditions: Subjects in the "standard story condition" read two well-organized stories; subjects in the "interleaved condition" read the same two stories interwoven with each other. Subjects' recall protocols followed the same order of presentation as that of the ideal story structure. In other words, subjects were able
to construct sensible discourse models even under the interposed condition.

In another investigation Carrell investigated the effects of different types of rhetorical organization of expository prose on ESL adults. Differences were observed among differing language backgrounds for various types of rhetorical organization. Subjects of Arabic background, unlike subjects from the other language backgrounds, found the "collection-of-descriptions" type to be the most "facilitative of recall" (1984, p. 464). On the other hand, subjects from the other language backgrounds found "causation" to be most facilitative of recall.

Information from the Carrell studies indicates that L2 readers know how to identify and use macrostructure, but that at times they may apply background knowledge of discourse structures used in their respective native languages. In other words, the process of constructing a discourse model similar to that of the author's may be hindered by lack of knowledge of macrostructural conventions in the target language.

While studies on macrostructure comprehension are useful, they provide only a "skeletal image" of the comprehension process. What is now needed in order to complete that image is an understanding of the network
underlying the larger structure, the microstructural features of text.

**Microstructure: Given-New:**

Clark and Haviland claim that "the heart of the given-new contract is the maxim of antecedence" (Clark & Haviland, 1977, p. 4), a precept to the speaker/reader that is stated as follows:

Try to construct your utterance such that the [reader] has one and only (sic) direct antecedent for any given information and that it is the intended antecedent (Clark & Haviland, p. 4).

The listener/reader in turn must, when integrating information, search his or her "information structure" (1977, p. 5) in order to select the appropriate antecedent. Clark and Haviland claim that, the more "direct" the relationship between given and new information, the less processing effort required. They hypothesize, for example, that less processing time is required for comprehension of

Horace got some beer out of the car. The beer was warm (Clark & Haviland, 1977, p. 21).
than for

Horace got some **picnic supplies** out of the car.

The **beer** was warm (p. 21).

Clark and Haviland define the relationship between "some beer" and "the beer" in the first pair as "direct." The relationship between "some picnic supplies" and "the beer," however, is "indirect," (i.e., requires inferencing on the part of the listener/reader). Therefore it is assumed that more processing time is need for the comprehension of the second pair.

Haviland and Clark (1974) conducted a study using sentence pairs to determine difficulty levels of different types of given-new relationships. As predicted, more processing time was needed for the pairs for which inferences needed to be made.

One flaw in the Haviland and Clark study is that some of the sentence pairs violate the given-new contract as it would occur in "natural "prose (i.e., prose written with the intent to communicate rather than for the purpose of testing). For example, in the sentence pair

Horace was especially fond of beer. The beer was warm (Haviland & Clark, 1974, p. 514).

because "beer" in the first sentence refers to beer in a generic sense rather than to a specific quantity, it provides no antecedent for "the beer" in the following
sentence. Another flaw in this study is that it failed to take into account the background knowledge variable. For example, in the sentence pair

Horace got some picnic supplies out of the car.
The beer was warm.

it is to be expected that subjects who consider beer to be a standard picnic item would require less processing time than those who do not. Moreover, subjects from a cultural background in which beer is not considered to be a standard picnic item might never see the relationship between "beer" and "picnic supplies." Although Haviland and Clark did not consider the background knowledge of the reader, their study laid the groundwork for the study of the role of inferencing in integrating information.

Hupet and Le Boudec (1977) tested the given-new strategy in a series of experiments in which subjects were given sets of four basic propositions in varying order: logical sequence, "unmixed condition," "orderly mixed" (with one proposition out of sequence)," and "randomly mixed" (with all propositions illogically sequenced) (p. 72). Subjects were required to integrate the four propositions into one complex idea. Findings corroborated Clark and Haviland's in that, the easier it was to find antecedents, the more accurate were the recall protocols.
In a similar study Garrod and Sanford (1977) found that, the greater the "semantic distance" between the presupposed and presupposing entities, the more processing time needed. ("Semantic distance" was determined by using class-membership information from Battig and Montag's [1969] study. As a result of this investigation exemplars of particular classes of items were assigned "high-conjoint frequency" or "low conjoint frequency. "Robin," for example, is a high-conjoint frequency exemplar of "bird," whereas "goose" is a low-conjoint frequency exemplar.)

The experimenters found that less processing was needed for sentence pairs in which the categorical term was paired with a high-conjoint frequency exemplar than for those in which the categorical term was paired with a low-conjoint frequency exemplar. Of the pairs below, then, the first pair was comprehended more quickly than the second one.

A bird would sometimes wander into the house.
The robin was attracted by the larder.

A bird would sometimes wander into the house.
The goose was attracted by the larder.

Most of the above studies have been conducted using sentence pairs. As a result, their findings provide information about how given and new information is processed in
a relatively context-free situation. Unfortunately, the studies have not taken into account two variables that are essential for any study of discourse comprehension: the background knowledge of the reader and the myriad cues that natural text provides in order to convey a comprehensible message.

Chihara (1977) did attempt to study given-new relationships under passage-length conditions. He found that L2 readers performed better on sequential cloze tests than on scrambled-order cloze tests. Advanced-level subjects performed significantly better than beginning-level subjects. Chihara concluded that sensitivity to discourse constraints increases with proficiency level.

Carrell (1977, 1984a) conducted two studies to investigate the effects of structural signaling on comprehension of given-new information. Carrell's 1977 study investigated whether L2 readers are sensitive to cleft and pseudocleft constructions, which structurally define given and new information. Her 1984a study investigated comprehension of factive and implicative predicates. For the 1977 study two groups of subjects, native adults and adult ESL students, were given lists of questions with two possible answers. The following is an example of the test items:
What is the cat chasing?

a. It is the rat that the cat is chasing.

b. It is the cat that is chasing the rat.

The answer choices consisted of cleft and pseudo-cleft sentences, which both signal structurally which information is presupposed and which is asserted. In a cleft sentence such as (a) above, the asserted information is "It is the rat" and the given information "that the cat is chasing." Sentence (a), then, is the appropriate answer. Sentence (b) would be an appropriate response for a question such as "What is chasing the rat?"

Subjects tested were grouped according to English proficiency level. Results showed that all three groups were sensitive to linguistic signals of given and new information.

In another study (1984b) Carrell investigated comprehension of factive and implicative predicates. Subjects were intermediate and advanced ESL students and native undergraduates. The structures under investigation were:

a. Factive predicates, which presuppose their complements

Example: We regret that they will not be able to attend.
b. Implicative predicates, which imply the truth of their complements
   Example: John managed to find his hat.

c. Nonimplicative predicates, which do not presuppose their complements
   Examples: John intended to find his hat.
   John didn't intend to find his hat.

The results indicated that all three groups were "generally proficient" (p. 14) in comprehension of implicative and factive predicates. The experimenter concluded that the given-new distinction "may be a psychological universal in both first and second language processing" (p. 15).

Comprehension of co-referential ties

Although the above studies have dealt with comprehension of given-new information, the following ones deal more directly with the interpretation of pronouns as "discourse pointers" of accessible information. Pronouns are dependent upon other information, whether from elsewhere in the text or the shared experience of author and reader.

Levin (1975, in Carpenter & Just, 1977) hypothesizes that certain syntactic constructions influence co-referent assignment. He hypothesizes that the subject of a sentence is more likely to be a co-referent than a direct object, and that a direct object is more likely to be a
co-referent than the object of a prepositional phrase. An expression in a superordinate clause is a more likely candidate than one in a subordinate clause.

When the bias value of the verb is not sufficiently strong to influence pronoun assignment significantly, assignment is determined by parallel function strategy (Sheldon, 1974). According to this strategy, the preferred antecedent will be the one that has the same grammatical function as that of the pronoun in the subordinate clause. Thus, in "Mary told Susan about the picnic when she saw her yesterday," because "saw" contains little natural bias, "she" by default is assigned to "Mary" and "Susan" is assigned to "her."

Kintsch and Vipond have expanded on Chafe's concept of "foregrounding" (Chafe, 1973). They maintain that a pronoun is easier to comprehend if its antecedent is foregrounded, that is, if it is more likely to be at the forefront of the reader's consciousness because of (a) its location in the macrostructure or (b) proximity to the pronoun. An example of the former would be that "he," in an article about George Washington would be more likely to refer to "George Washington" than to any other person who might have been mentioned in the article. Some researchers (Levin 1975; Frederiksen, 1981) refer to this
phenomenon as "topicality." The "proximity" factor can be seen in sentence pairs such as

I saw Mary, Susan, and Barbara this morning.
She is moving to Chicago, you know.
in which "she" is most likely to refer to the last-mentioned name, "Barbara."

Carpenter and Just (1977) investigated the influence of foregrounding on the assignment of pronominal reference by comparing eye-fixation information with performance on recall tasks. Subjects were required to read passages in which foregrounding of possible antecedents was varied. It was hypothesized that, in the cases in which there was more than one possible antecedent for a pronoun, structural cues that foregrounded one of the possible antecedents would lead the subjects to select that antecedent over the other possibilities. Cleft and pseudocleft constructions were used as foregrounding elements. In order to test for the effects of foregrounding on the interpretation of pronouns, sentence order was varied in the passages so that, in some cases, the foregrounding construction immediately preceded the pronoun, and in other cases it did not. The eye-fixation monitoring was followed by a test of recall in order to ascertain overall comprehension of the passages. It was found that, when the pronoun sentence was immediately
preceded by a foregrounding construction, subjects tended to select the antecedent foregrounded.

Two studies have been conducted in which the effects of different types of co-referential ties on reading comprehension have been investigated. Neither of these two studies has accounted for the role of semantics. Barnitz investigated comprehension of co-referential ties by children in grades two, four, and six. He compared their comprehension of "anaphoric vs. cataphoric ties, noun phrase vs. clausal antecedents, and intersentential versus intrasentential ties" (1979, p. 50). Results indicated that anaphoric ties are easier to comprehend than cataphoric ties, that noun phrase co-referents are easier to comprehend than clausal co-referents, but that no significant differences exist between comprehension of intrasentential and intersentential ties. These results should be interpreted with caution because the role of semantics was not considered.

Frederiksen (1981) investigated how L1 readers (10th-, 11th-, and 12th-grade students) select co-referents for pronouns. For this study, texts were constructed for which variables such as the following were manipulated: pronouns versus lexical reiteration, subject vs. predicate positions for antecedents, numbers of intervening
sentences between pronoun and antecedent, and number of potential antecedents for pronouns.

A significant main effect was found for "topicality," supporting Kintsch and Vipond's hypothesis that a potential co-referent located high in the macrostructure is likely to be selected as an antecedent. Another result was that reading times were fastest when ambiguity was held to a minimum. In other words, a text in which there were two or more potential antecedents for pronouns was difficult to understand. This result is not surprising because supplying the reader with the problem of selecting from two possible antecedents with relatively few contextual clues available is tantamount to requiring someone to solve a large, solid-colored puzzle.

One flaw of this study is that, like many of the other studies mentioned here, the passages read had been written for the purpose of testing rather than for the conveying of a message. As was demonstrated in Chapter I, arbitrary substitution of pronouns for lexical items and vice versa frequently distorts the original meaning of a passage. Consequently, findings from studies such as these provide little information about how readers integrate information from natural prose.

Freebody and Anderson's study (1983) was undertaken in order to assess the effects of cohesion levels,
vocabulary difficulty, and topic familiarity on reading comprehension. They based the study on the assumption that level of cohesiveness can be categorized according to difficulty level. They state: "Repetition of referential terms may be supposed to entail the least processing effort, followed by common synonym substitution, pronominalization, and ellipsis" (p. 281). Based on this assumption, the investigators then produced high- and low-cohesive forms of the passages. A third level of cohesiveness, termed the inconsiderate version (Kantor, 1978), contained propositions that were irrelevant to the central theme of the passage. The results showed no interaction between vocabulary difficulty and cohesion level.

As is the case with the Barnitz and Frederiksen studies, this type of experiment does not measure how well readers process information from natural text because experimenter manipulation of cohesion levels results in a text that has been contrived for testing, rather than communication, purposes. This arbitrary manipulation of lexical items and pronouns distorts the original message of a text.

Garvey et al (1974) undertook a study in order to examine the role of two types of semantic constraints in selecting antecedents for potentially ambiguous pronouns.
The two types of constraints investigated were "implicit causality," and "experiencer constraint."

According to the implicit causality constraint, in the sentences below the verb meanings dictate that the preferred interpretation for she in (a) be Mary and in (b) Jane.

a. Jane hit Mary because she had stolen a tennis racket.

b. Jane angered Mary because she had stolen a tennis racket.

It was hypothesized that comprehension of a sentence such as:

John telephoned Bill because he wanted some information.

should require less processing time than a sentence in which the causal relationship expressed in the subordinate clause is inconsistent with the main verb's natural bias, as in:

John telephoned Bill because he withheld some information.

The results showed that reaction times for selecting antecedents were faster when subjects selected antecedents consistent with the natural bias of the main verb.

Another verb feature under investigation in this study was the experiencer constraint. The rule regarding the
experiencer constraint is that "it is much more likely that, in discussing a private experience, the experiencer himself (if present) will be the speaker rather than any other participant in the conversation" (p. 237). Thus, pronoun assignment times were faster for "Bill told Sue that Mary bored him" than for "Bill told Sue that he bored Mary.""

**Language background**

Only one known study has been conducted on the effects of language background on comprehension of coreference. Flynn (1985) investigated whether the "principal branching direction" (PBD) of a learner's first language would affect how the learner would process complex sentences of the second language. She hypothesized that, if the PBD of an adult learner's first language were the same as that of the native language, processing and acquisition of complex sentences would be facilitated. On the other hand, if the PBD of the learner's native language were different from that of the target language, then processing of complex sentences would be more difficult. Languages such as English and Spanish are right-branching because subordinate clauses tend to be placed to the right of the main clause, as in:
This is the book that the man I met on the train going to Tokyo wrote.

Japanese, on the other hand, is principally left-branching, because subordinate clauses tend to be placed to the left of the main clause. The example sentence above, if written in Japanese, would have the following word order:

this Tokyo to go train met man wrote book is

Subjects (50 native speakers of Spanish and 53 native speakers of Japanese) were required to repeat complex sentences stated by the experimenter. Results indicated that sensitivity to PBD does provide a constraint on the acquisition of anaphora in second language acquisition. The Spanish group scored significantly higher than the Japanese group on the sentence imitation task. Spanish subjects scored significantly higher on anaphoric structures; for Japanese speakers there was no significant difference between sentences with anaphoric and cataphoric reference. The investigator concluded that insights concerning the structural aspects of a language learner's first language (such as PBD) must be taken into account in order to arrive at a theory of second language acquisition. Results from this study should be interpreted with caution because of the method of assessment. It is questionable whether the ability to mimic sentences actually
provides a valid assessment of subjects' comprehension of cohesive ties.

Summary

The research described in the first section of this chapter examined how L2 readers construct meaning from text. Results from these studies indicate that L2 readers, like L1 readers, do construct discourse models as they read. Results also indicate that these discourse models reflect the cultural background of the reader. Therefore, if the cultural background of the reader is different from that of the author, sharp differences may occur between their discourse models.

The research described in the second section of this chapter has investigated how readers (a) integrate given and new information in prose and (b) locate co-referential ties. The researchers mentioned here have hypothesized that such elements as syntax and foregrounding affect antecedent assignment to pronouns. Sentence pairs and passages used in the investigations have been experimenter-constructed for the purpose of testing. Results have shown that readers are sensitive to certain structural signals of given-new relationships such as cleft and pseudocleft sentences and factive and implicative predicates. Results from these studies also indicate that
readers are sensitive to such semantic constraints as the "experiencer constraint" and "implicit causality."

Webber states that "dealing with anaphoric language can be decomposed into two complementary tasks: (a) identifying what a text potentially makes available for anaphoric reference and (b) constraining the candidate set of a given anaphoric expression down to one possible choice" (1978, p. vi). The studies mentioned in the second portion of this chapter dealt with the latter task, but not with the former. Subjects were required to locate co-referential ties without the multiple clues inherent in natural discourse. In other words, the studies provide no information concerning how readers perceive relationships among entities in discourse.

From this review of literature it is apparent that what is needed is an investigation of comprehension of concept designation in L2 reading. Such an investigation must be conducted using natural text in order to gain insight into (a) how L2 readers construct discourse models and (b) how L2 readers perceive relationships among discourse entities within a discourse model.
Chapter III
DESIGN AND PROCEDURES

Research questions

The focus of the present investigation consisted of analyses of the relationship between overall reading comprehension and co-referential tie comprehension for L2 readers. In order to examine this relationship, two studies were undertaken. The first study consisted of an analysis of the relationship between (a) proficiency level and overall reading comprehension, (b) L1 anaphoric system and overall reading comprehension, (c) proficiency level and comprehension of co-referential ties, (d) L1 anaphoric system and comprehension of co-referential ties, and (e) overall reading comprehension and co-referential tie comprehension. This study was conducted using adult English-as-second-language (ESL) students as subjects. The second study (a) compared adult L1 readers with the ESL subjects and (b) examined the relationship between overall reading comprehension and comprehension of co-referential ties for both L1 and L2 readers.
**Population and sample**

The target population consisted of international students enrolled in the English language programs at The Ohio State University. These two programs represent two proficiency levels: The American Language Program, on the one hand, enrolls students whose English proficiency is at a lower level than that required for admission to the University. Students enrolled in The ESL composition program, on the other hand, have met the language requirement but need to develop further their English writing skills. These two groups will hereafter be referred to as "pre-matriculation ESL" and "matriculated ESL" respectively. Below is a brief description of admissions procedures for foreign students and the two language programs.

International students requesting admission to The Ohio State University are required to have earned a score of 500 or more on the Test of English as a Foreign Language (TOEFL) or 80 or more on the Michigan English Test. Students who do not meet this requirement are encouraged to seek to improve their English and then to re-apply. Many of the students so advised enroll in the pre-matriculation ESL program, a program that is designed to aid students in (a) adjusting to United States culture, (b) developing sufficient English skills to be able to perform reasonably in an academic setting, and (c) preparing for
the TOEFL or the Michigan English Test in order to gain admission to The Ohio State University. The intensive program consists of four levels of listening-speaking, grammar, reading—vocabulary, and composition. Of the students who participate in this program, approximately 85% plan on doing academic work in the United States, and a majority of these eventually enroll at The Ohio State University. Students who then earn a passing score on one of the English proficiency tests (and who also meet academic, financial, and immigration requirements) are accepted into the University.

The ESL writing program at OSU has as its goal "to bring students' expository writing skills to a level at which the students can successfully compete in regular University courses with American and other English-speaking students" (ESL Course Outline, 1985). Once foreign students are admitted to the University, they are required to write a one-hour placement composition so that they can be placed in the appropriate level of the ESL program. (Students with a TOEFL score of 650 or more are exempt from this requirement.) Students are then placed in one of three levels of the ESL sequence (English 106, 107, 108.01 [for undergraduates], or 108.02 [for graduate students]). Students who demonstrate near-native
performance on the placement composition are not required to enroll in an ESL course.

Subjects selected for this study were intermediate level pre-matriculation reading/vocabulary students and matriculated ESL 107 and 108 students. It was expected that the use of intermediate-level students from each program would ensure a substantial difference in proficiency level for the study. Also, this particular pre-matriculation level was selected because at this level the students (a) have attained reading speeds of at least 150 words per minute and (b) have received instruction in the selection of co-referential ties.

Subjects were paid volunteers and were recruited through class visitation by the experimenter. Because there were so few students in the pre-matriculation and matriculation groups, all volunteers (n = 31) were included in the investigation. L1 subjects were recruited from The Ohio State University freshman composition classes. A randomized sampling of these students produced 28 subjects.

Selection of the passage

The text chosen was a 327-word literary text in which naturally occurring pronouns were used in a deliberate fashion in order to convey a message. Specifically, the
passage was the introduction to "Demons," a short story by Joyce Carol Oates. This particular passage was chosen because it contains (a) a minimal amount of cultural bias and (b) a high density of co-referential pronouns. The passage was judged to contain a minimum of cultural bias because it takes place in the contemporary United States and the event described—a woman walking a dog—was considered to be one that had probably been observed by most international students living in the United States. Because it was anticipated that foreign students from some cultures might have difficulty understanding that a character would express such hostile thoughts concerning her father, all subjects were told that the passage contained an expression of a person's innermost thoughts.

Twenty-nine co-referential pronouns in the passage were selected for testing. Their selection was based on (a) the purpose of the investigation and (b) the results of the pilot study. "Both" is not, technically speaking, a "co-referential pronoun," but, because of its usage with ellipsis in the passage, it functions anaphorically and therefore was included in the co-referent location task. "Itself" as a reflexive pronoun bears a syntactic relation rather than an anaphoric relation with its antecedent (Bosch, 1983), but its inclusion was based on an interest in determining whether L2 readers understood even
"obvious" ties. Finally, results of the pilot study interviews indicated that many subjects who understood the meaning and usage of "this" in the phrase, "this dog," were unable to locate its antecedent in the co-referent selection task. This pronoun was therefore eliminated from the co-referent selection task in the main investigation.

The passage contains seven pronouns that refer to the protagonist, "Eileen," thus providing a test of whether or not L2 readers are able to locate co-referents located high in the macrostructure. One of those pronouns occurs as the first word in the text and therefore precedes its antecedent, which does not appear until the seventh sentence. Comprehension problems with this pronoun, then, would indicate difficulty in understanding cataphoric relationships. Other pronouns of particular interest are (a) the instances in which "both" and "they" are used to refer to an animal and a human being and (b) the pronoun that refers to an antecedent that must be inferred from the text:

The dog wanted so badly to tear flesh with his jaws that Eileen stared at his flat, brutal skull and thought clearly that it would be better if this dog died so that they could have some peace."
PLEASE NOTE:

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These consist of pages:

- P. 60 Demons
- P. 150-153 Demons

University Microfilms International
300 N Zeeb Rd., Ann Arbor, MI 48106 (313) 761-4700
Instrumentation

The data collection device used for the macrostructure identification task was an immediate recall protocol. This type of instrument was selected because it allowed each subject to generate his/her own reconstruction of the passage without the external influence of experimenter-generated questions. Therefore it permitted an analysis of how each subject had processed information from the text. Subjects were told before being given the passage that they were to read it with the intent of understanding as much of it as possible, and that, once they had finished reading, they were to relinquish the passage and would be required to write, in their respective native languages, everything they could remember from it. They were told that their recall protocols would be translated for the examiner.

The reason for allowing subjects to write their recall protocols in their respective native languages was to avoid confounding an assessment of subjects' ability to comprehend the language with their ability to produce it (Lee, 1986). Six translators were paid $10.00 per hour to translate the passages. These translators translated the Chinese, Malaysian, Korean, Portuguese, Italian, Arabic, and Japanese recalls. (The Spanish recalls were translated by the experimenter.) All translators were
professional translators or language instructors who were proficient in each language. Each translator met with the experimenter in order to be informed of the nature of the investigation (e.g., what was required of the subjects) and to be presented with a copy of the passage. During this interview the importance of maintaining the integrity of each subject's recall was also discussed. Translators were not informed of the respective proficiency levels of the protocols. In order to ensure that the original meanings of the recall protocols had not been distorted by the translations, a sampling of the protocols were translated by a second translator. Reliability calculations revealed a correlation of .92 for the two groups.

The instrument was constructed according to Meyer's immediate recall protocol procedure (Meyer, 1965). This procedure consists of (a) constructing a tree diagram representing the hierarchical ordering of propositions in the passage and (b) transferring that hierarchical ordering to a scoring sheet in which propositions are ranked from ten to one, with ten representing a top-level idea unit and one a low-level idea unit. The sum of the items remembered represented each subject's score.

For the scoring procedure protocols were typewritten and assigned temporary numbers so that identity of the protocols' authors was unknown to the rater. Variations
in lexical choices that retained the "spirit" of the original meaning in the passage (e.g., "rope" for "leash" or "burdened" for "encumbered") were scored as present. Inferences and incorrect information were circled but not scored.

Refinement of the instrument for the co-referent selection task was attained with the aid of a panel of three foreign language education graduate students. These students were given a typewritten, double-space copy of the passage with the co-referential pronouns underlined. They were requested to draw a line from each underlined pronoun to its antecedent. A comparison of their performances revealed unanimous agreement on all pronouns but one: the inferential "they" of the phrase, "... it would be better if this dog died so that they could have some peace." Some panelists had expressed "Eileen and her family" as antecedents; others had selected "Eileen and her mother." It was unanimously agreed "Eileen and her mother," "Eileen and her sister," and "Eileen and her family" could all be justified as correct answers for this pronoun. It was also unanimously agreed that "Eileen and the dog," "Eileen and her father," "the dog and father," and "the squirrels" should be considered incorrect. The panelists also suggested that writing the appropriate antecedent above each pronoun would be simpler—for both
subject and scorer—than drawing a line to the antecedent. These suggestions were all incorporated into the investigation procedures.

In order to ensure inter-rater reliability, an ESL instructor was trained in scoring the recall protocols. Pearson Product-Moment calculations for the recall protocols revealed a correlation of .86; calculations for the co-referent selection task revealed a correlation of .98. Both of these correlations were considered to be strong enough to warrant only one scorer for the main studies.

**Procedures and data collection**

The experiment consisted of three phases for each level: (1) reading the passage, followed by an immediate recall protocol, (2) a co-referent location task, and (3) an interview with the experimenter. For the first portion of the study, subjects were instructed to read the passage with the intent of understanding as much of it as possible. They were told that the purpose of the research project was to find out how well they had understood the passage, and that they could have as much time as they needed to read it. After having read the passage, subjects were given a blank sheet of paper on which they were instructed to write everything they could remember, in paragraphs and in their native languages, about the
passage. They were told that native speakers of their respective languages would translate their protocols for the experimenter. After having completed and returned the recall protocols, subjects were given the same passage with the pronouns underlined. They were instructed to write the co-referent of each underlined pronoun above the pronoun. They were provided with examples and practice items in order to ensure that they understood the nature of the task.

The third phase of the study consisted of taped interviews, the purpose of which was to determine on what basis subjects selected particular co-referents. Also of interest was whether or not "compounding" effects— one wrong choice increasing the likelihood of further errors— might be observed. During this portion of the study subjects, with the passage containing the underlined pronouns in front of them, were asked to explain the text, especially focusing on the pronoun meanings. After completion of this explanation, the interviewer asked question pertinent to textual comprehension and requested that unknown vocabulary be circled. Finally, inferences were elicited with questions such as:

a. What does Eileen think about the dog?
b. What does Eileen think of her father?
c. What does Eileen think of her family?
d. What do you think of her family?

Data analysis

A 3 x 2 Multivariate Analysis of Variance procedure (MANOVA) was performed on two dependent variables: an overall comprehension score as measured by an immediate recall score, and a raw score for the co-referent location task. Computer program SPSSx, which includes a multivariate analysis of variance, was used. Also, a Pearson product-moment procedure was computed on the two dependent variables.

The Second Study

Procedures of the first study were applied in the second study using adult L1 readers as subjects. The purpose of this portion of the investigation was to compare the performance of L2 readers with that of L1 subjects. Discriminant function analysis and a Pearson product-moment procedure were computed on the two dependent variables. Computer program SPSSx was used.
The pilot study

Subjects of the pilot study consisted of three volunteers from the advanced L2 pre-matriculation level, three volunteers from the matriculated level, and six L1 subjects who were randomly drawn from the main study pool after the random selection of the main study participants. This pilot study was conducted in order to (a) establish inter-rater reliability for scoring the recall protocols and (b) provide the experimenter with interviewing experience. Interviews were tape-recorded.

The Research Questions:

The following hypotheses were tested in the first study:

1. There is no relationship between proficiency level of L2 readers and overall reading comprehension.

2. There is no relationship between L1 anaphoric system and overall reading comprehension of L2 readers.

3. There is no relationship between proficiency level of L2 readers and co-referential tie comprehension.

4. There is no relationship between L1 anaphoric system and co-referential tie comprehension.
5. There is no relationship between overall reading comprehension and the ability to comprehend co-referential ties for L2 readers.

The following hypothesis was tested in the second study:

1. There is no relationship between co-referential tie comprehension and overall reading comprehension for both L1 and L2 readers.

![Figure 3]

RESEARCH DESIGN FOR FIRST STUDY
Chapter IV

ANALYSIS OF THE DATA

The purpose of the present studies was to investigate the relationship of co-referential tie comprehension with overall reading comprehension for L2 readers. In the first study more specific information was sought through analyses of the relationships between (a) proficiency level and overall comprehension, (b) L1 anaphoric system and overall reading comprehension, (c) proficiency level and comprehension of co-referential ties, and (d) L1 anaphoric system and comprehension of co-referential ties. Finally, a Pearson product-moment correlational procedure was computed in order to assess the relationship between the two dependent variables. The purpose of the second study, which included L1 readers, was (a) to observe and compare reading patterns of L1 readers with those of the L2 readers and (b) to investigate the relationship between the two dependent variables for both L1 and L2 readers.
The First Study:

To assess the effects of proficiency level on overall comprehension and co-referential tie comprehension, one independent variable was used: Subject classification was determined by matriculation level (pre-matriculated and matriculated) in The Ohio State University English as Second Language programs. The second independent variable, L1 anaphoric system, was divided into two levels: Types II and III as described by Kameyama's (1986) "zero anaphora permissibility" classification system. Type II languages (e.g., Spanish and Arabic) includes those languages in which pronouns are frequently eliminated if the information that they convey is found elsewhere in the text (such as in the verb form). (Portuguese, which is of Type II-III gradation, was included in the Type II group because only objects are of the Type III category and there were no object pronouns in the passage.) Type III consists of "topic-oriented" languages, in which pronouns that would refer to the topic of the discourse are not needed. In other words, pronouns referring to an entity judged by the speaker/author to be salient or "in focus" would be eliminated.

The two dependent variables of these studies were overall comprehension and a co-referent location task. "Overall comprehension" was assessed by an immediate
recall protocol, a procedure in which subjects express their own discourse models of the passage by writing everything that they can remember from the passage after having read it. This method of assessment was based on the notion that reading comprehension consists of the ability to construct a discourse model similar to that of the author, and that the most accurate representation of the reader's discourse model is the reader's written reconstruction of the passage, written immediately after having read the passage and without the interference of examiner-constructed questions. Subjects were given as much time as they needed to write the recalls, and they were asked to write them in their respective native languages. (The purpose of requiring them to write in the native language was (a) to allow the subjects to express their understanding of the passage in the language in which they communicate most freely and (b) to prevent the interference of L2 writing ability in scoring the recall protocols.) The co-referent location task consisted of naming the appropriate co-referent for each pronoun in the passage. Upon completion of both tasks, subjects were interviewed by the examiner.

For this study, comprehension and co-referent location scores were compared in a 2 x 2 multivariate analysis of variance (MANOVA) where levels and language type served
as between-subjects comparisons. In addition, comprehension and co-referential location scores were compared using Pearson product-moment correlational procedures.

**The Second Study:**

The second study consisted of a comparison of the performances of L1 readers with those of the L2 readers from the first study. Comprehension scores and co-referential location scores were compared in a discriminant function analysis (SPSSx) where L1 readers (native speakers of English) and L2 readers (native speakers of languages other than English) served as between-subjects factors. Additionally, comprehension and co-referential location scores were compared using Pearson product-moment correlational procedures.

**The Research Questions:**

Among the hypotheses tested were the following:

**Ho:** There is no relationship between proficiency level of L2 readers and overall reading comprehension.

**Ho:** There is no relationship between L1 anaphoric system of L2 readers and overall reading comprehension.
Ho: There is no relationship between proficiency level and co-referential tie comprehension for L2 readers.

Ho: There is no relationship between L1 anaphoric system of L2 readers and co-referential tie comprehension.

Total means for the overall comprehension dependent variable were 56.02 for the pre-matriculated level, 57.80 for the matriculated level, 62.00 for Type II anaphoric system, and 51.80 for Type III anaphoric system. Total means for the co-referent location variable were 22.56 for the pre-matriculation level, 25.48 for the matriculated level, 24.58 for Type II anaphoric system, and 23.46 for Type III anaphoric system. No follow-up procedures were justified because no differences were detected in the initial multivariate procedure.

As shown in Table 2, comparisons of comprehension and co-referent location scores (MANOVA) indicated no significant test statistic for either language level [Wilks' $F(2, 26) = 2.68, p < .09$] or language type [Wilks' $F(2, 26) = 1.17, p < .33$], nor for interactions between language level and language type [Wilks' $F(2, 26) = .14, p < .87$]. The null hypothesis, therefore, was confirmed for both comparisons (language level and language type).
Table 1
Means and Standard Deviations of Comprehension and Co-referent Location Scores as a Function of Proficiency Level and L1 Anaphoric System

<table>
<thead>
<tr>
<th>Level</th>
<th>Type II</th>
<th>Type III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Pre-matriculation</td>
<td>62.86</td>
<td>14.19</td>
</tr>
<tr>
<td>Matriculation</td>
<td>61.14</td>
<td>18.19</td>
</tr>
<tr>
<td>Total</td>
<td>62.00</td>
<td>14.00</td>
</tr>
</tbody>
</table>

Co-referent Location

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean</th>
<th>S.D.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-matriculation</td>
<td>23.29</td>
<td>5.28</td>
<td>21.83</td>
<td>5.38</td>
<td>22.56</td>
</tr>
<tr>
<td>Matriculation</td>
<td>25.86</td>
<td>3.63</td>
<td>25.09</td>
<td>3.36</td>
<td>25.48</td>
</tr>
<tr>
<td>Total</td>
<td>24.58</td>
<td>4.46</td>
<td>23.46</td>
<td>4.37</td>
<td></td>
</tr>
</tbody>
</table>
Table 2
Microstructure Comprehension MANOVA
by Proficiency Level and Language Type

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>d.f. Hyp</th>
<th>df Error</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between subjects</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
<td>2.0</td>
<td>26.00</td>
<td>2.68</td>
<td>.09</td>
</tr>
<tr>
<td>Language Type</td>
<td>1</td>
<td>2.0</td>
<td>26.00</td>
<td>1.17</td>
<td>.33</td>
</tr>
<tr>
<td>Level x Lang. Type</td>
<td>1</td>
<td>2.0</td>
<td>26.00</td>
<td>.14</td>
<td>.87</td>
</tr>
<tr>
<td>Subjects/Level x Type</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
That the MANOVA procedure did not detect significant differences between L2 proficiency levels might be attributable to three factors: Differences between the two proficiency levels simply may not have been great enough to account for proficiency level effects. Another possibility is that subject-controlled time-on-task may have been more advantageous to lower proficiency than to higher proficiency subjects. In other words, the allowance of unlimited time-on-task for both groups might have blurred ability differences between the two groups. A third possibility is that the skills necessary for successful comprehension of natural text (i.e., successful integration of information) may be different from the isolated skills measured by standardized proficiency tests.

That the MANOVA procedure detected no differences between L1 anaphoric systems indicates that L2 readers at this proficiency level have overcome any differences in pronoun usage that might impede overall comprehension. Bosch hypothesizes that "the notions of referentiality, anaphora, and deixis... are not language-specific notions. They relate to communicative behaviour and are themselves explicated in terms of our procedural model for interactions between organisms and their environment, of which linguistic communication is but a special case" (p.
Perhaps what is important, then, is that L2 subjects at this proficiency level "understand" that each language has a means of referring to discourse entities already in focus and that whether that means consists of ellipsis or simply the use of semantically attenuate forms seems to make no difference.

That neither proficiency level nor L1 anaphoric system appears to affect significantly overall comprehension indicates that the L2 reading process involves more skills than the two measured here. Green and Morgan (1981) suggest that [discourse comprehension] is not a monolithic competence with a single hierarchical organization. . . . The whole mind is deployed in producing and understanding discourse. It runs counter to common sense. . . . to claim that such mental activities are the product of 'strictly linguistic' processing mechanisms" (P. 177). Bernhardt (1985), concurs: She describes the L2 reading process as "interactive" and multi-dimensional" (p. 105).

It is possible, of course, that at lower proficiency levels L1 anaphoric system may be a significant factor. Also, speakers of Type I languages might have more difficulty understanding Type II or III languages than vice versa. Still another possibility is that comprehension of co-referential ties may be more problematic in spoken language than
in written. All of these matters deserve investigation.

Ho. There is no relationship between comprehension of co-referential ties and overall reading comprehension for L2 readers.

A Pearson product-moment procedure produced a correlation coefficient of .68 (p < .000). This result indicates that there is some relationship between overall comprehension and the comprehension of co-referential ties for L2 readers, and the null hypothesis was rejected.

This positive correlation, together with the lack of main effect for L1 anaphoric system in the first study, indicates that linguistic processing skills do account for a portion—but only a portion—of competence in discourse. Green and Morgan (1981) state that "the role of linguistic competence in discourse comprehension is smaller than one might suppose" (p. 167).
Table 3

Pearson Product-Moment Correlations between Overall Comprehension and Co-referent Location for L2 Readers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Comprehension</th>
<th>Co-ref. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>1.00</td>
<td>.68</td>
</tr>
<tr>
<td>Co-ref. Location</td>
<td>- - -</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Table 4
Pearson Product-Moment Correlations
between Overall Comprehension and Co-referent Location
for L1 and L2 Readers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Comprehension</th>
<th>Co-ref. Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>1.00</td>
<td>.55</td>
</tr>
<tr>
<td>Co-ref. Location</td>
<td>- - -</td>
<td>1.00</td>
</tr>
</tbody>
</table>
The Second Study:

The second study, which was designed to compare L2 readers' performance with that of L1 readers, included an examination of L1 readers' performance on the overall comprehension and pronoun selection tasks. The following null hypothesis was tested:

Ho: There is no relationship between overall reading comprehension as measured by an immediate recall protocol and the ability to locate co-referents of pronouns in text.

The comparison between overall comprehension and the ability to select co-referents of pronouns yielded a Pearson product-moment correlation of .55 (p < .000) for both L1 and L2 readers. The null hypothesis, therefore, must be rejected. This moderate relationship, along with the correlation of .68 (p < .000) for L2 readers, will be examined in the remainder of this chapter, particularly the role of co-referential tie selection in overall comprehension for these two groups of readers.

The discriminant function analysis procedure classified the readers into two groups: L1 readers and L2 readers. Standardized canonical discriminant coefficients were .66 for the co-referent selection task and .54 for
the overall comprehension task, thus indicating that selecting co-referents contributed slightly more to the discrimination than did comprehension (propositions recalled), a finding substantiated further by structure coefficients for co-referent selection (.86) and comprehension (.78). Respectively, for first language readers the group centroid was .83 and for second language readers, the group centroid was -.75.

Table 5

DISCRIMINANT ANALYSIS AND UNIVARIATE ANOVAS
FOR
ANAPHORIC RELATIONSHIPS AND RECALLED PROPOSITIONS.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Canonical Coefficient</th>
<th>Struct. Coef.</th>
<th>F Univ.</th>
<th>(1, ST)p &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphoric rel.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Co-ref. ties)</td>
<td>.67</td>
<td>.86</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>(Propositions recalled) .54</td>
<td>.78</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4
ALL-GROUPS STACKED HISTOGRAM
CANONICAL DISCRIMINANT FUNCTION I
As is shown in Figure 4, 72.88% of the native readers were correctly classified by the discriminant function analysis. Of the L2 readers, 64.5% were correctly identified as L2 readers, while 35.5% were identified with the L1 readers. Of the L1 readers, 82.1% were correctly classified as L1 readers, and 17.9% were identified with the L2 group. This classification permitted an examination of the reading performances of four groups:

1. L1 readers performing as L1 readers (L1-L1)
2. L1 readers performing as L2 readers (L1-L2)
3. L2 readers performing as L2 readers (L2-L2)
4. L2 readers performing as L1 readers (L2-L1)

Observance of performance levels and comprehension problems of these four groups helped to explain the .68 correlational coefficient for L2 readers and the .55 correlational coefficient for all readers between the co-referent selection and overall comprehension tasks. The examination of L1-L1 readers' performance permitted the construction of a discourse model "prototype" of an L1 reader, so that the performances of other groups could be compared with this prototype. Performances of L1-L2 readers and L2-L1 readers provided insights into how a discourse model can become slightly distorted when only a few items are misunderstood. L2-L2 readers consisted of those readers whose discourse models were severely
distorted because of a variety of comprehension problems. For the present study one aspect of this group’s performance was examined: the relationship between co-referential ties and overall comprehension. Discussion of this group’s performance focuses on the most frequently made co-referential tie errors, and how those errors contributed to the distortion of these readers’ discourse models.

The remainder of this chapter is divided into four sections. The first section consists of a description of the performance of L1-L1 readers. The following sections consist of descriptions of performance of L1 readers not performing as L1 readers (L1-L2s), L2 readers performing as L1 readers, and L2 readers performing as L2 readers.

**Characteristics of L1 readers performing as L1 readers:**

Information gleaned from the recall protocols, pronoun comprehension tasks, and interviews of L1-L1 readers indicated that these readers shared so many similarities that a prototype of their discourse models could be constructed. These readers understood the major lexical units and rhetorical relationships of the text. Performance on the two dependent variables indicated that these readers understood not only the concepts linked by the pronouns but also which concepts were being linked.
Figure 5
CORRELATION BETWEEN OVERALL COMPREHENSION (Y AXIS) AND CO-REFERENT LOCATION (X AXIS) FOR L2 READERS
(r = .68)
Figure 6
CORRELATION BETWEEN OVERALL COMPREHENSION (Y AXIS) AND CO-REFERENT LOCATION (X AXIS) FOR ALL GROUPS
($r = .55$)
Overall comprehension scores of L1-L1 readers ranged from 55 to 146. Co-referential tie scores in this group were either 28 or 29. Of the 19 subjects in this group, five subjects made one co-referential error each.

All subjects understood the rhetorical relationships (problem—solution, comparison-alternative, collection of descriptions) in the first paragraph. All indicated comprehension of the following lexical units:

a. that Eileen was walking the dog
b. that she was trying to stop the dog from tugging at the leash
c. that she thought of the dog as an extension of her father
d. that she was thinking of the similarities between the dog and her father

Although a minority of these readers did not know the meaning of "mottled," a majority were familiar with all of the vocabulary in this paragraph.

All subjects indicated comprehension of the major lexical units and rhetorical relationships in the second paragraph:

a. that the dog wanted to eat the squirrel
b. that Eileen wished that the dog would die so that they could have some peace (cause-effect)
c. that Eileen thought that the dog and Marcey were alike in that they were "possessions" of her father (comparison-analogy)
d. that Eileen’s mother had little to do with the dog
e. that there were several restrictions for the dog in the house
f. that Eileen assumed that other households were also encumbered with mothers, fathers, sisters, and balding, vicious dogs
g. that Marcey, who was "slow," was considered to be good, and Eileen, who was not slow, was considered to be questionable (comparison-contrast with cause-effect)

A minority of the L1 readers did not know the meaning of "invalid" and were unable to guess its meaning from the context. All subjects understood the figurative meanings of "belonged" and "slow."

A critical component of these readers' performance, and one that distinguished them from many of the L2-L2 readers, was their comprehension of the anaphoric chain, "her (Eileen’s) father... the dog’s master... the old man." All of these readers understood that these three descriptions referred to Eileen’s father. This knowledge apparently enabled these readers to integrate two major
pieces of information from each paragraph: the descriptions of Eileen's father in the first paragraph and Marcey (who belonged to "the old man") in the second paragraph.

Of interest in this study was what types of inferences subjects would make in order to complete their discourse models. Inferences by this group were quite similar. All of these readers inferred, for example, that Eileen's descriptions of her father and the dog were not flattering. Virtually all of the subjects, therefore, inferred that Eileen did not like the dog or her father very much. When asked to point to the word or phrase in the text that indicated that Eileen did not like her father, subjects frequently mentioned the comparison with the dog:

She doesn't think a whole lot of her father!
Well, I don't think I would describe my father as having liverish, brown, camouflaged skin.
And it's obvious that her father has heard things that she didn't really want him to hear.
. . . Especially the next part where she wishes

the dog were dead. If the dog reminds her of her father!

Two other points of agreement were that Marcey was the favored sister and that the mother appeared to be a
weak person. When asked why they thought the mother might be pretending to be an invalid, subjects mentioned that it might be her way of escaping from either responsibilities of the household or having to deal with the father. All subjects inferred that the household was an unhappy one and that Eileen was unhappy with the household.

Eileen's not very happy with her household. I think she sees her father as being very strong and a very powerful person, but not in a good way. He abuses his power, and she sees her mother as being a weak person (an invalid's a weak person) and her mother's using that as an excuse—she's 'weak' physically and she . . . doesn't stand up to her father. And her sister, it seems to me she doesn't stand up to her father either. She lets her father own her.

One variable within this group was the extent to which readers were willing to make inferences. Whereas some readers, when asked about the mother's personality, for example, would infer that perhaps the mother had nothing to do with the dog because she too saw him as an extension of her husband, others would comment that they knew very little about the mother from only two paragraphs. Perhaps this variable accounts for the
variation in co-referent selection for the pronoun referring to the inferred entity in the phrase:

... it would be better if this dog died so that they could have some peace.

82% of the readers in this group selected "Eileen and her family" as co-referents for this pronoun, but the remaining 18% selected "Eileen and the squirrel" as co-referents. That any readers in this group would select "Eileen and the squirrel" as co-referent is puzzling since 100% of these readers inferred that the family was unhappy. Perhaps these readers were reluctant to "take a chance" that the co-referent might be an entity beyond the text.

In sum, these readers integrated information from various parts of the text in order to build remarkably similar discourse models. Performances on the recall protocols, pronoun tasks and information obtained from the interviews indicated that all readers from this group understood the vocabulary and major rhetorical relationships in the text, and that they integrated this information in order to construct similar discourse models. Subjects seemed to differ only with respect to the extent to which they were willing to make inferences.
L1 Readers Performing as L2 Readers

What distinguished this group from the other native readers was either (1) less detailed information on recall protocols or (2) poorer performance on the pronoun selection task. Scores in this group ranged from 10 to 56 on the recall protocols and 26 to 29 on the co-referent selection task.

A possible explanation for the less detailed recall protocols might be that the subjects were simply less able to integrate the information successfully, or that they chose to include only what they considered to be important or interesting. Some subjects, for example, focused on only one or two facts and events and wrote about their inferences from those points:

The girl is upset with her father about letting her sister do something and she not allowed to. The dog is the father's pet, and it remembers (sic) of the anger she feels to her father. So when the dog doesn't do exactly what she when (sic), she thinks hurtful things. At the end of the paper she remembers how everyone go (sic) through this.

The following subject was the only L1 reader to make an error on a pronoun other than the inferential "they." This subject selected "Marcy and Eileen" as co-referents
of the pronouns "both" and "they" rather than Marcey and the dog in the lines:

The dog belonged in the house the way Eileen's sister Marcey belonged: both were possessions of the old man and could get away with anything. The fact was that they never really did anything at all. They belonged to the old man.

This subject's interpretation differed from that of the L1-L1 readers in that she perceived a shared experience between Eileen and Marcey, whereas L1-L1 readers saw a common experience (being possessed by the father) shared by Marcey and the dog but not by Eileen. The negative connotations of a person's "belonging" or "being possessed by" another person just as a dog belongs to a person is eliminated from this reader's discourse model. Therefore, that particular component of her discourse model is different from corresponding components of the discourse models of L1-L1 readers. This deviation affected the inferences made by this subject. Whereas other subjects noted Eileen's disdain for her sister, this subject stated in the interview that she thought Eileen and Marcey had a good relationship:

(There is) . . . some camaraderie between the two sisters because of them being able to get away with a lot of things.
This subject was the only native reader who did not comment that the household was unhappy. When asked during the interview how she would describe the household, she stated:

I would say a typical household. Any household has its rules and regulations.

In sum, it is not known whether low recall scores in this group were due to comprehension difficulties or to a preference for focusing on one's own inferences rather than on more concrete information from the text. The L1 reader who scored lower on the pronoun task, however, provided information on how misinterpretation of one or two pronouns can affect overall comprehension. This subject's failure to resolve two co-referential ties affected her perception of the relationship of the antecedents and, consequently, the structure of her discourse model.

L2 Readers Who Performed as L1 Readers

Subjects in this group were selected by the discriminant function analysis procedure as performing on a par with the L1 readers. Their scores ranged from 27 to 29 on the co-referent comprehension task and 59 to 88 on the overall comprehension task. In other words, these subjects' scores indicated that they understood the lexical units, rhetorical relationships, and co-referential ties
as well as the native readers. Readers in this group demonstrated skill in comprehension monitoring and in integrating information from all parts of the text in order to guess—sometimes successfully—unknown lexical terms. The reader whose recall excerpts appear below, for example, demonstrated (a) an awareness of the rhetorical relationships in the passage and (b) efforts toward applying that knowledge to guess unknown lexical terms. He mentioned the comparison-alternative relationship, for example, in the first paragraph:

She never considered or treated the dog as an animal, rather she considered it an extension to her relationship, with, or her love and respect for her father.

and the comparison-analogy between Marcey and the dog:

The dog belonged to the old man in the same way Eileen's sister belonged.

Where possible, this reader tried to use his knowledge of text structure to guess the meanings of unknown words. For example, his awareness of the problem-solution relationship in the first paragraph allowed him to guess (correctly) that, because she tells the dog to stop doing something, the dog must be doing something annoying. He guessed (incorrectly) that the dog might be licking her hand.
She came out from the door with the dog with her; its tongue hanging, and it is licking her hand. She said, "Stop it, you know, stop it."

Other vocabulary not known by this subject included "squirrel," "claimed to be," and "invalid." As did many other L2 readers, he used his knowledge of "valid" and the prefix "in" to guess that "invalid" meant "powerless," thereafter inferring that the mother must be powerless in some way. (L1 readers who did not know the meaning of "invalid" were unable to apply linguistic knowledge in order to guess its meaning.)

Figurative language created a comprehension problem for this reader. He did not understand the meanings of "possessions" and "slow," for example, as they were used in the passage. When questioned about the meaning of "possessions" in the passage, the subject did not indicate that he understood the negative connotations of a person "belonging" to another person. He suggested that the man owned Marcey and the dog "by bequeath, perhaps." He guessed that "slow" meant "calm, quiet," and accepted the literal interpretation of the passage: that Marcey was good because she was "calm and quiet," and Eileen was not good because she was not "calm and quiet." Therefore, he did not see the irony in Eileen's perception of the relationships.
The most glaring difference between this reader's interpretation of the passage and that of the Li-Li readers' was that, although he understood the "father", "master", "old man" chain, he did not infer that Eileen disliked her father:

She never considered or treated the dog as an animal, rather she considered it an extension to her relationship with, or her love and respect for her father.

During the interview this subject expressed confusion that Eileen thought of the dog as an extension of her father, and yet she wanted to get rid of him (the dog). He commented that it was a "strange family" and stated, "There are many things I can't connect with each other."

This subject demonstrated all of the attributes of a skillful reader: He was adept at perceiving rhetorical relationships and he used his understanding of those relationships to make intelligent guesses concerning lexical terms that he did not understand; he used linguistic knowledge in order to guess meanings; and he understood all of the co-referential ties in the text. The major obstacle that this reader was unable to overcome was background knowledge. His value system seemed to make it difficult for him to accept that a fictitious character could express such negative feelings toward her father.
The background knowledge "gap" also seems to be at the root of the figurative language problem. The reader knew the literal meanings of "possessions" and "slow," but was not familiar with the negative connotation in United States culture of a person's "owning" another person, nor was he familiar with the use of "slow" to describe a dull-witted person. This reader, then, demonstrated all of the skills necessary for successful reading comprehension, but fell short of native-like comprehension largely because of gaps in the cultural experience necessary for comprehension of the passage.

**L2 Readers Performing as L2 Readers**

As is evident from the chart, readers from this group made more pronouns errors than those from the other groups. Therefore, pronoun errors made by this group of readers should provide insight into which elements of discourse are most closely linked with co-referential tie comprehension. Of interest with this group of readers is not only the errors made but also the co-referential ties that were successfully located.

Of the seven pronouns used to refer to the protagonist, only one of the pronouns was misinterpreted by the readers in this group and that error was made by only 5% of the readers. This result supports the hypothesis that
Figure 7
PERCENTAGES CORRECT FOR EACH PRONOUN:
FIRST LANGUAGE READERS
Figure 8
PERCENTAGES CORRECT FOR EACH PRONOUN:
SECOND LANGUAGE READERS
a pronoun is easier to comprehend if its antecedent is foregrounded (Kintsch & Vipond (1978). More specifically, the result supports other findings that pronouns are easier to comprehend if they refer to entities located high in the macrostructure of the passage (Frederiksen, 1981; Levin, 1975).

Included in the series of pronouns referring to the protagonist was "she" of the opening sentence. Even though Fowler's Dictionary of Modern English Usage (1961) states that "the pronoun should seldom precede its principal," (p. 464), 100% of the readers understood that "she" referred to "Eileen," who was named later in the paragraph.

Even though, according to the Lakoff-Cole scale, a proper name is seen as the most specific way to designate a person, that Eileen's father is first designated as "her father" and not by name did not seem to present any comprehension difficulties for these readers. Prince classifies an entity such as "her father" as inferrable (containing)." Bosch would refer to this phrase as one interpretable through the reader's BK rather than through a CM (from previous discourse). "Her father" is apparently one of the perhaps few types of inferrable entities that are universally accessible across cultures.
Although results from sentence-level research have indicated that "wh-" clauses are difficult for L1 children to understand (Richek, 1974), the use of "whose" in this passage was understood by 84% of these readers. The use of "which" in the second paragraph was also understood by 84% of the readers in this group.

The majority of the pronoun errors occurring in the passage consisted of the misinterpretation of (a) two "pronoun clusters" and (b) a pronoun that referred to an antecedent that had to be inferred from the text. The first pronoun cluster consisted of "both," "their," "their," "they," "their" from the following lines in the first paragraph:

Both had vague mottled skin, liverish and brown as if camouflaged, and their eyes were watery with alertness. It seemed to Eileen that their ears, though of different shapes and colors, had in common an unclear, intangible quality of intensity--they both heard everything, heard whispers not meant for their ears and words not spoken aloud, heard even the echoes of words that should have faded away.

In order to understand this pronoun cluster, the reader had to understand that (a) "master" referred to "Eileen's
father," and that (b) the dog and father were being compared.

Errors occurred even more frequently in a pronoun cluster in the second paragraph, consisting of "both," "they," and "they" in

The dog belonged in the house the way Eileen's sister Marcey belonged: both were possessions of the old man and could get away with anything.

The fact was that they never really did anything at all. They belonged to the old man.

In order to understand this pronoun cluster, it was necessary to understand that (a) Eileen was comparing her sister with the dog, and (b) "the old man" referred to her father.

40% of the readers in this group misunderstood the first pronoun cluster. 85% misunderstood both pronoun clusters. 88% of the readers who misunderstood the first pronoun cluster also misunderstood the second cluster.

Stated another way, 60% of the readers understood the first cluster, but everything "fell apart" somewhere between the end of the first paragraph and the beginning of the second pronoun cluster in the second paragraph. A strong majority (88%) of those who misunderstood the first pronoun cluster never did "recover." It seems, then, that comprehension of the second cluster depended, to a large
extent, on comprehension of the first cluster.
Understanding that "the old man" referred to the same person who was described in the first paragraph was necessary in order to integrate information from both paragraphs. More specifically, knowing that Eileen's father was the dog's master and that Eileen identified him with the dog apparently helped readers to understood the analogous relationship between the dog and Marcey in the second paragraph.

The readers who did not understand that "father," "master," and "the old man" referred to the same person not only were unable to integrate information pertaining to this character from all parts of the passage, but were forced to construct discourse models that would accommodate additional characters.

The following reader misinterpreted the author's usage of "master" as a specific person from the text and then was unable to locate the appropriate co-referents for the pronouns of the pronoun cluster. She stated in her recall protocol:

The woman does not think that a dog can be an interesting animal. But her father told her that a dog could be loyal to its master. The dog has a great sense of hearing. Even to whispers, the dog could
overhear the woman walking along the street taking her parcel.

In the sentence, "But her father told her that a dog could be loyal to its master," "its master" is used in a generic sense—to refer to dogs' masters in general. In other words, "its master" as the phrase is used in the reader's recall protocol does not designate a particular concept from the passage. Therefore, this reader misunderstood the concept designation intended by the author and, consequently, was unable to locate the coreferential relationship between "his master" and the subsequent pronoun cluster.

Without an understanding of the descriptions of Eileen's father in the first paragraph, this reader was unable to see that "the old man" was the same person. She stated:

But the dog belonged to her sister, Marcey.

And also the dog belonged to an old man who stayed with Marcey. Marcey lived with her mother.

"And also" in the above protocol indicates that the reader might have understood the comparison/analogy relationship and applied it so that the dog would belong to an old man as he belonged to Marcey.
Another reader wrote the following:
The main character, Eileen, comes face to face with a strange situation in which she discovers that strange animals came to be extensions of people, which in turn were under the control of a Master. Specifically, she encounters the case of her father who, in the form of an animal with colored ears and alert eyes was pestering her. She was very surprised because she couldn't imagine that that animal could be an extension of her father.

This reader, who named "Marcey and Eileen's mother" as coreferents of the second pronoun cluster, did not mention "the old man" in the recall protocol. When asked during the interview who "the old man" was, he replied:

At the beginning I thought it was the master, but it also could be the old father. I'm confused—whether it's the father or the master.

Some readers interpreted the pronoun cluster of the first paragraph as referring to Eileen and the dog, possibly because they assumed that Eileen was the dog's master. Below are two excerpts from protocols of readers who made such an interpretation and, subsequently, created another "old man."
After that, she went to the long side of the street. There was an elderly man who lived on that street. He owned the dog.

It happened that the houses along the street had dogs, too. An old man, who felt it unnecessary to keep his dog, was bothered because he had to feed it with bones.

Some readers who understood the pronoun cluster of the first paragraph were still unable to see the link between Eileen’s father and "the old man." One such subject selected "Marcey and the dog" and "Marcey and Eileen" as co-referents of the second pronoun cluster. In the recall protocol this reader stated that "this dog was property of an old man and of his sister." Another reader apparently reconciled information from both paragraphs by deciding that the dog resembled Eileen’s father, who was now dead:

That dog was a reappearance of her father as he once had belonged to her father.

This reader incorporates "old" into his discourse model by deciding that the house where Eileen and her sister grew up now belongs to two old persons. It is not clear why this reader decided that there were two old people.
Perhaps the plural pronouns in the cluster contributed to that decision.

She stopped at a house where she and her sister grew up. Now the house belonged to two old persons. She made the dog stop at the door of the house. The two old persons do nothing to the dog. They were very old already. People could enter the house to take anything they wanted (or to take as many things as they could).

This reader's protocol also points out a means of accommodating two other misunderstood items: the meanings of "belonged" and "get away with." This reader (and others in this group) knew the literal meaning of "belonged" and was familiar with the individual words that make up the expression, "get away with." Without an understanding of the expressions as they were used in the passage, the subject was lacking further clues in the interpretation of the pronouns.

A third error and one made by 55% of the subjects in this group was the interpretation of "they" in the sentence

The dog wanted so badly to tear flesh with his jaws that Eileen stared at his flat, brutal
skull and thought clearly that it would be better if this dog died so that they could have some peace.

Of all the pronouns in the passage, this one seems to be most subject to the inferential reasoning and, consequently, most dependent upon the reader's understanding of what the passage was "about." (The Aboutness Principle of Anaphora (APA) states "roughly, that an anaphorically used expression refers to an object which the discourse at the relevant moment is about" [Bosch, p. 20]). The majority of the readers in this group (55%) misunderstood this pronoun, indicating that they had not understood that the passage was "about" Eileen's family. The most frequently occurring erroneous selection was "Eileen and the dog." Perhaps these readers' tendency to select just-mentioned noun phrases as antecedents indicates an unwillingness or timidity to reach beyond the text for antecedents.

In the above examples communication failure between author and reader apparently occurred because of misunderstandings with respect to concept designation. In order to assess this communication problem, it is necessary to examine the author's choice of expression with respect to what is known about cooperative principles of communication. Bloom and Hays state that "The general rule that
calls for the use of the least informative adequate expression suggests the use of designators low on the Lakoff-Cole scale after the concept has once been introduced, and of abbreviated forms when they are available" (p. 32). However, a speaker / author can estimate that a required concept is more arousable by way of a description than by way of a proper noun, as in:

Do you remember the little town in Kansas where we had the car repaired? (pp. 32-33)

It appears that the author's selection of "her father" as concept designator at the beginning of the first paragraph was adequate for L2 readers as well as for L1 readers, even though, according to the Lakoff-Cole scale, this type of descriptor is less specific than a proper name. That all readers interpreted this pronoun correctly indicates that "that all people have fathers" is BK information universally accessible to members of all cultures represented in the study. "The dog's master," on the other hand, did not prove to be a felicitous designator for many of the L2 readers. It appears that, in this particular passage, the author selected "the dog's master" rather than "Eileen's father" as concept designator because the phrase reinforces the identity that Eileen perceives between the dog and father. Perhaps, then, the author's intent was not only to choose the most arousable
expression, but also to condense and reinforce information pertinent to the development of the story.

Bosch explains the comprehension of utterances in discourse with respect to the Aboutness Principle of Anaphora, a corollary of which is the Principle of Natural Sequential Aboutness (PNSA):

Unless there is some reason to assume the contrary, each following sentence is assumed to say something about objects introduced in previous sentences. (P. 208)

The interpretation of utterances, according to Bosch, is dependent upon a sequential development of context models (CMs), which in turn are dependent upon the reader's background knowledge (BK). The interpretation of semantically attenuate forms, such as pronouns, is dependent upon the appropriate sequential relationship of context models. Frequently the interpretability of an expression in discourse is available not in the context of the discourse but in the reader's background knowledge. In other words, an author may use an expression based on the assumption that the reader's stereotypical knowledge of a particular concept will provide him/her with adequate information for the interpretation of the expression. "Her father" is an example of an expression that posed no problem for any of the subjects. "That all people have fathers" seems to be
stereotypical information shared by people of all the cultural backgrounds represented in the study.

"The dog's master," on the other hand, apparently failed as a concept designator for some readers. Because even those readers who misunderstood the expression had understood the referent of "whose" in "whose dog he was," it seems that these readers simply may have been unfamiliar with the use of "master" to refer to the owner of a pet. Still another possibility is that comprehension of this expression may have depended upon stereotypical knowledge of dog ownership in United States culture, such as the closeness of the relationship between pet owners and their dogs (even, in extreme cases, to the point of shared identity). The expression, "the old man," may have been problematic for several reasons. Obviously, readers who misunderstood the expression simply were unaware of its use as a means to refer to one's father in United States culture. (LI readers, it will be remembered, understood the expression as the way to refer to one's father in a very familiar way and, possibly, in a deprecatory manner also.) The LI subjects also assumed that the expression as used in the passage was being used in a derogatory manner, probably because other clues in the passage reinforced this usage of the term. That Eileen would compare her father with his dog, for example,
reinforced that she must have negative feelings about her father.

Another characteristic of the expression, "the old man," that may have caused it to be difficult to understand for L2 readers is that it can be classified as a "stereotyped compound" rather than "compositional" (Nunberg (1985, p. 203). Nunberg distinguishes between expressions such as country music and New Orleans jazz. He refers to country music as a "stereotyped compound," and to the latter as "compositional." He explains:

The reason is that in the theory of country music that is popularly presupposed, it is not best identified by its rural origin, or even, nowadays, by its association with the most rural parts of America. Whereas New Orleans jazz is best identified by its provenance; wherever it happens to be played now, it is still identified by reference to certain classic New Orleans exemplars (Nunberg, p. 204).

It is probable that, whereas L2 readers were interpreting "the old man" as a compositional expression, L1 readers were interpreting it as a stereotyped compound. Those readers who interpreted the expression as a stereotyped compound had availed themselves of yet another clue to the relationship between Eileen and her father.
Readers who had interpreted the expression as "compositional" not only failed to grasp a clue concerning their relationship, but were forced to create an additional character to fill an "old man" character slot.

In sum, misinterpretation of a pronoun for this group of L2 readers seemed to indicate a lack of understanding of another descriptor in the passage. What appears, then, to explain the correlation between pronoun comprehension and overall reading comprehension is that a pronoun error may be symptomatic of the misinterpretation of a descriptive expression. Co-referential pronouns, in their role as semantically attenuate expressions that operate as "discourse pointers," can serve as valuable indicators of concept designation failure for L2 readers. In other words, a reader who has failed to link a pronoun with its antecedent has probably misunderstood the author's means of designating that concept. In this particular passage the misunderstood descriptor was often a link in the "father" . . "master" . . old man" chain. Results from this study suggest, then, that means of concept designation that may be advantageous for L1 readers are not necessarily advantageous for L2 readers. Further research is needed in order to classify different types of concept designators and determine what types are likely to create comprehension problems for L2 readers. The results also
suggest that L2 reading instructors need to be aware that the mid-level concept designators that are felicitous for L1 readers may be confusing for L2 readers.

Summary of Results from L1-L1, L1-L2, L2-L1, and L2-L2 Groups:

Results from the performances of all four groups indicate the following:

L1 readers who performed as L1 readers understood the major lexical items and rhetorical relationships in the text. Although there were some differences in the extent to which subjects were willing to make inferences, the inferences that were made in this group were remarkably similar: All subjects inferred, for example, that Eileen did not like her father and that her family was unhappy. These subjects understood the co-referential ties in the passage: 22% of these subjects made co-referential tie errors, and each of those subjects made only one error each.

L1-L2 readers recalled less information from the text and relied more on inferences than on concrete information for their interpretations of the text. Only one subject from this group made more than one pronoun error. The errors made provided clues to the 55% correlation between co-referential tie comprehension and overall comprehension. In other words, the
errors affected the subject's perception of the relationship between the antecedents.

L2-L1 readers demonstrated that they comprehended coreferential ties as well as L1-L1 readers. They also demonstrated a strong ability to use information from all parts of the text in order to derive meaning from a particular entity. These readers understood the literal meaning of the text but lacked the cultural experience necessary for the comprehension of colloquial and figurative expressions.

L2-L2 readers also demonstrated a lack of cultural experience necessary for the "native-like" comprehension of colloquial and figurative expressions. In addition, subjects in this group had difficulty comprehending coreferential ties. The errors made pointed to misinterpretation of the antecedents. It appears, then, that errors in co-referential tie comprehension stem not from an inability to understand "how pronouns function" but rather misinterpretation of the descriptive expressions acting as their antecedents.
Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Overview:

Until recently contributions to reading comprehension research from the fields of linguistics and psychology had been hampered because research in those areas had been largely limited to sentence-level investigations. Linguists traditionally have attempted to pinpoint what constraints within a sentence determine the antecedent for a particular pronoun. In other words, linguistics research has placed an emphasis on structure as a determinant of co-referential tie resolution. Recently, however, linguists have emphasized the effects of context and cognition on the interpretation of utterances (Bloom & Hays, 1978; Bosch, 1983; Webber, 1979). Research in cognitive psychology has viewed co-referential tie selection as a means of providing clues to memory and discourse processing strategies (Garrod et al, 1977; Garvey et al, 1974; Lesgold, 1974; Lesgold et al, 1979). These studies, however, have used texts constructed for the purpose of testing, thus ignoring a crucial element, the
communicative purposes of the author. Current research in both of these fields, then, has led to studies such as the present one, which has investigated the relationship between the comprehension of what has traditionally been viewed as a linguistic feature, co-referential ties, with overall comprehension of natural text. That pronouns are referred to as "concept designators" (Bloom & Hays, 1978) emphasizes the inseparable relationship between language and cognition, i.e., between linguistic features and comprehension.

The issue of co-referential chain comprehension with respect to L2 reading comprehension arose with Bernhardt's hypothesis (1985) that intratextual perception ("the reconciliation of each part of the text with that which precedes and succeeds" [1986, p. 105]) is an important component in reading comprehension. The investigation of this hypothesis necessitated a definition of the microstructures that bind discourse entities. For such an analysis the work of Cole (1974, citing and extending Lakoff 1968), was utilized. Lakoff and Cole devised a scale that listed, in descending order of specificity, five means of designating concepts in discourse. Because pronouns are ranked low on the Lakoff-Cole scale, it was assumed that investigation of pronoun errors would provide clues regarding L2 readers' comprehension of concept
designators from "further up the scale" and, as a result, provide information regarding how L2 readers integrate information within a text.

The Present Studies:

The two independent variables used in the present study were (a) proficiency level and (b) L1 anaphoric system. Proficiency level was included in the investigation because it was assumed that overall linguistic knowledge of English as measured by standardized proficiency examinations would bear a relationship with reading comprehension. L1 anaphoric system was included as an independent variable because it was assumed that L2 readers from anaphoric systems different from that of English might bring different expectations of pronouns to the text.

Proficiency level was determined by matriculation level at The Ohio State University, which in turn had been determined by performance on either the Test for English as a Foreign Language or the Michigan English Test. Members of the "pre-matriculation" ESL group had received a score of less than 500 on the TOEFL or 80 on the Michigan Test; members of the "matriculated" level had received a score of 500 or more on the TOEFL or 80 on the Michigan Test.
LI anaphoric systems were classified according to Kameyama's typology (1986). According to this typology, languages are classified according to "zero anaphora perm­issibility" (ZAP). L2 subjects participating in the present study were classified as Type II (languages in which overt pronouns are not required when the co-referent is available from elsewhere in the text, such as from verb inflection) and Type III (languages in which zero anaphora is permitted when the co-referent is available from the context). Language backgrounds represented in the Type II group were Spanish, Italian, Arabic, and Portuguese. Languages represented in the Type III group were Chinese, Japanese, Malaysian, and Korean.

The passage read in the present study was the intro­duction to a contemporary short story and consisted of 327 words. It was written in the form of a narrative monologue in which the reader viewed the protagonist's world through the eyes of the "experiencer," the protagonist herself. Subjects were tested individually. They were presented a typewritten version of the passage and were asked to read it with the intent of understanding as much of it as possible. They were allowed to read the passage as many times as they wished and to take as much time as they needed. When subjects indicated that they had finished reading the passage, they were given a blank
sheet of paper and required to write, in the native lan­
guage, as much as they could remember from the passage.
After completion of this task, they were presented a
double-spaced copy of the passage with the co-referential
pronouns underlined. They were then required to write the
antecedent of each of these pronouns above the pronoun.
The final portion of the examination consisted of an
interview with the examiner, in which the subjects ex­
plained how they had interpreted the passage, especially
focusing on meanings of the co-referential pronouns.

A second study consisted of application of the
same procedures to L1 readers. The inclusion of L1
readers in the study allowed for the comparison of L2
readers' performances with those of L1 readers. Finally,
Pearson product-moment correlation coefficient was com­
puted for (a) L2 readers and (b) L2 and L1 readers in
order to examine the relationship between overall
comprehension and co-referential tie comprehension.

The purpose of the first study, then, has been to
investigate: (a) the effects of L2 proficiency level on
overall reading comprehension and co-referential tie com­
prehension in English and (b) the effects of L1 anaphoric
system on co-referent comprehension and overall reading
comprehension. A MANOVA procedure was used to investigate
differences attributable to proficiency level and L1 anaphoric system.

The purpose of the second study was to compare the performances of L2 readers with those of L1 readers. Discriminant function analysis was used to classify subjects into four groups: L1 readers performing as L1 readers (L1-L1), L1 readers performing as L2 readers (L1-L2), L2 readers performing as L1 readers (L2-L1), and L2 readers performing as L2 readers (L2-L2). This classification permitted an analysis of the reading patterns of each group. Finally, Pearson product moment correlation procedure was computed to examine the relationship between the two dependent variables.

Summary of findings:

The data generated by this study did not detect significant differences between L2 proficiency levels. That no differences were detected might be attributable to three factors: Differences between the two proficiency levels simply may not have been sharp enough to account for proficiency level effects. Another possibility is that, because time-on-task was subject-controlled, less proficient readers may have been able to compensate for difficulties by devoting more time to the task. A third possibility is that the skills necessary for successful
comprehension of natural text (i.e., successful integration of information) may be different from the isolated skills measured by standardized proficiency tests. These findings are consistent with those of Bernhardt (1985), who concluded that "linguistic competence and conversational proficiency were inadequate predictors of the ability to comprehend literary discourse" (p.105).

The MANOVA procedure detected no differences attributable to L1 anaphoric system on either of the dependent variables. These results suggest that L2 readers from varying anaphoric backgrounds have, at this proficiency level, attained similar levels of proficiency with respect to overall reading comprehension and the comprehension of co-referential ties.

The most interesting results obtained from the studies were the correlational coefficients (.68 for L2 readers and .55 for both L1 and L2 readers) between pronoun comprehension and overall reading comprehension. The discriminant function analysis procedure's classification of subjects into four groups permitted an analysis of this relationship.

L1 readers who performed as L1 readers achieved overall comprehension scores of 55 to 146 of a possible total of 162. Their pronoun scores ranged from 28 to 29 of a possible total of 29. Performances of these subjects
on both dependent variables and information from the follow-up interviews enabled the investigator to derive a discourse model prototype against which L2 discourse models could be compared. Their high performance level on the co-referent selection task indicated that they understood the anaphoric relationships in the text.

L1 readers who did not perform as L1 readers received overall comprehension scores ranging from 10 to 86 on the overall comprehension task and 26 to 29 on the co-referent comprehension task. The readers in this group who scored poorly on the overall comprehension task tended to include only a few items from the discourse in their recall protocols, and then elaborated on their own inferences. Co-referent selection performance by the only L1 reader to misunderstand more than one pronoun provided insight into the relationship between co-referent comprehension and overall comprehension: This reader drew an inference concerning the relationship between the two characters referred to that was drastically different from that of the L1-L1 prototype.

Scores of L2 readers performing as L1 readers ranged from 60 to 88 on overall comprehension and 27 to 29 on the co-referent selection task. In other words, members of this group performed on a par with L1 readers performing as L1 readers. These readers demonstrated skill in using
what knowledge they had to guess meanings of unknown items. Readers used knowledge of rhetorical relationships, for example, to guess—sometimes correctly—unknown vocabulary. One of the problems encountered by these readers, and also by the L2-L2 readers, was in the comprehension of colloquial and/or figurative language. These readers knew, for example, the literal meanings of "slow" and "belong," but did not understand their meanings as they were used in the passage. This problem may stem from two sources: (a) that most second language students learn vocabulary from textbooks and "textbook definitions" tend to include only literal meanings of words and (b) that knowledge of particular usages of a word or expression often depends on cultural experience. An interesting result brought forth by this group of readers is that the comprehension of a co-referential tie does not guarantee that an L2 reader will draw the same inferences concerning the antecedent that an L1 reader would. One reader who understood the "father" . . . "master" . . . "old man" anaphoric relationship still did not understand that the protagonist harbored negative feelings toward her father, an inference shared by virtually all of the L1-L1 readers. The overall performance of this group of readers, then, called to attention the overwhelming influence of cultural experience on reading comprehension.
Scores of L2-L2 readers ranged from 16 to 70 on overall comprehension and 16 to 29 on the co-referent selection task. A close examination of the most frequently occurring pronoun comprehension errors indicated a "missing link" in a subject's co-referential chain. Those "missing links" usually consisted of a misinterpreted descriptor. In the particular passage used in this study, the use of "the dog's master" and "the old man," both used to refer to the protagonist's father, created comprehension problems for L2 readers.

Readers who misunderstood the link between "Eileen's father" and "the dog's master" also misunderstood the subsequent pronouns "both," "their," "their," "they," and "they," which were used to refer to "the dog's master" and "the dog." Therefore, they did not understand that the dog and master were being compared. Consequently, they were not aware of this subtly derogatory description of the father. Although only a minority of the L2-L2 subjects (40%) misunderstood this cluster, 88% of those who misunderstood it also misunderstood the pronoun cluster in the second paragraph, indicating that these readers were lacking information for the successful interpretation of the second pronoun cluster.

A pronoun chain misunderstood by 85% of the L2-L2 readers was the "both," "they," "they" series in the
second paragraph. Errors in this chain pointed to a misunderstanding of the description, "the old man."
Whereas L1 readers understood the expression as the author had intended (as a familiar and possibly disdainful way to refer to one's father), many L2 readers interpreted the expression literally as "the man who is old" and, as a result, were forced to create an additional character in their discourse models.

The "pronoun cluster" errors described above indicate that a misunderstanding of co-referential ties is a manifestation of a misinterpretation of antecedents. In other words, readers who misunderstand what pronouns refer to have misunderstood the descriptive expressions to which the pronouns refer.

A third problematic co-referential tie for L2 readers was the pronoun "they" in the sentence:

The dog wanted so badly to tear flesh with his jaws that Eileen stared at his flat, brutal skull and thought clearly that it would be better if this dog died so that they could have some peace.

This pronoun was particularly dependent upon inferential reasoning in that the selection of an appropriate antecedent had to be made from outside the text. In other words, anaphoric resolution depended upon an awareness of
topic. Because the protagonist had expressed negative feelings toward the dog and her father, the selection of "Eileen and her family," "Eileen and her mother," and "Eileen and Marcey" were judged as acceptable responses. The selection of such antecedents as "Eileen and the dog," "Eileen and the squirrel," and "the squirrels" were judged as unacceptable responses. L2 readers who selected the latter type of antecedent may have done so because (a) L2 readers are traditionally taught to expect a pronoun's antecedent to be the nearest preceding noun phrase, and (b) the choice of the nearest preceding noun phrase is most likely to be correct if one does not understand the passage.

Prince (1981) classifies discourse entities into three general categories: new, evoked, and inferrable. She refers to the "inferrable" category as the "most complex" (p. 236) type of the three. It is therefore not surprising that the majority of the L2-L2 readers misunderstood this pronoun.

Bosch points out that "we could hardly say any less or presuppose any less about something in referring to it than in the case where we use a pronoun" (p. 203). He goes on to say:

The intended referent for an anaphoric pronoun thus must already be the most salient object in
the domain of discourse at the moment of the utterance, more salient at least than any other object that could possibly be referred to by the same form. And the most salient object in any domain of discourse is the object the discourse is about at the relevant moment (Section 2.3.1, p. 203). Apparently, the L2 readers did not perceive the discourse to be "about" Eileen's family in this particular instance.

A comparison of L2 discourse models with the L1 prototype revealed that comprehension problems regarding co-referential chains are two-pronged. First, L2 readers encounter difficulties when they are unfamiliar with the descriptive expression used as the antecedent of a co-referential pronoun. Second, lack of comprehension of these expressions may be indicative of a lack of cultural knowledge. In this particular case, L2 readers who misunderstood the usage of "the old man" may have also misunderstood that it is permissible in United States culture to harbor negative feelings toward one's father. Results from this study indicate, then, that comprehension problems with respect to co-referential chains may stem from (a) lack of familiarity with a descriptor or (b) lack of knowledge of the cultural concept that a particular descriptor conveys.
Finally, it is important to emphasize that comprehension decisions such as co-referential tie resolution are not made in a vacuum. Bernhardt comments that "Decisions interact with decisions, leading to reconstructions consistent with previous reconstructions which are not necessarily in concord with actual intentions in the text" (1985, p. 14). An examination of L1-L1 readers' performances demonstrates clearly that knowledge of rhetorical relationships, vocabulary, and background knowledge interact to aid the reader in constructing a discourse model similar to that of the author. Whereas an L1 reader may rely on the interaction of all of these components, an L2 reader may have access to only one or two of them at a particular time. The success or failure of resolving anaphoric relationships, then, depends to a great extent on the successful interaction of all of these components of the reading process.

**Recommendations for further research:**

Subjects in this study were grouped according to proficiency level and anaphoric system alone. Because results of the study indicated that cultural knowledge played an important role with respect to comprehension of the passage, it might prove fruitful to divide subjects along cultural as well as anaphoric system bounds for
subsequent studies. For example, in this study native readers of Spanish and Arabic were included in the same language group. Results from the interviews suggested that readers of Spanish-speaking background possessed more cultural knowledge of the United States than did those of Arabic background. A subsequent study in which subjects were divided according to L1 anaphoric system and cultural background might provide insight into interaction of the two factors.

An especially interesting result obtained from this study, however, is that comprehension gaps occur in the mid-level ("definite description," and "epithet") designators on the Lakoff-Cole scale. It seems that an author's use of such descriptors, while felicitous for L1 readers, can prove to be "stumbling blocks" for readers unfamiliar with the culture. Therefore, subsequent research should investigate two major areas: (a) to refine further the classification of different types of descriptive expressions as they are used in discourse and (b) to examine further L2 readers' comprehension of mid-level descriptors.

Bosch has distinguished between "context model" (CM) and "background knowledge" (BK) discourse entities. CMs are described as those entities that are interpretable from previous discourse; BK entities are described as
those that are interpretable through "universal knowledge." It is suspected that there are very few entities that are "known" universally, i.e., "known" cross-culturally. This classification system, then, is too simplistic for L2 reading research needs.

Prince's assumed familiarity taxonomy is more complex than Bosch's system and takes into account cultural assumptions. Prince herself states that the model needs to be refined in order to include the more abstract, complex categories contained in written text. That the system did not accommodate the stereotyped compound found in the present study indicates that developments in pragmatics theory and findings from discourse comprehension research may be mutually helpful.

Further research in L2 reading comprehension should include an examination of L2 readers' comprehension of anaphoric relationships, especially focusing on mid-level descriptors, in natural text. An examination of L1 readers' performance should be included in these studies so that comparisons can be made between the interpretations of descriptors by each group. The effects of pre-reading instruction of descriptors and the cultural information that they convey should also be examined. Of course, ideal conditions for such studies would include large numbers of subjects.
The overall comprehension instrument used in the present study adequately measured literal comprehension of the passage. This instrument, however, does not purport to measure inferences, nor does it discriminate between the literal and figurative interpretation of a word or phrase. The term, "slow," for example, was scored as present for all readers who recalled it, whether it was interpreted literally or as "mentally slow."

Interestingly, many L2 readers understood that "slow" was being used in a figurative sense, and many deduced that it must mean "calm" or "quiet." Those readers who misunderstood "slow" as it was used in the passage also misunderstood the irony of Marcey's being "good because she was slow." Therefore, these readers also misunderstood that clue to Marcey's character and, consequently, to the relationship among Marcey, Eileen, and their father.

Because inference and comprehension of figurative language seem to be even more crucial to comprehension of literature than to comprehension of other types of prose, their measurement should be incorporated into the scoring instruments of subsequent studies. Scoring instruments could be constructed by interviewing L1 readers prior to the main study and building their common inferences into the recall protocol template.
Implications for pedagogy:

Results of this study point to a precept that has been brought forth time and again in similar studies: that pre-reading instruction stressing familiarity with discourse content is an invaluable aid to L2 readers. Results from this study suggest that instructors should search out possible misinterpretation problems regarding different types of concept designators, particularly figurative and colloquial expressions. Pre-reading discussion could begin, when possible, with discussion of "universally known" concept designators (e.g., "her father), and proceed to "culturally known" (e.g., "the old man") expressions and their connotations. These discussions should be supplemented with pertinent materials—such as short newspaper and magazine features, advertisements, and cartoons—that convey the cultural values, and, if relevant, the humor and/or irony associated with that concept.

The author’s breach of at least two pronoun “rules” in the passage—that she began the passage with a pronoun and that she used a pronoun to refer to an inferred entity rather than to a preceding noun phrase—indicates that L2 readers should be taught the usage of pronouns in discourse. Readers should also be taught that confusion
in interpreting a pronoun may be indicative of a misunderstanding of another entity in the passage.

**Limitations of the studies:**

Subjects used were volunteers. Therefore, the results cannot be extended to other populations.

Sample sizes were small. Perhaps, if they had been larger, differences between proficiency levels and L1 anaphoric systems would have been detected.

Finally, writing the antecedent of a co-referential pronoun above the pronoun is an artificial task and therefore may not be a totally accurate assessment of the reader's comprehension of the co-referential ties during the reading process itself.
REFERENCES


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Richek, M. Reading comprehension of anaphoric forms in varying linguistic contexts. Reading Research Quarterly, 1976-77. 12, 145-165.


APPENDIX
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Course________
Instructor________________

PARTICIPANT INFORMATION

Dissertation research
Marjorie C. Demel
Summer, 1986

Please print clearly.

Name____________________________________________________

Local address_____________________________________________________________________

Phone______________________________________________________________________________

Convenient time to call______________________________________________

Please suggest some convenient times for your interview:

Mon.____ Tues.____ Wed.____ Thurs.____ Fri.____

Native country______________________________________________

Native language____________________________________________

Age at which you began learning English__________

Other languages spoken ____________________ (Age_____)

_________________ (Age_____)

_________________ (Age_____)

1
PARTICIPANT INFORMATION

Dissertation research
Marjorie C. Demel
Summer, 1986

Please print clearly.

Name ____________________________________________

Local address ____________________________________________

Phone _________________________

Convenient time to call _____________________________

Permanent address ________________________________________

Do you speak any languages other than English? _____

If so, at what age did you learn your second language? _____

Please suggest some convenient times for your interview:

Mon.____  Tues.____  Wed.____  Thurs.____  Fri.____
PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

P. 60 Demons

P. 150-153 Demons

University Microfilms International
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descriptions of actions and thoughts

Description of actions

CAME OUT SIDE DOOR, TOOK SIDEWALK

agent

SHE (EILEEN)

range

STREET
description: manner

TUGGING AT LEASH

agent

DOG

description: attribution

VAIN

PARTLY BALD

Problem/solution: problem

JERKED HER HAND

agent

GRIP
description: attribution

LEATHER
description: attribution

WORN

Problem/solution: solution

SAID "STOP THAT!" ETC.
description: manner

HUSHED

EMBARRASED
description: manner

HOLDING BACK ON LEASH

Causation: covariance, consequent

PANTED

YIPPED
description: attribution

FALSETTO
description: attribution

HIGH WOMANISH

Causation: covariance, antecedent

THERE WAS SQUIRREL

range

NEARBY

Causation: covariance, antecedent

WANTED TO TEAR FLESH
description: manner

SO BADLY

WITH JAWS

Causation: covariance, consequent

STARED AT SKULL

agent

EILEEN
description: attribution

FLAT

BRUTAL
Description of thoughts

THOUGHT
agent

EILERN

Comparison: alternative

NOT ANIMAL

patient

DOG

Comparison: alternative

EXTENSION OF FATHER

description: attribution

WHOSE DOG HE WAS (BELONGED TO FATHER)

description: representative identification INDEED

RESEMBLED FATHER

patient

DOG

Collection

HAD SKIN

patient

BOTH

description: attribution

VAGUE MOTTLED

BROWN AND LIVERISH

description: attribution

AS IF CAMOUFLAGED

HAD EYES

description: attribution

WATERY WITH ALERTNESS

(HAD) EARS

Comparison: adversative THOUGH

DIFFERENT

description: attribution

SHAPES

COLORS

Comparison: alternative

(HAD) IN COMMON

patient

INTENSITY

description: attribution

UNCLEAR

INTANGIBLE

HEARD EVERYTHING

description: representative identification

WHISPERS NOT MEANT FOR THEIR EARS

WORDS NOT SPOKEN

ECHOES OF WORDS

description: attribution

SHOULD HAVE FADED AWAY

Causation: covariance, antecedent

BETTER IF DOG DIED

Causation: covariance, consequent

COULD HAVE PARCH

Comparison: analogy

BELONGED IN HOUSE
DOG

Comparison: analogy THE WAY
BELONGED IN HOUSE
patient
MARCEY
description: equivalent
EILEEN'S SISTER

Causation: covariance, antecedent
WERE POSSESSIONS OF OLD MAN

Causation: covariance, consequent
COULD GET AWAY WITH ANYTHING

Causation: alternative
NEVER DID ANYTHING AT ALL

Causation: covariance, antecedent
WAS INVALID

Causation: alternative OR
CLAIMED TO BE INVALID

Comparison: covariance, antecedent
HAD NOTHING TO DO WITH

patient

DOG

description: attribution
NOT ALLOWED ABOVE LANDING
NOT ALLOWED IN PARLOR
ETC., ETC.
description: equivalent
WERE RULES OF HOUSE
description: equivalent
HAD GROWN UP WITH
HAD SUPPOSED TO BE LAWS OF CITY ITSELF

ENCUMBERED WITH

patient

EACH HOUSE
description: setting location

EACH STREET
description: attribution

DOGS
description: attribution
BALDING
VICIOUS

FATHERS
MOTHERS
SISTERS

Comparison: adversative

Causation: covariance, consequent
ONE GOOD

Causation: covariance, antecedent
ONE SLOW

Comparison: adversative

Causation: covariance, consequent
ONE QUESTIONABLE

Causation: covariance, antecedent
NOT SLOW
TWO TRANSLATIONS OF A SPANISH RECALL PROTOCOL

Translation I

The passage entitled "Demons" narrates the story of a town or city where homes were formed by fathers, mothers, brothers and sisters, and dogs, and a person considered "slow." The main character "Eileen" comes face-to-face with a surprising and unknown situation where she discovers that strange animals came to be extensions of people, that in turn came to be extensions of a Master. Specifically she confronts the case of her father who in the form of an animal with colored ears and alert eyes was pestering her. She was very surprised because she didn't imagine that that animal would be the extension of her father.

But there was no solution to the situation because nothing could be done. The animals lived in her sister's house, and they were accustomed to her except that the mother was an invalid.

But what was notable about the story is that although all the homes had fathers, mothers, sisters, animals and a "slow" person, in the case of Eileen, she was not "slow."

Translation II

The reading entitled "Demons" narrates the story of a town or city where the homes were constituted by fathers, mothers, sisters and dogs, and a person considered "slow." The main character "Eileen" confronts a surprising and unknown situation where (by which) she discovers that strange animals came to be extension of persons, that at the same time were extensions of a master. Specifically she confronts her father's case who in the form of an animal with colorful ears and alert eyes was besieging her. She was very surprised because she was not expecting that that animal was going to be the extension of her father.

But the situation had no remedy for nothing could be done. The animals lived in the sister's home and they were accustomed to them aside (from the fact) that the mother was incapacitated.

But what is remarkable about the story is that even though all the homes had fathers, mothers, sisters, animals and a "slow" person, in Eileen's case, she was not "slow."