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A Description of the Meaning-Making Strategies Reported by Proficient Readers and Writers.

Sarah H. Martin

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A description of the meaning-making strategies reported by proficient readers and writers

Martin, Sarah H., Ph.D.
The Louisiana State University and Agricultural and Mechanical Col., 1987
A DESCRIPTION OF THE MEANING-MAKING STRATEGIES REPORTED BY PROFICIENT READERS AND WRITERS

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Curriculum and Instruction

by

Sarah H. Martin
Ph.D., The University of Georgia, 1979
M.Ed., The University of Georgia, 1982
May 1987
ACKNOWLEDGEMENTS

It is impossible to adequately acknowledge all of the assistance and support that has been given to me during my work on this dissertation; however, it is essential that I try to show how much I appreciate that support. The impetus for my doctoral work began at the University of Georgia in a seminar taught by Dr. John Readence and Dr. Dan Kirby. I am grateful to them for providing such an opportunity. The initial work on this study continued at Louisiana State University under the guidance of several friendly and helpful faculty members: Dr. David England, Dr. Sarah Liggett, Dr. Lea McGee, Dr. Richard Lomax, and the continued support of Dr. John Readence. Each has taught me valuable lessons and given me opportunities to grow toward my own goals. Thank you all. For Dr. Readence, who has seen me all the way through from student teaching to Ph.D., I give special thanks, for sharing your knowledge and for sharing your invaluable friendship.

In addition to the faculty support, any graduate student knows the program could not be completed without the support of fellow graduate students. This list of colleagues are too numerous to mention, extending from Georgia, and Louisiana to my new home in Michigan. Although I cannot list you all by name, none is forgotten. Thank you all for your friendship.
I would also like to thank the Ypsilanti Public School System and Ypsilant High School for all of the assistance provided me during my data collection. Thanks go to the principle, the teachers, and the students who participated.

Finally, special thanks go to my family, the Hanveys, who supported me with emotional and financial support through more years of schooling than they could believe. Adding Martins to the Hanveys extended this circle of support, and my appreciation and love goes to the Martins who made me feel at home in Louisiana.

It is to two members of the Martin family that I would like to dedicate this dissertation. The first is Dr. Charles E. Martin, Sr., who treated me like a daughter and helped me through the first semesters of school at LSU. He made education important to his children and his students. This legacy he left to his son, my husband, Dr. Michael A. Martin whose love and support have made attaining this goal possible. To Michael and his father I dedicate this dissertation.
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iv
The purpose of this study was to develop a description of the cognitive strategies reported by proficient readers and writers as they completed a variety of reading and writing tasks. Seven above-average, twelfth-grade students were selected as subjects from teacher recommendations and standardized test scores. Each subject was involved in five data collection sessions: (a) a writing assessment/think aloud practice session, (b) writing a reflexive task, (c) writing an extensive task, (d) reading a concrete text, and (e) reading an abstract text. All sessions were held with subjects individually. The data collection techniques included: (a) recording the thoughts subjects reported as they completed the tasks, (b) cued retrospective reports, and (c) researcher observation notes. From this data eight categories of strategies were identified: (a) monitoring, (b) phrasing content, (c) using content prior knowledge, (d) using text form knowledge, (e) rereading, (f) questioning, (g) inferencing, and (h) making connections to author/audience. Frequency counts of the occurrences indicated that the subjects used the strategies of monitoring, rereading, and phrasing
content most frequently during their meaning making. The use of these strategies differed by tasks more for reading than for writing. Strategy use for the reading differed most for phrasing content, monitoring, rereading, using content knowledge, and inferencing. Strategy use for writing differed less with noticeable differences occurring for using text form knowledge and questioning.
CHAPTER ONE
INTRODUCTION

Language researchers have been working amidst a shifting paradigm (Hairston, 1982). Emphasis on the close examination of language products has moved toward inquiry into language processes. Many studies of writers composing have been conducted (e.g., Emlg., 1971; Hayes & Flower, 1980; Matsuhashi, 1981; Perl, 1979), as have studies investigating comprehension processes (e.g., Bransford & Johnson 1972; Brown, 1980; Goodman, 1985; Kintsch & van Dijk, 1978; Rumelhart, 1980). However, most of these investigations have focused on the processes of a particular language skill, reading or writing, in isolation. For language researchers to develop a well-rounded theory of how language users interact with text, these separate investigations of reading and writing must be followed by joint investigations of the two language skills as related processes.

Much current theory in both comprehension and composition describes these processes in similar terms. Specifically, both are seen as constructive processes in which the language user completes transactions between knowledge concepts and text (e.g., Hayes &
Flower, 1980; Rumelhart, 1980). Rather than studying reading and writing with this theory as a guiding principle, researchers have depended upon measures of specified skills related to each of these processes and correlated them to show relationships (Stotsky, 1983). The problem with this type of research is that it only indirectly measures constructs of reading and writing processes. For example, to what extent can a relationship between phonics skills and spelling skills, such as that found by Shanahan (1984), describe the essential language processes of reading and writing? Research is needed which will go beyond skill measures to describe deeper levels of meaning processing.

Review of Related Literature

This section discusses current research pertinent to the present study. See Appendix A for definitions of some terms important to the this study. A more complete review of the literature may be found in Appendix B.

In considering the comprehension processes involved in reading, Spiro (1980) has stated that meaning does not exist in words by themselves; rather, words are simply a framework on which meaning is constructed in accordance with the reader's understanding of the world. This view is corroborated
by the earlier work of Rosenblatt (1938/76) who described literary response in terms of responses to cues and development of tentative frameworks which might undergo revisions on further reading.

These theories have at their foundation the concepts of schema theory (Rumelhart, 1980). In this theory the long-term memory consists of frameworks of knowledge. These frameworks are constructed through experience; therefore, for new learning to occur, the relevant framework, or schema, must be called into the conscious consideration of the learner. Learning new information, then, requires that these schemata (prior knowledge) be called forth so that the necessary additions and reorganizations may occur (Bransford & Johnson, 1972). Research has found, furthermore, that the compatibility of existent knowledge in these schemata with information in texts affects how readers interact with text, and shapes the information that is learned (Alvermann, Smith, & Readence, 1985). Therefore, these and other comprehension researchers have concluded that the sterile meaning which might be said to reside in the text is not necessarily the meaning which is made by the reader.

Another pertinent area of reading research involves metacognition. Of special interest are those investigations involving the self-regulatory mechanisms
used by active learners during problem solving. Brown (1980) stated that these self-regulatory strategies were unstable in that while they were used more often by adults, they were also used by children on some occasions, and at times were not used by either adults or children. These processes included: (a) checking problem solutions; (b) planning the next move; (c) monitoring the effectiveness of an action; and (d) testing, revising, and evaluating strategies for learning. They came into play when learners were actively involved in understanding a difficult task. The present study investigates these strategies with regard to readers' and writers' attempts to make meaning during either comprehending or composing.

Researchers have also characterized the composing processes involved in writing. They have moved forward from the dimensions described by Emig (1971) in her observations of high school senior writers to more specific descriptions of composing processes (Flower & Hayes, 1981a; Matushashi, 1981; Peri, 1979; Scardamalia & Berieter, 1982). These processes are complex and situation-dependent. Writers use a variety of intricate processes which are not easily studied. The recursiveness and idiosyncracy of writing make composing difficult for researchers to characterize.
Therefore, generalizations about composing processes must be informed by descriptions of specific writers reacting to specified tasks.

With the proliferation of research investigating composing processes, writing, too, has come to be seen as meaning construction rather than simple meaning representation. The concept of discovery in writing has been described by several writing researchers (e.g., Hairston, 1982; Murray, 1980; Perl, 1979). Britton, Burgess, Martin, McLeod, & Rosen, (1975) posited that the shaping of ideas into words occurs "at the point of utterance" (p. 26). The traditional notion that writing is simply organizing preexisting ideas is no longer a valid one to writing researchers who have themselves experienced the appearance of new ideas as their composing progressed.

Because reading and writing researchers now seem to be taking similar paths, much interest has recently developed in investigating how these two language processes are related. Stotsky (1983), in her synthesis and review of the correlational and experimental studies of reading and writing, found that: (a) better writers tend to be better readers and tend to read more than poorer writers, (b) better readers tend to produce more syntactically mature writing than poorer readers, (c) instruction primarily
Intended to improve writing does not have a significant effect on reading improvement, (d) writing activities used specifically to improve reading comprehension do cause gains in reading comprehension, and (e) reading activities and literary models used in place of grammar drills or more writing practice significantly improve writing. Stotsky concluded her review with a call for descriptive case studies designed to further investigate the relationships between reading and writing.

Recently several case studies of readers and writers have been conducted. Birnbaum’s (1982) case study involved four fourth-grade and four seventh-grade subjects who were recommended as proficient readers and writers by their teachers. Each subject was videotaped reading realistic fiction, fantasy fiction, factual exposition, and writing expressive, poetic, and transactional prose. Further data were collected in audiotaped sessions in which the subjects’ oral reading was judged for miscues and in writing sessions in which the subjects composed aloud. A third source of data resulted from classroom observations of subjects and teacher and parent interviews. Her study found that good readers approached writing and reading actively with intent to construct meaning.
A second study which illustrated qualitative investigation of reading and writing was conducted by Kirby (1986). Her case studies involved five high risk, or basic-level, college freshmen for the purpose of describing what processes these students used to construct meaning. Each subject was videotaped in four sessions which involved reading and writing activities and retrospective interviews on the processes they used during these activities. In the first session subjects read realistic fiction about a childhood memory and wrote a summary. The second session involved subjects reading a factual text on the family, writing a summary of the text, followed by an introspective interview on their reading background and attitudes. In the third session the subjects wrote expressively about a childhood memory, reread it for revision, and read it aloud for miscue analysis. The fourth session involved subjects writing a transactional piece on family social structure, rereading for revision, and reading aloud for miscue analysis, followed by an introspective interview on their writing background and attitudes. Kirby found that personal experience and interest were very important to meaning construction and that externalization of meaning helped these students to monitor their meaning construction.
In a recent study by Langer (1986), reports of reading and writing processes reported in think-aloud and retrospective report procedures were analyzed for the purpose of comparing meaning construction in the two processes. Langer collected protocols of third-, sixth-, and ninth-grade students reading and writing reports and narratives. She concluded that reading and writing required the use of similar processes for meaning construction, but that patterns of meaning-making strategies differed across the two processes.

In conjunction with these qualitative studies, the theoretical work of Shanklin (1981) offered a theory of composing and comprehending developed through a clear understanding of reading and writing as transactions through which readers and writers develop meaning. Her theory included six major points which state that reading and writing: (a) are constructive -- the meaning is not solely in the text, but in the interaction of reader and text; (b) involve an understanding of text construction which guides choices; (c) involve transactions -- ideas develop and change through the process; (d) are dynamic, providing feedback to the reader/writer; (e) are developmental; and (f) involve errors, or missed transactions, at all levels of development.
The study of cognitive processes, such as comprehension and composition, is difficult at best. Much of this type of research is based upon data which include large amounts of inferencing by either the subject or the researcher. One data collection technique which allows the gathering of data on cognitive processing without an excessive amount of researcher or subject inferencing is the think-aloud procedure. The use of think-aloud protocols is described by Newell and Simon (1972) who first used the technique in problem-solving research. In later work, Ericsson and Simon (1980) argued that thinking aloud while completing cognitive tasks does not substantially alter the process in any regard except that it increases the time needed for task completion. Flower and Hayes (1980, 1981a, 1981b) have conducted numerous studies using think-alouds in their development of a model of writing. Furthermore, other researchers (Berkenkotter, 1983; Langer, 1986; Newell, 1984; Olshavsky, 1976-77; Waern, 1979) have also employed this technique in their investigations of reading or writing processes. Because of the unique, rich information that this technique provides the researcher, it is the method of data collection employed in this study.
Need for the Study

Building on schema theory, reading researchers have described the processes of comprehension as involving construction rather than reception of text (Rumelhart, 1980; Spiro, 1980). To comprehend effectively, readers must actively combine what they already know with what is newly presented in a text. According to studies investigating the effects of existing knowledge on comprehension, it has been found that this prior knowledge is useless unless the reader is aware of it (Bransford & Johnson, 1972), and that prior knowledge can hinder readers' comprehension if it is inconsistent with the text (Alvermann, Smith, & Readence, 1985). Awareness of these inconsistencies between prior knowledge and text is one type of metacognitive ability which has been investigated by Brown (1980), who has conducted various research studies on how well readers monitor their successes and failures in comprehending.

Similarly, researchers involved in describing composing processes have built models representing composing in like manner. Hayes and Flower's (1980) description of composing plans includes procedures which may be based upon "ad hoc plans people use to guide themselves through the process of writing"
Some of these plans may be "limited" and "stereotypic" (p. 45). On the other hand Murray (1980) discusses discovery in writing and how writers do not and need not necessarily know what they will write before it appears on the page. The seeming contradiction here might be explained by a clearer description of the multitude of processes that the mind must be involved in during composing. Flower and Hayes (1980) have suggested a variety of planning procedures and monitoring capabilities which can help writers alternate between effective and ineffective procedures.

The similarities between comprehending and composing processes seem fairly obvious when one surveys the theoretical and empirical literature of the two disciplines. The proof, however, can only be obtained through direct, simultaneous investigation. Investigations such as those conducted by Birnbaum (1982), and Kirby (1986) favored a constructive description of both processes. Similar work by Langer (1986), while supporting the theory that comprehension and composition involve similar processes for meaning construction, also suggested that they have important differences.

Based upon the foundations provided in comprehension processing research and that of composition processing, it would seem that both of
these complicated cognitive processes involve activities for constructing meaning with text. Further investigation is necessary before the exact nature of this meaning construction may be determined.

Investigation based upon direct observations of a variety of subjects reading and writing in a variety of situations is needed. The present study addresses this need by investigating the meaning making processes reported by proficient readers/writers as they read concrete and abstract text and write reflexive and extensive essays. The following questions guide this study:

1. What strategies common to both reading and writing are reported by proficient high school seniors as they complete specific expository reading and writing tasks?

2. To what extent can these common strategies provide a description of meaning construction?

3. How do these reported strategies differ across reflexive and extensive writing tasks and abstract and concrete reading tasks?
CHAPTER TWO

METHOD

This chapter describes the subjects involved in the study, the materials employed, and the procedures used for data collection and analysis.

Subjects

The subjects for this study were seven high school seniors attending school in the upper Midwest. Subject selection began with recommendations obtained by the researcher from teachers in the high school who taught the upper level senior classes. These teachers recommended the seniors they considered to be articulate and proficient readers and writers. Parental permission for access to students' files was obtained for the students recommended (see Appendix C for letter), and California Achievement Test Reading national curve equivalent scores were obtained. Scores are presented in Table 1.

Insert Table 1 about here

Those students whose scores were above the national average on the California Achievement Test were then contacted and asked for their cooperation.
Table 1

Demographic Data on Subjects

<table>
<thead>
<tr>
<th>Participant</th>
<th>Reading Vocabulary</th>
<th>Reading Comprehension</th>
<th>Reading Total</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary</td>
<td>63</td>
<td>64</td>
<td>64</td>
<td>F</td>
</tr>
<tr>
<td>Becky</td>
<td>70</td>
<td>66</td>
<td>72</td>
<td>F</td>
</tr>
<tr>
<td>Bill</td>
<td>79</td>
<td>78</td>
<td>80</td>
<td>M</td>
</tr>
<tr>
<td>Cindy</td>
<td>74</td>
<td>97</td>
<td>87</td>
<td>F</td>
</tr>
<tr>
<td>Peter</td>
<td>70</td>
<td>83</td>
<td>77</td>
<td>M</td>
</tr>
<tr>
<td>Mark</td>
<td>86</td>
<td>97</td>
<td>97</td>
<td>M</td>
</tr>
<tr>
<td>Val</td>
<td>86</td>
<td>99</td>
<td>99</td>
<td>F</td>
</tr>
</tbody>
</table>
The study was described and the extent of time for which they would be needed was explained to subjects in individual interviews. Those who were enthusiastic and seemed capable of articulating their thoughts while reading and writing were scheduled for the data collection. Seven students, 4 females and 3 males, became the subjects for this study. All of the subjects were white, and all intended to go to college.

Materials

A pilot study was conducted to develop original materials and instruments employed in the study. Appendix D describes this pilot study.

Selection of Tasks. Both the reading and writing tasks were designed to represent differences along a continuum of abstraction described by Moffett (1968) which leads from individual understanding -- the "I-it" relation -- to relations with the world -- the "I-you" relation. To keep the level of abstraction as the important difference between tasks, one topic on which the subjects would have general but not specific prior knowledge, television, was selected for both the reading and writing tasks. Some prior knowledge was necessary to complete the tasks, but because the use of prior knowledge was not specifically in question in this study, it was not necessary to assess each subject's specific prior knowledge on the subject.
**Reading.** To parallel the research by Olshavsky (1976-77) and to provide reading tasks of varying difficulty, Carroll's (1960) factors of abstract and concrete style were used. An abstract style is "subtle, profound, and complex with deliberate use of obscure words and long, periodic sentences" (Olshavsky, p. 659). (A periodic sentence begins with subordinating phrases and clauses which build up to the main clause which is placed at the end of the sentence.) A concrete style is a "straight-forward, simple means of expressing an idea with short sentences and familiar words....similar to journalistic writing" (Olshavsky, p. 659). The abstract passage was intended to produce processing strategies less involved with interpersonal relationships and more concerned with comprehension of abstract ideas. The concrete passage was intended to call up some of the subjects' own familiar experiences and similar experiences of others.

Three judges rated four possible passages as concrete or abstract with these descriptions as guidelines. (See Appendix E for Passage Rating Sheet.) Using these ratings, two passages were selected for inclusion in the study. "The Phantom World of TV" (Anders, 1977) was judged to be abstract, and "A Changed State of Consciousness" (Winn, 1977) was judged to be concrete. The passages chosen for the reading
tasks were under 1200 words and were of twelfth-grade readability according to the Raygor Readability Estimate (Raygor, 1977).

A third passage, "The Rise of Multiversities" (Toby, 1971) was chosen as the practice reading passage because it was similar to the two passages chosen. It was used in introducing the subjects to the think-aloud procedure. Copies of these passages may be found in Appendix F.

Writing. To coincide generally with the reading tasks, the writing tasks were judged as eliciting the reflexive and extensive composing modes as described by Emig (1971). According to Emig, the mode labelled reflexive is "a basically contemplative role: 'What does this experience mean?'"; the extensive, a basically active role: 'How, because of this experience, do I interact with my environment?'" (p. 37).

Construction of the writing tasks was partially patterned after assignments published by Faigley, Cherry, Joilliffee, and Skiller (1985) because these tasks have been shown to be effective assignments. The initial assessment writing assignment was one developed by them and was used exactly as directed. However, to stay within the chosen topic, new writing assignments had to be constructed for the reflexive and extensive writing tasks. The constructing-a-hypothesis
assignments developed by Falgley et al. were used as guides for constructing these assignments because they demand that the writer combine the information given with prior knowledge.

In order for the two modes of reflexive and extensive writing to be elicited, the audiences and purposes proposed by the assignments were different. Raters were given the assignment and correctly identified them as reflexive and extensive. The reflexive task asked for the writer to compose for his or her own understanding an explanation of the part that television watching might play in his or her life while the extensive task asked for the writer to explain for an audience why the amount of television watched per week varies by household income. A practice writing assignment similar in form to the other two assignments was developed to introduce the subjects to the think-aloud procedure. Copies of the assignments may be found in Appendix G.

Post Reading Assessment. Comprehension of material read was assessed through written free recalls and multiple-choice tests on each passage. For a copy of the written free recall task, see Appendix J.

The multiple-choice tests consisted of 10 questions, each with four possible answers. Questions were constructed to assess text explicit, text
implicit, and experience-based comprehension (Readence, Bean, & Baldwin, 1985). Construct and content validity and appropriateness of the questions for the target subjects were rated by three judges. A copy of the rating sheet may be found in Appendix K. Some questions were revised using the comments and ratings given by these judges. Finally, a fourth judge rated the revised tests as valid and appropriate. Copies of the tests may be found in Appendix L.

**Writing Quality Assessment.** Scoring rubrics for the original assignments were constructed through the use of essays obtained from 104 university-level students enrolled in summer classes of Freshman Composition. Students were randomly divided so that 52 essays on each assignment were collected. The four instructors involved were also asked to judge the assignments for content and construct validity. (See Appendix M for the rating sheet for validity of writing assignments.)

Using the scoring rubrics developed by Faigley et al. as a guide and the essays elicited from the Freshman Composition classes as examples, primary trait scoring rubrics were developed for both of the assignments. The primary traits used to judge both assignments were: (a) meeting the demands of the rhetorical situation, (b) hypothesizing a reason for
the changes in the data given, (c) providing specific details for the hypothesis given, and (d) providing explanation of details given. These scoring rubrics were judged to be useful in rating the essays by two expert judges. See Appendix N for Primary Trait Scoring Rubrics.

Procedure

All subjects were given the writing assessment task during the first session. The four think-aloud tasks—(a) reading abstract text, (b) reading concrete text, (c) reflexive writing, (d) extensive writing—were counterbalanced to eliminate task-order effects.

Data Collection. Data were collected by the researcher in individual sessions with each subject. Sessions took place during school hours in the school building. No session took longer than one and one-half hours. All data were collected during a three-week period. All sessions were audiotaped and transcripts of these tapes provided data for analysis. The researcher read directions to each subject and answered any questions about procedures as consistently as possible.

(1) Assessment/Practice Session. The subject was first told generally what the research was about. Then, the writing assessment task was given. Because
the purpose of this task was to provide a benchmark of
the subject's normal writing ability, the subject was
allowed to complete it without thinking aloud. When
the essay was completed, the subject was given
instructions and practice opportunities in thinking
aloud. The subject was allowed to ask questions about
procedures, but efforts were made to keep task
administration consistent across sessions and subjects.
Explanation of the technique was kept consistent
through the use of a script which may be found in
Appendix H. In order that directions to subjects for
each task were kept consistent over data collection
sessions, the directions were also written in script
form. See Appendix I for copies of think-aloud task
directions.

(2) Reading Abstract Text. The subject was read
the directions for reading while thinking aloud. The
subject was then given the abstract passage, "The
Phantom World of TV," and began reading and thinking
aloud. When the subject completed the reading to his
or her satisfaction, the written free recall task was
given, followed by the multiple-choice test. The
subject was not required to think aloud while
completing these assessment tasks. Upon completion of
both assessments, the subject was asked some questions
evoked by the researcher's observations of the reading processes.

(3) **Reading Concrete Text.** The subject was read the directions for reading while thinking aloud. The subject was then given the concrete passage, "A Changed State of Consciousness," and began reading and thinking aloud. When the subject completed the reading to his or her satisfaction, the written free recall task was given, followed by the multiple-choice test. The subject was not required to think aloud while completing these assessment tasks. Upon completion of both assessments, the subject was asked some questions evoked by the researcher's observations of the reading processes.

(4) **Reflexive Writing Session.** The researcher read aloud to the subject the directions for writing while thinking aloud. The directions included the first portion of the assignment stressing the reflexive nature of the task. Thinking aloud, the subject then completed the writing task. When the subject was finished to his or her satisfaction, the researcher asked some questions evoked by her observations of the subject's composing processes.

(5) **Extensive Writing Session.** The researcher read aloud to the subject the directions for writing while thinking aloud. The directions included the
first portion of the assignment stressing the extensive nature of the task. Thinking aloud, the subject then completed the writing task. When the subject was finished to his or her satisfaction, the researcher asked some questions evoked by her observations of the subject's composing processes.

Scoring. Multiple-choice tests were scored by the researcher and verified by a second rater. With 10 being a perfect score, subjects' test scores ranged from 4 to 9 on the abstract text and from 6 to 8 on the concrete text.

Written free recalls were scored according to the procedures described by Johnson (1970). Each text was parsed into pause acceptability units by 57 education students. The validity of a pausal unit was accepted when at least one-half of the students agreed on the unit. The division of "The Phantom World of TV" resulted in 114 units with an average length of 9.8 words per unit while the division of "A Changed State of Consciousness" resulted in 122 units with an average length of 9.8 words per unit.

A rating of the number of idea units present in each subject's free recall was determined first by the researcher and then by a second rater. Each idea listed on the written free recall sheet was counted as an idea unit. The idea units in each subject's free
recall were then matched with the pausal units in the text. The number of matches represented the score for that subject’s free recall. The interrater reliability for the number of idea units which matched units from the text was .99. Scores on the written recalls ranged from 7 to 23 for the concrete text and from 3 to 12 for the abstract text.

All compositions were scored using the scoring rubrics developed from, or found in, Faigley et al. (1985). Two trained judges blindly scored each composition; compositions were typed and unmarked in any way with regard to subject or task. Scores consisted of ratings from 1 to 4 on each of the four primary traits. These individual trait scores were summed across traits and judges to produce a possible score range of from 8 to 32. The actual scores ranged from 10 to 30. Reliability in this scoring was computed using the Pearson Product Moment correlation for each primary trait. The reliability coefficients are considered adequate and are presented in Table 2.

Data Preparation. All sessions with subjects were audio-taped and transcriptions were made. In
Table 2

Reliability Coefficients for Writing Sample Scores

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<thead>
<tr>
<th></th>
<th>Assessment</th>
<th>Reflexive</th>
<th>Extensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhetorical Demands</td>
<td>.93</td>
<td>.88</td>
<td>.91</td>
</tr>
<tr>
<td>Reason Given</td>
<td>.92</td>
<td>.72</td>
<td>1.00</td>
</tr>
<tr>
<td>Details Given</td>
<td>.88</td>
<td>.73</td>
<td>.79</td>
</tr>
<tr>
<td>Details Explained</td>
<td>.96</td>
<td>.88</td>
<td>.80</td>
</tr>
</tbody>
</table>
addition, the researcher's observations and subject interviews were typed and added to the transcriptions. For transcriptions of the reading sessions, the subjects' reported thoughts were matched with the appropriate clauses in the text to which they corresponded. For transcriptions of the writing sessions, text produced by the subjects was indicated by underlining. What resulted was a representation of data from three sources: (a) the subjects' reported thoughts, (b) the text, and (c) the researcher's observations and interviews. See Appendix 0 for sample pages of data.
The data were analyzed for two purposes. First, an attempt was made to assess the quality of the comprehending and composing. Multiple-choice tests and written free recalls assessed reading comprehension, and primary trait scoring assessed the written products. Secondly, the process data were analyzed to develop descriptions of strategies common to comprehending and composing, to develop a description of meaning making, and to compare the use of strategies across the different tasks.

Comprehension and Composition Quality

One concern with the think-aloud procedure was that it would interfere in the processing and confuse the descriptions developed. To get some notion of the effect that thinking aloud had on the subjects, comprehension and composition quality was assessed in a variety of ways. Some idea of the subjects' normal comprehension abilities was illustrated by their California Achievement Test (CAT) scores. Comprehension quality assessment during the think-aloud procedure was illustrated by two scores per subject per
task: the multiple-choice test score (MC) and the written free recall score (WFR).

While these scores can only generally indicate comprehension quality, it seems, from the WFR scores, that some interference may have occurred. The CAT scores show that all subjects' comprehension should be above average. However, only a small portion of the possible idea units were recalled. The MC score of 4 also seemingly supports that comprehension difficulties may have occurred for at least one subject. The scores are presented in Table 3.

Insert Table 3 about here

Composition quality assessment was conducted using equivalent tasks with and without thinking aloud. The initial writing assessment task products and the products of the reflexive and extensive think-aloud sessions were scored resulting in individual scores on each of four primary traits for each written product. Primary traits rated included: (a) meets rhetorical demands, (b) hypothesizes a reason, (c) provides specific grounds for reason, and (d) explains details. These individual trait scores were summed to provide a total score which could range from 8 to 32. While scores for Val and Peter show some consistent
Table 3

**Multiple Choice and Written Free Recall Scores**

<table>
<thead>
<tr>
<th>Subject</th>
<th>CAT Scores</th>
<th>Abstract</th>
<th>Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td>64</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Becky</td>
<td>72</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Cindy</td>
<td>87</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Bill</td>
<td>80</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Peter</td>
<td>77</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Mark</td>
<td>97</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Val</td>
<td>99</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

\[^a\text{Highest possible score} = 10. \ ^b\text{Total possible idea units} = 114. \ ^c\text{Total possible idea units} = 122\]
Interference, the other subjects' scores seem largely unaffected. Scores are presented in Table 4.

---

Insert Table 4 about here

---

**Process Analyses**

**Strategy descriptions.** The data analysis process combined the constant comparison method described by Glaser and Strauss (1967) which developed descriptions of strategies with an enumeration system which provided some quantitative results to describe meaning making and to make task comparisons. Based upon the protocol parsing methods described by Swarts, Flower, and Hayes (1984), the protocols were parsed into clauses. The total number of clauses produced was 3275.

The first question this study addressed concerned the reported strategies which were common to both reading and writing. Constant comparisons of the descriptions of subjects' reported behaviors, interviews, and observations resulted in the identification of eight categories of strategies: (a) monitoring, (b) phrasing content, (c) using content prior knowledge, (d) using text form knowledge, (e) rereading, (f) questioning, (g) inferencing, and (h) making connections to author/audience. (See Appendix P
Table 4

Composition Quality Scores

<table>
<thead>
<tr>
<th>Task</th>
<th>Assessment</th>
<th>Reflexive</th>
<th>Extensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary</td>
<td>13</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Becky</td>
<td>17</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Cindy</td>
<td>16</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Bill</td>
<td>16</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>Peter</td>
<td>30</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Mark</td>
<td>20</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Val</td>
<td>30</td>
<td>10</td>
<td>17</td>
</tr>
</tbody>
</table>

Note. Total score range = 8 - 32
for a discussion of the development and a summary of the categories.) Coding of the data by using the descriptions of these categories allowed for every clause to be coded. A second rater coded a sample of the protocols which consisted of representative samples from each subject involved in each task equaling a total of 20% of the total number of clauses. Percentages of agreement between raters was adequate, ranging from 70% to 100% for the categories. These differences in amount of agreement illustrate the differences in the amount of rater inferencing necessary to code the different strategies. Table 5 presents the percentages of agreement between the two raters coding for the strategy categories.

Insert Table 5 about here

The first category of strategies, monitoring, included strategies involving evaluation of processing, evaluation of comprehension/composition, and facilitation of processing. Subjects' reports frequently included their personal evaluation of how their processing was progressing and how well they were understanding what they read or expressing their thoughts in writing. Illustrating evaluations of processing, Bill's abstract reading included frequent
Table 5

Percentages of Agreement for Strategy Coding

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>89</td>
<td>92</td>
</tr>
<tr>
<td>Phrasing Content</td>
<td>85</td>
<td>78</td>
</tr>
<tr>
<td>Content Knowledge</td>
<td>71</td>
<td>85</td>
</tr>
<tr>
<td>Text Form</td>
<td>70</td>
<td>82</td>
</tr>
<tr>
<td>Rereading</td>
<td>91</td>
<td>98</td>
</tr>
<tr>
<td>Questioning</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Inferencing</td>
<td>71</td>
<td>76</td>
</tr>
<tr>
<td>Making Connections</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
stops to comment on his slow progress. "I start thinking that I'm reading this sentence over again, and Bill, you have to stop that. So I lose concentration." While writing, Mary reported, "Now I'm hoping I'm doing this right," and "I'll try to keep thinking about it all the time."

With regard to evaluation of comprehension and composition, Peter reported on the fifth clause of the abstract text, "This is kind of confusing what this is all about so far." While writing his reflexive piece, he reported, "I'll leave it. It's alright, not good, but alright." Sometimes this evaluation was reported as a simple "okay," "yea," or "I don't know." after a clause had been read or an idea had been stated.

Facilitation of processing included reported behaviors which moved the subjects through the tasks. While reading, the subjects made decisions regarding how to proceed. "I'll just read on." "...I'll have to read it slowly." In writing, these included planning strategies, "I need to say why." or "I want to say how much more." Facilitation of processing also included specific word recognition strategies and spelling strategies. These behaviors did not occur with enough frequency to merit a separate category, but they did illustrate that the subjects were aware of ways to remedy these decoding/encoding problems. The
strategies used included use of context and morphemic analysis to decode unfamiliar words, and sounding out and looking at different spellings. Each of these strategies was reported no more than three times.

During the interviews, subjects reported strategies such as looking away from the text while reading or writing to get their minds off of the task momentarily when they became aware that their processing was blocked. Peter said, "...when I get a block, and I don’t know where to go or what to say, ...then I look away and something will catch my eye." Behaviors observed while subjects were engaged in reading and writing included frequent nodding or shaking of the head and sighing or snickering. In addition, one subject mentioned trying to read on "hoping that the more I read, the better I’d be able to put it into context." Additionally, several subjects described decisions to review previous text for antecedents for pronouns. The researcher observed that each subject used a pen or finger at some time to point out text while reading and a phrase or word while writing.

The second category of strategies, phrasing content, included responses in which the subjects simply rephrased the text read or ideas which they had already decided to write. Frequently while reading,
some subjects simply restated the clauses as they went through the task. They made no major changes in the content of the clause but inserted simpler or more general vocabulary. To the clause "Such a view, however, would be mistaken," one response was, "Such as this, so this is not true." The subject used no major processing strategy outside of simply restating the clause to comply with the think-aloud requirement. In writing, this category included rehearsal of different ways to phrase an idea which had been previously activated. "The economic bracket, uh, um, the financial bracket of 10,000 to 14,999...." In addition, this category included statements of information from the task assignment. "If the income is between 10 and 19 thousand, people seem to have more time watching TV."

In the interviews, when asked about this behavior, subjects simply responded, "I just looked at the data." "I just read to, you know, get what it's talking about." "I took it in, I understood it." From observations subjects were nodding and simply piling up information as they read, and adjusting wording as they wrote.

The third category of strategies, using content prior knowledge, included the use of both general content knowledge that was not mentioned in the text or
in the writing assignment, and the use of personal experiences. While reading, subjects elaborated on information given by the text. When the text mentioned Hitler, for example, Bill responded, "fascist state." Val connected homeostasis, in the concrete text, to anatomy, and adverse developmental consequences to psychology. The use of general content prior knowledge was evident in writing as subjects looked for reasons for the data changes given in the assignments. Subjects generalized about working people, "they don't have as much leisure time to watch TV," or "they don't have homework to do." Bill created a scenario involving William Bennett and an invented increase in education spending.

The use of personal experiences was limited but was reported by all subjects. The concrete text produced many such responses to its clauses describing the recently awakened sleeper. Peter responded, "Sounds like me;" and Val reported, "Sounds like something I would say." Becky mentioned personal experiences with children's behaviors, "I know three and four-year-olds, and they're always saying, I'm tired, and I'm sick, and I'm happy." In addition, the abstract text produced opinions of the good of TV, "If we didn't have radio and TV, we wouldn't know most of what's going on;" and the use of commercials, "And on
TV and radio, commercials can be done, and that increases the ratings, and movies cannot have commercials." As might be expected from the design of the writing tasks, subjects frequently reported personal experiences during these sessions as well. Mark described his college plans, Becky her desires to remain unmarried, and Mark used knowledge of his uncle, the auto worker.

During the interviews, subjects often mentioned that their prior knowledge of the world was their main support for the hypothesis they developed in their writing. Cindy responded, "I was considering what a job of 20 and above would involve, as opposed to under 20, and they would probably spend a lot more time on that than the lesser paying jobs." For reading, they used their prior knowledge to judge the accuracy of the text. Mark responded, "Yea, thinking about it, when they talked about irritability, I notice it mostly in my little sister... it doesn't matter what's on, like they were saying in there, the content is unimportant."

The fourth category of strategies, using text form knowledge, included the use of subjects' knowledge of standards of style, form, and mechanics. While reading, subjects would mention the difficulty or lack of coherence of the texts. Val reported, "I'm thinking this is pretty, uh, high-level reading cause the, the
way it's set up. The vocabulary isn't really hard, but the sentence structure makes it hard to read." Becky reported, "First they talk about TV, then they talk about something else; now they're talking about TV, and they didn't link it in any way." While writing, subjects were frequently concerned with redundancy and whether their composition "sounded right." They would ask, "Have I used that word before?" or make comments such as, "that's really wordy." Bill reported setting the goal of sounding "witty."

With regard to form in reading, subjects used their knowledge of how text fit together to classify clauses and make decisions on processing. Subjects would report, "Now they're asking a question," or "It's an example." Mark classified statements as introductions to new ideas or conclusion statements. Each subject used this knowledge in his or her writing as well. Most mentioned needing "topic sentences," "conclusions," or "more reasons."

Subjects used their knowledge of text mechanics during reading and writing. Peter noticed the quotation marks in the concrete text which mark the example quotes of parents. Mark used his knowledge of colons to decide to read on rather than reread when clauses seemed incomplete. While writing, subjects
frequently made decisions regarding placement of commas, end marks, and correct spellings.

In the interviews subjects mentioned text form knowledge less than some of the other strategies, but they discussed the style of the pieces they had read and produced. Several subjects complained that the texts seemed disconnected. "It was like they were hopping around." "It was confusing in the middle because it wasn’t tied together." Mark first attributed this confusion to the clause divisions, but upon rereading, had the same difficulty. "I’d already read it, so I saw where they were going, but if I hadn’t read it, I wouldn’t see how movie theaters, production, television, mass people really related."

The fifth category of strategies, rereading, included acts and reports of rereading. Subjects sometimes simply read aloud previously read or written text, or they reported that they would reread. During both reading and writing this rereading occurred in isolation and also in the midst of other processes. A subject might be stating his or her understanding of a clause and suddenly decide to reread. "The next part just says that... um, I’ve got to reread it," reported Mark. While writing, subjects frequently went back to reread sentences or portions of sentences previously written. "Let’s see. Let me read this again. As women
get older..." reported Becky. The purpose of this strategy varied, but it was frequently used during reading and writing. Also included in this category are occasions when the subjects would reread the task assignment during composing.

In the interviews, subjects clarified their reasons for rereading such as "to make sure it was right," "to keep it smooth," "to see if I'd missed anything," "to see if I'd said the same thing twice," "to try to put what they're referring to in," and "to try to remember it." While observing, the researcher could not always detect when a subject reread; however, when she did see rereading, she noted it and included it in the analysis. On a few occasions subjects briefly skimmed either their work or the text just after they had announced that they were finished. The subjects were not aware of why they did this skimming when they were asked about it in the interviews.

The sixth category of strategies, questioning, was reported when subjects needed to move on in some way. During reading, subjects would ask questions when something in the text seemed unclear. "Haven't we been talking about crankiness and misbehavior?" asked Bill. "What happens in front of the radio and TV?" asked Cindy. While writing, subjects used questioning to generate options. "Okay, so what would the main reason
be?" asked Peter. "...But 10 more minutes than what?" asked Mark.

Interview data provided little clarification of how subjects used questioning. However, when asked how they developed the reason for their hypotheses, some subjects described a dialogue-type strategy in which they questioned and answered their way to a hypothesis. The use of this strategy was also observed. During both reading and writing subjects sometimes took their eyes away from their papers and asked and answered questions concerning the content with which they were working.

The seventh category of strategies, inferencing, included subjects generalizing from the data presented in the task assignment or in the text and subjects connecting information stated in various parts of the text. While reading, subjects would frequently generalize based upon the information they read. Bill reported, "So, I guess TV is bad for their disposition." "It says we don't need the, the going to the movies anymore," reported Cindy. While writing, subjects generalized about the data given. "See, the 12 to 17 probably that's the lowest because they have less time to spend watching TV; 18 to 34 are the working people; they can watch TV when they get home," reported Peter.
Inferencing by making connections within text while reading included subjects inserting more specific terms that had been explained before into places where the text was more general. Cindy reported, "They're talking of the people who are consuming." While this type of inferencing occurred less frequently during writing, an example can be found when Bill reported after writing that people with higher incomes were inspired to do more work at home, "which is reading, which means that they wanted to read, which I've classified as work."

In the interviews the subjects discussed their inferencing behavior by explaining that they found it necessary to insert a referent in the place of the pronouns. They claimed that this increased their understanding. With regard to generalizing, Bill said, "I guess I'm making conclusions, kind of inferring from the text, just making general assumptions about what they're talking about."

The eighth category of strategies, making connections with author/audience, included any reference made to a person on the other side of the written text. In reading, this could simply be the use of a personal pronoun in reference to the text rather than the more common "it." "Or, the sick trip, they call it." "And they're saying that people buy this."
On a few occasions, however, the reference was more pointed. "Doesn't sound like this author likes TV," reported Peter in response to the title, "The Phantom World of TV." In writing, subjects occasionally mentioned an audience. Cindy reported, "Just explain it to myself on paper." "I'm doing this to clarify for myself, okay," reported Peter. "Now I need to say what these activities are, because if I were reading this, I would wonder what the writer had meant by this statement," reported Mark.

This strategy was specifically discussed by the researcher with each subject after his or her task completion. With regard to reading, several subjects never considered the author at all while reading and others only considered a vague author with whom they disagreed. Many of the subjects mentioned a teacher, the researcher, or the writing judges as their audience, while others considered the audiences proposed by the task assignments.

These eight categories were developed to identify the common strategies these subjects reported while reading and writing. Because the intent was to describe similarities, categories of strategies represent the commonalities between the behaviors reported in reading and writing. Categories were
general enough to be applicable to both reading and writing and to allow for coding of all clauses.

Describing meaning making. The second question this study addressed concerned the extent to which descriptions of strategies common to reading and writing could describe meaning making. In combination with the descriptions of the strategies provided previously, a description of meaning making can be further developed by a count of the frequency with which the reported strategies occurred in the various tasks. In this study, frequencies consisted of the number of clauses within which a strategy occurred. A clause could be coded as illustrating more than one strategy. For example, the clause, "Now I'm gonna reread this," was coded as both rereading and monitoring.

The frequency counts indicated that monitoring, rereading, and phrasing content were the three strategies most often employed by the subjects in both reading and writing processes. However, while monitoring was the most frequently used strategy for writing, followed by phrasing content, those strategies were reversed in importance for reading. Following those three strategies, the order of importance is mixed across reading and writing. In reading, inferencing was the fourth most frequently used
strategy followed by using text form knowledge, making connections with author/audience, using content prior knowledge, and questioning. In writing, using text form knowledge was the fourth most frequently used strategy followed by using content prior knowledge, questioning, inferencing, and making connections with author/audience was eighth. Table 6 presents the frequencies and percentages of strategy use.

Insert Table 6 about here

Comparisons of Strategies by Task. The third area that this study investigated was the differences with which these strategies were reported by subjects across the different reading and writing tasks. The frequencies of strategy reports were tallied by task to address that purpose. These tallies illustrated that definite differences existed in processing between the different reading tasks but only slight differences existed between the writing tasks.

For the abstract reading task, the order of frequency was from the most frequently employed strategy, phrasing content, through monitoring, rereading, inferencing, making connections with author audience, using text form knowledge, and using content prior knowledge, to the least frequently
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Reading frequency</th>
<th>Reading %</th>
<th>Writing frequency</th>
<th>Writing %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>626</td>
<td>33.4</td>
<td>752</td>
<td>53.6</td>
</tr>
<tr>
<td>Phrasing Content</td>
<td>877</td>
<td>46.8</td>
<td>323</td>
<td>23.0</td>
</tr>
<tr>
<td>Content Knowledge</td>
<td>57</td>
<td>4.6</td>
<td>194</td>
<td>13.8</td>
</tr>
<tr>
<td>Text Form</td>
<td>144</td>
<td>7.7</td>
<td>245</td>
<td>17.5</td>
</tr>
<tr>
<td>Rereading</td>
<td>251</td>
<td>13.4</td>
<td>313</td>
<td>22.3</td>
</tr>
<tr>
<td>Questioning</td>
<td>53</td>
<td>2.8</td>
<td>117</td>
<td>8.3</td>
</tr>
<tr>
<td>Inferencing</td>
<td>165</td>
<td>8.8</td>
<td>39</td>
<td>2.8</td>
</tr>
<tr>
<td>Making Connections</td>
<td>108</td>
<td>5.8</td>
<td>19</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Total clauses</strong></td>
<td><strong>1873</strong></td>
<td></td>
<td><strong>1402</strong></td>
<td></td>
</tr>
</tbody>
</table>
employed strategy of questioning. For the concrete
text, this order was altered in that using text form
knowledge moved from sixth to third followed by
rereading, inferencing, using content prior knowledge,
making connections with author/audience, and
questioning. Differences in percentages of occurrence
between reading tasks were obvious for phrasing
content, 13.8\% difference; monitoring, 10.3\%
difference; rereading, 8.1\% difference; using text form
knowledge, 5.7\% difference; and inferencing, 4.6\%
difference. Other strategies differed only slightly in
frequency of occurrence.

For writing there was no difference from one task
to the other in the ranking of frequency of strategy
occurrence. In addition, there was very little
difference in the percentages of strategy occurrence
between tasks. The biggest differences existed between
using text form knowledge which occurred in 15.9\% of
the reflexive clauses and 19.3\% of the extensive
clauses and questioning which occurred in 6.9\% of the
reflexive clauses and 10.0\% of the extensive clauses.
Table 7 presents the frequencies and percentages of
strategies by task.

__________________________

Insert Table 7 about here

__________________________
Table 7

**Frequencies and Percentages of Strategies by Task**

<table>
<thead>
<tr>
<th>Task</th>
<th>Reading</th>
<th>Writing</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abstract</td>
<td>Concrete</td>
<td>Reflexive</td>
<td>Extensive</td>
</tr>
<tr>
<td></td>
<td>frequency</td>
<td>frequency</td>
<td>frequency</td>
<td>frequency</td>
</tr>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Monitoring</td>
<td>400</td>
<td>226</td>
<td>399</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td>(37.9)</td>
<td>(27.6)</td>
<td>(53.3)</td>
<td>(54.1)</td>
</tr>
<tr>
<td>Phrasing Content</td>
<td>430</td>
<td>447</td>
<td>172</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>(40.8)</td>
<td>(54.6)</td>
<td>(23.0)</td>
<td>(23.1)</td>
</tr>
<tr>
<td>Content Knowledge</td>
<td>48</td>
<td>39</td>
<td>106</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>(4.5)</td>
<td>(4.8)</td>
<td>(14.2)</td>
<td>(13.5)</td>
</tr>
<tr>
<td>Text Form</td>
<td>55</td>
<td>89</td>
<td>119</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>(5.2)</td>
<td>(10.9)</td>
<td>(15.9)</td>
<td>(19.3)</td>
</tr>
<tr>
<td>Rereading</td>
<td>179</td>
<td>72</td>
<td>171</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>(16.9)</td>
<td>(8.8)</td>
<td>(22.8)</td>
<td>(21.7)</td>
</tr>
<tr>
<td>Questioning</td>
<td>33</td>
<td>20</td>
<td>52</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>(3.1)</td>
<td>(2.4)</td>
<td>(6.9)</td>
<td>(10.0)</td>
</tr>
<tr>
<td>Inferencing</td>
<td>114</td>
<td>51</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>(10.8)</td>
<td>(6.2)</td>
<td>(2.4)</td>
<td>(3.2)</td>
</tr>
<tr>
<td>Making Conclusions</td>
<td>71</td>
<td>37</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(6.7)</td>
<td>(4.5)</td>
<td>(1.2)</td>
<td>(1.5)</td>
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</tbody>
</table>
CHAPTER FOUR
DISCUSSION

The purpose of this study was to describe the common strategies that proficient readers and writers employ in meaning making. Specifically, it was designed to develop descriptions of the strategies reported by seven high school seniors reading and writing equivalent expository tasks. In addition, the frequency with which these strategies were employed by the subjects was tallied to illustrate the composition of meaning making. Finally, the frequencies with which the strategies occurred within the different tasks were compared.

The findings of this study must be discussed within certain limitations; specifically, the small sample of subjects and the special population that they represent limits generalizability. The descriptions developed are not applicable to all readers and writers; rather they represent what these specific subjects reported while involved in these specific expository tasks. A second limitation concerns the discussion of the interference of the think-aloud procedure. No absolute claims can be made that thinking aloud did or did not interfere with regard to reading because of the lack of equivalence between the reading comprehension scores compared. These scores
were regarded as acceptable only in that they provided
the researcher with a general notion of whether there
was think-aloud interference. Lastly, as is the case
with most qualitative data analysis, there is the
possibility of subjective, researcher biases. The
strategy descriptions developed consist of the
observations and decisions of this researcher. Others
might have interpreted the data differently.

Given these limitations, the following discussion
will address the concern with interference by the
think-aloud procedure, the descriptions of the
strategies, the development of a description of meaning
making, and a comparison of strategy use by task.
Research and instructional implications will also be
discussed.

To determine whether having subjects think aloud
while involved in the reading and writing tasks
substantially interfered with their processing, their
performances with and without thinking aloud were
compared. With regard to interference with reading
comprehension, comparison of the multiple-choice scores
and the CAT reading scores would seem to indicate
little interference for subjects' comprehension. Only
Val, whose CAT score ranked at the 99th percentile but
whose multiple-choice scores were only 4 and 7 out of
10, seemed to demonstrate any interference. Other
subjects' scores seemed to parallel their percentile ranks.

However, the written free recall scores might seem to indicate that some interference in comprehension did occur for subjects while thinking aloud. Out of the possible 114 and 122 idea units which could have been recalled from the abstract and concrete texts, respectively, these subjects' highest total recall scores were only 12 and 23 for those texts. While this might seem to indicate that the subjects' comprehension while thinking aloud was hampered, there are several reasons why that comparison cannot be made with assurance. First, an informal examination of the recalls reveals that many of the ideas recalled were the main ideas of the text, demonstrating that the subjects had comprehended important points whether they recalled a large number of ideas or not, or that they did not know how extensive their recall lists should be.

Another possible explanation for the low recall scores could be a difference in the subjects' attitude toward the achievement test situation and the research situation which had no bearing on their scholastic standing. Although subjects seemed to make a sincere effort to complete each task well, they might have been less involved with the research than with their
achievement test. In addition, the achievement test format differed greatly from the written free recall. Therefore, an alternate explanation may be that the subjects were simply unaccustomed to the written free recall task and, therefore, did not perform as well as they did on the more familiar multiple choice tasks.

Assessment of the subjects' writing performance with and without think-aloud involvement was obtained through the use of equivalent writing assignments. The initial writing task was completed by subjects without thinking aloud and was scored randomly with the other written products of the think-aloud sessions. The results of these assessments indicate that two subjects achieved equal or higher scores on the think-aloud tasks than they did on the initial task. Two subjects' initial scores were between their two think-aloud scores, and three subjects' think-aloud scores were lower than their initial scores.

Of those subjects whose think-aloud writing scores were lower than their initial writing scores, only Val's and Peter's scores fell noticeably. Because Val's comprehension scores also indicated some difficulty, it could be that the think-aloud procedure was interfering with her reading and writing processes; however, in the interview discussions, both she and Peter mentioned that the subject of television was more
difficult to write about than was the subject for the initial writing task, energy production. Therefore, the difference in their writing scores may have resulted from a problem with subject matter.

Therefore, having seen little evidence of think-aloud interference on the subjects' processing, the researcher conducted analyses to categorize and describe the processing strategies which were shared by reading and writing. Making constant comparisons of descriptions of the behavior reported in each clause highlighted the different strategies being used. The most obvious difference in the data was between clauses involving content strategies and those involving other strategy implementation. Monitoring strategies emerged as important in keeping content and strategy processes working together smoothly in both reading and writing. Kirby (1986) discussed the importance of her subjects' abilities to select, use, and effectively adjust processing strategies while reading and writing. Birnbaum (1982) also found that the ability to "monitor and to reflect over their processing of text" (p. 253) was characteristic of her proficient subjects. These abilities were also important in this study and were categorized under monitoring strategies.

Phrasing content occurred when subjects perceived that they were processing successfully. They repeated
the ideas in the text with ease or stated the ideas they were transcribing into their compositions. The subjects who reported large percentages of this strategy were those who seemed to interact less with the texts they were reading and producing. Several were unaware that they were missing important points. Dependence upon this strategy seemed to signal a lack of metacognitive awareness as described by Flavell (1976).

After the researcher separated monitoring and content processing, further classification was necessary to provide more specific descriptions of the types of separate strategies frequently employed in reading and writing. Subjects' activation and use of prior knowledge quickly emerged as important. The researcher divided prior knowledge into content and form knowledge. While reading and writing, subjects found it necessary to call on both types of prior knowledge. Subjects used their knowledge of text form for clues to effective strategy implementation and as a classification system for ideas which had been comprehended. Content knowledge helped subjects accept and integrate the information they were reading. Subjects interjected their knowledge into their responses and made connections through inferencing.
While writing, subjects used their knowledge of text form to move through the process effectively. Their knowledge that papers needed introductions and conclusions helped them frame their responses to the tasks. In addition, their knowledge that general statements need support led to greater use of content prior knowledge. It must be mentioned, however, that to some extent, the assignment demanded activation and use of content knowledge in that it called for hypothesizing based on previous knowledge. If the writing tasks had been based upon some reading or provided information, the subjects' use of content prior knowledge might have been different.

Many reading researchers (e.g., Anderson, Reynolds, Schallert, & Goetz, 1977; Bransford & Johnson, 1972) have established the importance of the use of prior knowledge. In their model of the writing process, Flower and Hayes (1981a) included prior knowledge as an important component of the writer's long term memory. Finally, Langer (1986) found that using schemata was a frequently employed strategy for her subjects, representing 49% of the reasoning operations during reading and 36% during writing.

Further specific strategies which emerged from the data were rereading, questioning, and inferencing. These occurred as subjects attempted to resolve
problems in processing. Rereading was used in many ways: to rehearse, to clarify, and to aid coherence. Subjects questioned themselves and the task most often when they needed to generate ideas or strategies to effectively deal with their problems. Inferencing appeared as a link between the content of the task and the subject's prior knowledge. This linking strategy helped move the subjects through their reading and writing tasks. Langer's (1986) research also found that subjects depended on these strategies when processing.

Finally, the strategy of making connections with the author/audience is often discussed by educators as important, especially with regard to audience awareness in writing (Ede & Lunsford, 1984). Although some connection was reported by subjects, it was not their major concern, and the connections made were tenuous in most cases. While reading, subjects would alternate referring to the text as "It" and using the pronoun "they," indicating only a vague notion that someone was on the other side of the text. While writing, few subjects really considered the audience proposed by the task assignment, and those who did, did so only briefly. This description of subjects' attention to possible readers is more similar to Murray's (1982) theory that writers are first concerned with pleasing
themselves than with Ede and Lunsford's description of the roles of the audience that writers must consider.

To provide a description of the subjects' meaning making, frequency counts were made of the occurrences of the strategies shared by reading and writing. For both reading and writing, monitoring, rereading, and phrasing content were the most frequently reported strategies. These represent the major functions of management, problem-solving, and representation of meaning, respectively. That monitoring in writing replaced phrasing content in reading as the most frequently used strategy illustrates the increase in subject-centered planning reported during writing. While writing subjects frequently reported goal-oriented strategies; during reading they seemed simply to follow the text from clause to clause with little personal control.

Regardless of the difference in order of frequency for reading and writing, subjects' meaning making consisted mainly of setting forth and evaluating their processing. They commented on and accepted their meaning construction, and then phrased their interpretation of the ideas involved, i.e., monitoring and phrasing content. When a problem arose, the most commonly reported method of addressing it was to reread, either the previously read text, the previously
produced text, or the task assignment. This pattern was common for both reading and writing, but when the less frequently used strategies were compared, the pattern of use for reading and writing were different.

These findings are similar to those of Langer (1986). Although her strategy descriptions differ in some respects from those in this study and, therefore, confuse comparisons, there are strong similarities in the strategies observed. Langer found that the subjects involved in her study also used the same strategies during reading and writing. Her summary of the patterns of strategy use was that "...strategies tested took somewhat different patterns in reading as opposed to writing. The children generated more ideas when they read and formulated more ideas when they wrote" (p. 247). The difference in the strategies her subjects used most frequently in reading and writing and those reported in this study most frequently might be a result of the differences in ages of the subjects, in tasks, or in methods of analysis. But the idea that it is a difference in the pattern of usage which separates reading and writing rather than a difference in the strategies used is an important concept.

In examining the other strategies used while reading, if the phrasing content, monitoring, rereading pattern broke down, subjects most frequently turned to
Inferencing. Subjects would either remember some information given previously by the text, connect it with the present clause, and construct meaning, or they would call on some of their own world knowledge to construct a generalization. The next most common strategy was to call on their knowledge of text form. It seemed to help them to categorize a clause as serving a particular function in the text, such as giving an example, asking a question, or elaborating on an idea.

The three strategies ranked last in reported frequency counts for reading were using content prior knowledge, connecting with the author/audience, and questioning. The lack of subjects’ identification with the texts may be a reason for the small use of content prior knowledge. The subjects seemed to see it as their tasks to get information from the text rather than to integrate the text information with what they already knew and thought. Hence, the subjects failed to process in the manner Rumelhart (1980) explained as necessary to effective comprehension in that they did not activate prior knowledge and then integrate the prior knowledge with the new knowledge. Some of this integration did occur in conjunction with the subjects generalizing during inferencing, but most of that inferencing was text-based. The infrequency with which
the subjects made connections with the author and asked questions may be related. The subjects did not seem to realize that there was a real person behind the text; therefore, they were less inclined to ask questions of what they perceived as merely an inanimate text.

The pattern of strategy use subjects reported while writing differed from that reported while reading in that it moved from monitoring, phrasing content, and rereading to using their prior knowledge rather than to inferencing. The importance of the use of text form knowledge seems obvious in the case of composition, especially when this is the aspect of writing which has been the focus of most writing instruction (Flower & Hayes, 1980). Similarly, the importance of content prior knowledge is also obvious. The subjects had to activate prior knowledge to explain the data given in the assignment.

In addition to the use of prior knowledge being an inherent demand of the writing assignments, it is also an area of writing instruction which has received much attention (Flower & Hayes, 1980). The next most frequently reported strategy, questioning, may also be a function of the instructional emphasis. Subjects knew that it was important to support and clarify statements they made in their compositions. The strategy they employed to enable their schema
activation was to ask themselves questions to keep their processing moving.

The strategies which were reported in writing the least, inferencing and making connections with the author/audience, may indicate that the subjects lacked practice with meeting the demands of this type of assignment. An increase in inferencing could have increased the subjects' understanding and use of the data given in the task assignment. In addition, greater adherence to the assignment would have increased the attention to the proposed audiences, themselves and a class. From the interview information, it seemed that what these subjects lacked was practice with writing for a variety of purposes to a variety of audiences. Therefore, they were unable to employ the inferencing and audience awareness demanded by this assignment.

The final area of concern in this study was the difference between the strategies subjects reported for tasks which were concrete and subject-centered as opposed to abstract and audience-centered. While some differences did occur for reading, there were only slight differences in writing.

While reading the abstract text subjects reported much more monitoring and rereading than they did during the concrete reading. They more frequently had to make
inferences and connect with the author than they did for the concrete text for which simple phrasing of content worked hand in hand with monitoring to provide smooth comprehension. Subjects' classification of clauses by text form or purpose, which did not appear frequently in the abstract reading, seemed to enhance the meaning of clauses in the concrete text which subjects easily understood.

In addition, much less rereading was necessary for the concrete task. Although the abstract text was shorter, while reading, subjects reported 237 more clauses in response. The abstract text was more difficult to comprehend, and the subjects' reported processing demonstrated that fact. This may indicate that the subjects have had more practice reading different kinds of texts and, therefore, knew better how to adjust their processing to meet the demands of different reading situations.

On the other hand, regarding the lack of differences in strategy reports for reflexive and extensive writing, the amount of practice with the task of writing may provide an explanation here as well. Subjects seemed to address both tasks in the same manner, although one task proposed that they write for themselves as the audience, and the other proposed a class as the audience. The only frequency differences
which seem important were the understandable increase in the use of text form knowledge and questioning for the extensive task. These differences reflect the effective processing reported by those few subjects who were aware of the difference in audiences. They worked to generate more ideas and more clearly presented those ideas for the class report proposed by the task assignment.

In summary, the findings of this study may have implications for future research and instruction. With regard to research, each of the strategies identified must be more specifically investigated with a variety of subjects and topics so that the strategies may be more fully described and understood. In addition, this study's findings indicate a difference in strategy use by subjects involved in different tasks, but it seems possible that students of different abilities and ages may also use strategies differently when involved in different tasks. Therefore, the manner in which other subjects use these and possibly other strategies should be investigated.

In addition, the manner in which individuals use the strategies described in this study should also be investigated. Indications from this study suggest that individuals may have modes of processing which guide both their reading and writing processes. Comparative
case study investigations could help describe these processing modes so that those which prove effective to comprehension and composition may become a part of instruction.

This study supports the use of the think-aloud procedure for data collection concerning subjects' strategy use while they are involved in processing. The descriptions developed from think-aloud protocols are less removed by time and recollection from the actual processing event. More descriptions such as those from this study can help develop well-defined and recognized concepts of what these strategies involve so that instruction may be designed to enhance the development of student readers and writers.

Although researchers conducting laboratory research such as the present study must be cautious in suggesting implications for instruction, one instructional implication seems obvious. Students need practice in a variety of reading and writing situations. Current instructional practice seems more effective in teaching students to read for varying purposes than to write for different purposes and audiences. Students need to develop a repertoire of effective strategies from which they may choose to address different reading and writing tasks. Reading and writing instruction must be based upon clear
definitions and descriptions of strategies such as those provided in this study.
References


APPENDIX A

DEFINITION OF TERMS
Definition of Terms

The following terms are defined for the purpose of this study.

Abstract text style - subtle, profound, and complex with deliberate use of obscure words and long, periodic sentences (Olshavsky, 1976-77, p. 659).

Concrete text style - straight-forward, simple means of expressing an idea with short sentences and familiar words (Olshavsky, 1976-77, p. 659).

Constructing-a-hypothesis assignment - requires writers to create evaluation arguments, make an evaluative generalization based on specific data, and use general principles to judge a specific situation (Faigley, Cherry, Jolliffe, & Skinner, 1985, p. 136).

Experience-based comprehension - deriving an answer from previous knowledge (Readence, Bean, & Baldwin, 1985, p. 125).

Extensive writing - the writer takes an active role, interacting with the environment (Emig, 1971, p. 37).
**Metacognition** - one's knowledge concerning one's own cognitive processes and products or anything related to them (Flavell, 1976, p. 232).

**Pausal unit** - units of text produced by divisions which were psychologically acceptable for pausing to catch a breath, give emphasis, or enhance meaning (Johnson, 1970, p. 13).

**Proficient readers and writers** - those subjects whose California Achievement test scores were above the national average.

**Reflexive writing** - the writer takes a contemplative role, relating information only to himself or herself (Emig, 1971, p. 37).

**Schema theory** - long-term memory consists of frameworks of knowledge which are constructed through experience (Rumelhart, 1980).

**Text explicit comprehension** - getting the facts as stated by the author of the passage (Readence, Bean, & Baldwin, 1985, p. 125).

**Text implicit comprehension** - inferring from the text to derive an answer to a question (Readence, Bean, & Baldwin, 1981, p. 125).
Think-aloud procedure - subjects are asked to say aloud everything they think and everything that occurs to them while performing the task, no matter how trivial it may seem (Hayes & Flower, 1980, p. 4).

Written free recall - a list, written without the text available, of all the ideas a reader can remember from a passage previously read.
Review of the Literature

The review of related literature will begin by discussing theory and research in reading comprehension processes and writing processes. This discussion will provide a foundation for an evaluation of research and theory concerning reading and writing relations. Following that will be a consideration of the research and theory supporting the use of think-aloud protocols as a technique for obtaining information on cognitive processes.

Comprehension Processes

Psychologists originally conducted much of the research on reading processes. Early investigations dealt mostly with aspects of perception, for example, Cattell's (1886) research on the time required to perceive letters and words, and Dearborn's (1906) study of eye movements. Investigations of various aspects of comprehension in reading were largely ignored until the 1950's. Venezky (1964) attributed this lack to the importance given to more predominant foci on word recognition, oral reading, and vocabulary. However, two important works which have greatly affected current comprehension research were conducted prior to this time. Thorndike (1917) introduced the concept of
reading as an active, thinking process. This concept greatly influenced instruction in critical thinking skills during the 1940's and 50's. Secondly, the work on memory organization on which current schema theory is based was conducted by Bartlett in 1932.

Many contemporary theorists have embraced this notion of reading comprehension as a constructive process (e.g., McNeil, 1984; Rumelhart, 1985; Shanklin, 1981; Spiro, 1980). This theory has as its foundation the notion of schemata, or frameworks of knowledge and understanding (Rumelhart, 1980). While schema was first mentioned by Kant (1963), Bartlett (1932) brought it into modern psychology. Briefly, the theory is that knowledge is organized into frameworks which are built by experience and called up when new experiences must be understood. The pieces of information in the slots of the frameworks are compared to the information presented by the new experience. Matches confirm present understanding, and further slots are filled with new information. New frameworks are also built to organize new understandings of experiences. With regard to reading comprehension processes, this theory of human knowledge and understanding has several important implications, three of which are of special concern to the present study: (a) prior knowledge affects comprehension; (b) comprehension consists of
both top-down and bottom-up processes; and (c) metacognitive, comprehension-monitoring abilities affect comprehension. Each of these theoretical assumptions is supported by research. What follows is a review of the important studies conducted to substantiate these assumptions.

**Prior knowledge.** Ausubel (1963) proposed that new learning occurs when it can be connected to prior learning. Using the foundation similar to schema theory, he contended that this prior knowledge must be called forth if new experiences are to be made meaningful. Much research supporting this notion has been carried out. Dooling and Lachman (1971) and Bransford and Johnson (1972) conducted studies in which subjects were provided with a simple but vague passage to read. Although the subjects could easily read the passage, they could not tell what the passage dealt with. When subjects were later told the subject of the passage, its meaning was easily comprehended. The researchers concluded that even though prior knowledge may exist, if it is not activated, comprehension will suffer.

In another investigation of the effects of prior knowledge, Anderson, Reynolds, Schallert, and Goetz (1977) presented college-level physical education and music majors with two passages, each of which could be
Interpreted in two ways. The first passage could be interpreted as either a prisoner planning escape from a jail cell or as a wrestler trying to get out of his opponent's grip, and the second passage could be interpreted either as four people preparing to play cards or as a quartet starting music practice. The subjects' interpretations of the passages were consistent with their area of expertise where applicable. Music majors' interpretations were of the jail break and the quartet while physical education majors interpreted the passages as wrestling and card playing. Their prior knowledge obviously shaped the meaning they constructed from the texts.

Not only must prior knowledge be activated so that it can assist in meaning construction, but it must also be consistent with the author's meaning, or it can hamper comprehension. In a study by Alvermann, Smith, and Readence (1985), sixth-grade subjects were given passages either compatible or incompatible with intuitive knowledge. Results of recall and multiple-choice comprehension measures supported the notion that prior knowledge which is counter to information read can override the information presented by the text and cause misinterpretations.

Langer and Nicollich (1981) have developed a method for assessing prior knowledge which also assists in
activating readers' prior knowledge before reading. The assessment involves using a free association technique cued by important terms or phrases taken from the text. Subjects jot down ideas that they associate with the target term. The researcher can then categorize these ideas as: (a) highly organized knowledge -- superordinate concepts, definitions, analogies, linking; (b) partially organized knowledge -- examples, attributes, defining characteristics; or (c) diffusely organized knowledge -- associations, morphemes, sound alikes, personal experiences. The criteria used to categorize the ideas correspond theoretically with Vygotsky's (1962) stages of concept development, and Bruner's (Bruner, Goodnow, & Austin, 1956) basics for concept categorization. Langer (1984a) reported that results from investigations of the reliability of this measure make it "a promising research tool for the control of background knowledge" (p. 479). Thus, the importance of prior knowledge to comprehension has been empirically established.

The results of these studies help to substantiate schema theory by showing that knowledge is not just acquired additively as it is encountered. Rather, it is incorporated into preexisting knowledge when that knowledge is activated and compatible with the new knowledge presented. This process of knowledge
construction, building on prior knowledge, is the basic goal of reading comprehension. Therefore, think-aloud protocols of subjects reading should include examples of students referring to their prior knowledge and should illustrate how subjects make connections with prior knowledge when they encounter new knowledge.

Furthermore, the investigations of prior knowledge use during reading have provided important insights which can inform instruction. Writing instruction, too, may benefit from a clearer understanding of how writers' prior knowledge affects their writing ability. In order to clarify our understanding of prior knowledge in writing, we need specific accounts of writers referring to their prior knowledge during composing.

Interactive processing. The second assumption about reading comprehension is that it requires both top-down and bottom-up processing. Rumelhart (1985) explained that reading models, such as those described by Gough (1985) and LaBerge and Samuels (1985), have described reading processes as "series of noninteracting stages of processing" (p. 722). Flow charts and related paradigms lend themselves to wholly bottom-up models, beginning with visual perceptions of individual letters and words and moving up to phrases, sentences, and so on. Top-down processing occurs in
just the opposite manner, in that ideas emerge first and then control the selection of details for support. However, common sense supported by empirical research suggests that reading processes are interactive, tapping into both top-down and bottom-up processes.

Using schema theory as the conceptual foundation, Rumelhart (1980) explained the importance of processing information in both directions. Top-down processing is called conceptual-driven processing in that it activates schemata which in turn activate their subschemata for details. Bottom-up processing is called data-driven processing in that a subschema is activated first and the schemata within which the subschema fits is then activated. That processing information in both directions is important has been illustrated by researchers in a variety of ways.

Palmer (1975) showed that facial features presented out of context may be unrecognizable, while in context they are easily recognized. The concept of face must be activated before the data of specific facial features has meaning. With regard to reading, Reicher (1969) found that letters were more accurately perceived when occurring in a familiar word than in an unrelated series of letters. Consequently, it seems obvious that models of comprehension which allow for processing only from feature to letter to word to idea.
i.e., from the bottom up, are lacking. There are occasions when a concept must first be understood, and then details can further develop the understanding of that concept.

The importance of a solid theory of processing is obvious in a study such as this. Regardless of a researcher's attempt to remain objective in data analysis, knowledge of a variety of processing theories can influence conclusions drawn. Hence, the interactive model described above is important because it can adequately answer many questions about how readers comprehend text.

Furthermore, the relevance of interactive processing is obvious in writing. Writers have been observed to move from idea to phrase to spelling to mental image, interactively (Flower & Hayes, 1984). Considering this interactive processing as a theoretical link existing between reading and writing, empirical investigation should substantiate the theory.

Comprehension monitoring. One final comprehension process which is of great importance to this study is the comprehension-monitoring aspect of metacognition. Flavell (1976) defined metacognition as "one's knowledge concerning one's own cognitive processes and products or anything related to them" (p. 232). If the schema-theoretic view of reading is accepted, it is
understood that the reader is involved in constant activation of seemingly acceptable schemata, testing of the relevance of that schemata, and development of further schemata. So, comprehension monitoring must occur to oversee the functioning of comprehension processes. Baker and Brown (1984) explained the importance of readers' understanding when they do and do not comprehend. The researchers named three main types of comprehension failures: (a) the reader does not have the appropriate schemata to interpret the text; (b) the reader has the appropriate schemata, but the author has not effectively clued the reader in; and (c) the reader interprets the text, but the interpretation is inconsistent with the author's intended meaning.

Readers' awareness of their failures to comprehend varies for different reasons in different situations, but most researchers seem to agree that skilled readers are unaware of comprehension monitoring until some problem arises. Brown (1980) distinguished between readers' normal, automatic state of comprehending and their debugging state of processing. Anderson (1980) and Flavell (1981) agreed with Brown that the skilled reader probably has no conscious monitoring until some obstacle arises. Furthermore, poor readers may not
even be aware of comprehension-monitoring strategies and, therefore, be unable to employ them.

A study by Forrest and Waller (1979) supported the notion that reading for different purposes alters comprehension monitoring. In their study, third- and sixth-grade students judged as poor, average, and good readers were given two stories to read with different purposes: (a) for fun, (b) to create a title, (c) to skim for information, and (d) to study. The subjects were given comprehension tests and were also asked to rate their confidence in their answers. The results were that the older and better readers were better comprehenders (scored higher on the tests) and also more confident in their performance. They were aware that different skills were required and could use them to perform as necessary.

In a study designed to determine if better readers used a particular, more mature, comprehension-monitoring strategy than poor readers, DiVesta, Hayward, and Orlando (1979) used a cloze task structured to require two different processing strategies, the use of previous text or the use of subsequent text. The subjects were good and poor middle-school and high-school students. It was theorized that the more mature strategy was the use of subsequent text, a strategy which does not interrupt
the flow of reading as much. The results showed that, although both good and poor readers used previous text more frequently, only the good readers used subsequent text nearly as often as they used previous text. While the use of subsequent text may not always be appropriate, its use is indicative of more flexibility in reading.

Garner and Reis (1981) also investigated the monitoring behaviors of good and poor comprehenders, specifically the use of lookbacks. The poor comprehenders ranged from fourth through tenth grade while the good comprehenders were sixth-, seventh-, and eighth-graders. The treatment was delivered individually to subjects so that close observation of verbal and nonverbal behavior was possible. Treatment involved the reading of a passage which was divided onto three separate pages. When the subjects had completed reading a section of the passage, questions were asked, some of which could only be answered through the use of previously read pages. All subjects were observed to use some monitoring behaviors, and good comprehenders used lookbacks more often and more successfully than did the poor comprehenders. However, significant differences were most evident in the oldest subjects where the good comprehenders spontaneously and frequently used the lookback strategy successfully.
Other studies of comprehension monitoring are of particular importance to this study in that they employ on-line techniques of data collection. The first is a study by Olshavsky (1976-77) which employed a think-aloud procedure. Tenth graders thought aloud while reading different texts. Their reported thoughts were analyzed and recurring strategies were identified. Olshavsky found similarities in the strategies used by good and poor readers. They both showed some awareness of failures to comprehend and used contextual cues, inferential reasoning, and rereading in their attempts to comprehend. In a second study Olshavsky (1978) varied the difficulty of the passages in an attempt to distinguish between the good and poor readers' strategy use. Instead, strategy use for both good and poor readers decreased. Her explanation for this was that the subjects gave up on their attempts to comprehend as they encountered difficult texts.

Comprehension monitoring is essential if the message from the text is to be adequately interpreted by the reader. Readers must be aware of and able to control their comprehension processes. The same has been found to be true of writers. In their model which will be discussed later, Hayes and Flower (1980) include a monitor within the writing process which regulates the other processes. Sommers (1980) found
that the student writers she studied were unaware of all that revision should entail: therefore, they engaged in making word-level changes when major revisions were needed. Other writing researchers (e.g., Scardamalia & Bereiter, 1983) have noticed better monitoring behavior in the good writers they studied. To further develop a description of cognitive monitoring, the monitoring behaviors reported by the subjects of this study will provide important data for describing monitoring across reading and writing processes.

Composing Processes

In 1977, Flower and Hayes wrote, "the inner, intellectual process of composing, the complex and sometimes frustrating experience we all go through as we write, is a virtually unexplored territory" (p.449). While some groundbreaking work had been conducted previously (Beach, 1976; Emig, 1971; Graves, 1975; Mischel, 1974; Stallard, 1974), research into the process of writing was, of necessity, experimental in nature and overwhelmed by a product-centered tradition which focused on the features of the text produced rather than the processes of production. As Flower & Hayes (1977) stated, investigations of writing as
a complex, cognitive process had only begun. Since that time, intensive, descriptive studies of composing processes have increased, and some workable models have been proposed. The present review will describe the most viable of these models and the specific composing processes which research to this point has described.

Models. The most widely recognized and employed cognitive model of writing processes was developed by Hayes and Flower (1980) and Flower and Hayes (1981a) who proposed it as a starting point to guide further process research. Their model, presented in Figure 1, is based on data collected from think-aloud procedures like those used by Newell and Simon (1972) in problem-solving research.

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Insert Figure 1 about here

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The three-part model first divides the writing process into three major processes -- planning, translating, and reviewing. The planning process includes the subprocesses of generating, organizing, and goal setting. The translating process acts to produce the language consistent with the writing plan, and the reviewing process includes the subprocesses of reading and editing. A monitor is also included in the writing
Figure 1. Flower and Hayes model of the writing process. Note. From "A Cognitive Process Theory of Writing" by L. Flower and J. R. Hayes, 1981, College Composition and Communication, 370. Reprinted by permission of L. Flower.
process to oversee the functioning of the other major processes and subprocesses. The second important part of the writing act in this model is the task environment. The task environment includes the writing assignment and any text which is produced so far. The writer's long term memory is the third part to be included in the model.

The advantages of this model include the fact that it not only describes writing processes, but it organizes them so that the recursiveness (Emig, 1971), or repetitiveness, of writing processes is allowed. There is also flexibility in that individual differences can be described with only minor changes. As Scardamalia and Bereiter (1986) have stated, the model fulfills its purpose. It has "served as a frame for working out more detailed and possibly more controversial accounts of how the mind copes with writing tasks" (p. 781).

Flower and Hayes have continued to investigate and specify their model. In Flower and Hayes (1980b) and Flower and Hayes (1981b) information was published from their research on planning. From analysis of protocols gathered from four subjects, three experts and one novice writer, the researchers concluded that paragraph boundaries and sentence-level shifts in logic were poor predictors of the long, pregnant pauses of interest.
Instead, these long periods of planning seemed to occur at episode boundaries and represented "creating or returning to rhetorical goals" (1981b, p. 241). This rhetorical planning consisted of: (a) reading and elaborating on the assignment, (b) reviewing and reinstating goals created earlier, and (c) planning process goals directing the writing processes themselves. Three conclusions concerning planning were stated by the authors: (a) planning involves many levels, including sentence-level linguistic planning as well as rhetorical planning concerning audience, task, and writer goals; (b) composing processes are episodic in patterns which are not dictated by text patterns but by goals; and (c) episodes are begun by goal-setting activity.

In addition to their discussion of the general model in Hayes and Flower (1980), another work (Flower & Hayes, 1980b) discussed the constraints within which writers work and a taxonomy of planning. The authors described three types of constraints that writers must juggle when producing text: (a) the demand for integrating knowledge, (b) conventions of written text, and (c) aspects of the rhetorical problem. The constraint-juggling strategies reported by writers thinking aloud included: (a) ignoring a constraint, (b) breaking the problem up into smaller subproblems,
(c) setting priorities for which problems must be handled, (d) calling up a well-practiced routine with which to deal with the problem, and/or (e) using a plan to integrate the constraints. Plans were described as including three types. Plans to do deal with aspects of the rhetorical problem. Plans to say deal with the content of the text and can include scaled down models of the text. Finally, composing plans deal with how to get the job done. These plans may include strategies for generating ideas or strategies for freewriting.

Using their protocol data as a foundation, Flower and Hayes (1984) published a theoretical discussion concerning the question, "How do writers actually use different forms of knowing to create prose" (p. 120)? In other words, how do writers represent their knowledge in writing? In their model, planning is the "purposeful act of representing current meaning to oneself" (p. 124). Hence, it is within this process that the answer to their question lies, and planning takes place throughout the entire writing process. Flower and Hayes theorized that throughout the continuing process of composition, writers represent meaning to themselves in a variety of ways which range along a scale from the most abstract to the most concrete representation: (a) imagery; (b) schema and metaphor; (c) gists and goals; and, (d) notes.
outlines, and prose drafts. Flower and Hayes explained how these representations assist writers in capturing their knowledge and translating it into formal prose.

While Flower and Hayes and other researchers have also continued to investigate the efficacy of this cognitive model of writing processes, some reading researchers, (e.g., Tierney & Pearson, 1983), have used this model in attempts to relate reading and writing processes. However, other models of composing can be used to inform writing process research. One is that developed by de Beaugrande (1984).

De Beaugrande's model is based on text linguistics and research into the symbolic structures operating within the course of text production. The model presents a series of parallel stages which interact simultaneously before, during, and after text has been produced to alter and produce representations of meaning. The parallel stages -- (listed from most abstract to most concrete) goals, ideas, conceptual development, expression, phrases, letters/sounds -- interact throughout long term memory, short term memory, short term sensory storage, and working memory. This processing affects the retrospective representation of prior text, the perception of current text, and the predictive representation of subsequent text. As with the Flower and Hayes model, this model
represents the flexibility of different writing events and the multitude of levels at which a writer must operate.

What is important about these research models of composing processes is their opposition to a linear stage concept. Each describes a number of levels at which writers work while composing. Also, the relationship of these levels is interactive. Like Rumelhart's (1985) reading model, the meaning is not made by simply going from one step to the next. In addition, the models are iterative and recursive: processes are repeated at different times during production and at different levels of processing. Current writing process researchers (e.g., Gould, 1980; Warnock, 1984) have agreed that the early, linear models of writing no longer contribute to our understanding of this complex process.

Processes. Several specific processes of composing have received individual attention. One aspect is that of planning. According to the research conducted by Gould (1980) with business writers, as much as 65% of composing time is spent on planning while the results of Berkenkotter's (1983) analysis of the think-aloud protocols of Donald Murray resulted in an average of 45%. The conclusion that nearly half of
composing consists of planning supports the importance of investigations in this area.

Matsuhashi (1981) and Matsuhashi and Quinn (1984) investigated the pauses made by skilled high-school students as they composed. Subjects were videotaped and processes timed so that length of pauses could be analyzed against text produced. Results from the first study indicated that writers made global decisions before lexical or semantic ones. In the second study, texts produced were analyzed into propositions according to Kintsch's (1974) system. Results indicated that pauses occurred within rather than between sentences and that longer pauses occurred more before propositions of predication than before those of modification. These findings concur with those of Flower and Hayes (1981b) that longer planning pauses are more rhetorical than sentential in scope.

A second area of composing processing receiving much attention is that of revision. Although revision had, for a time, been considered to be that work done on text after a draft was completed (Murray, 1978), current researchers have investigated the revision which occurs throughout the composing process. Bridwell (1980) found that her twelfth-grade subjects revised more while writing the first draft than after it was completed. These writers were concerned with
marring the surface of the final draft, or ruining what they considered to be a finished piece. In a study comparing student and experienced writers, Sommers (1980) found that experienced writers were more apt at making sentence- and theme-level changes while students were stuck at word- and phrase-level changes.

Faligley and Witte (1981) noticed a developmental difference in the types of revisions made by inexperienced student writers, advanced student writers, and expert adults. Inexperienced writers were most concerned with correcting errors and made only meaning-preserving changes. The advanced writers would make many changes which preserved the meaning; however, they also made many changes which did affect the meaning. The expert adults made few corrections, several meaning-preserving changes, and more changes that affected meaning than the other two groups. The conclusion is that the development of revision seems to move from the superficial correcting and tidying-up of the first draft to an end of concern with meaning.

In a recent study Flower, Hayes, Carey, Schriver, and Stratman (1986) investigated the process of revision through the use of think-aloud protocol analysis. They compared the revising of expert and novice writers. The differences found stemmed from differences in capability to detect and diagnose
problems. While novice writers could sometimes detect a problem in their writing, they were unable to diagnose exactly what the problem was and, hence, could not fix it. Expert writers had a better-developed knowledge of linguistic rules and patterns. This seeming capacity for objectivity with regard to language allowed them to determine correctly what was wrong and what needed fixing. Here, again, is a suggestion that metacognitive monitoring of processes may be an important key to successful processing, whether it be comprehension of a given text, or creation of an original one.

While other writing processes are receiving research attention, planning and revision have been investigated more fully than others. Problems of definition and method of analysis have hampered investigations of specific processes, but some conclusions have been made. Both planning and revision occur throughout composing and therefore are important processes used in meaning construction. Each should play an important part in the present study. With regard to possible similarities with reading, planning and revision seem theoretically similar to the activation and confirmation of appropriate schema. In both processes ideas must be generated and connections
must be made to clarify knowledge presented in light of preexisting knowledge.

Reading and Writing Relations

Because reading and writing researchers now seem to be taking similar paths, much interest has recently developed in investigating how these two language processes are related.

Theory. Much theoretical work has been conducted connecting reading and writing. One theoretical viewpoint (Petrosky 1982) is that writing completed in response to reading is an effective connection of the two processes. He argued that such writing helped to make students' comprehension overt, and including reading in writing instruction helped to stimulate ideas. Tierney and Pearson (1983) developed another theory connecting reading and writing for instructional purposes. Using the Flower and Hayes (1981a) model of writing as a starting point, Tierney and Pearson discussed how each process described by the model could be applied to reading instruction. Special emphasis was given to advanced planning and goal-setting prior to reading. However helpful these models may prove to teachers interested in integrating reading and writing in classroom activities, they are not particularly enlightening for researchers interested in detailed descriptions of cognitive processes. More specific
models of similarities and differences between reading and writing must be developed. Some theorists have begun work in this direction.

The theoretical work of Shanklin (1981) provided a theory of composing and comprehending developed with a clear understanding of reading and writing as transactions through which readers and writers develop meaning. Using the reading theories of Goodman (1976) and Rosenblatt (1978) as a foundation, Shanklin developed a transactional theory of writing. Her theory included six major points which state that reading and writing: (a) are constructive -- the meaning is not solely in the text, but in the interaction of reader and text; (b) involve an understanding of text construction which guides choices; (c) involve transactions, i.e., ideas develop and change through the process; (d) are dynamic, providing feedback to the reader/writer; (e) are developmental; and, (f) involve errors, or missed transactions, at all levels of development. This model makes several assumptions which can be questioned in further research.

Another recent model which may prove informative to reading and writing researchers is that reported by Kucer (1985). Kucer stated that reading and writing are parallel processes. The building up of a text
world, or configuration of meaning, is the basis of the similarity between the two processes. He theorized that cognitive efficiency demands that strategies be shared for the two. Specifically, his model described the processes used to access prior knowledge, to transform prior knowledge into a text world, to locate and retrieve information, and the importance of context in all of these. For accessing facility, Kucer explained the importance of process schemata the function of which are to guide the language user's procedures for finding content schemata. In other words, there are schemata for the how to as well as the what. Proceeding along the lines of schema theoreticians, he further explained how both readers and writers must instantiate, or fill in, the content of the schemata accessed. This involves for both readers and writers considerations of new as well as old knowledge.

Finally, Kucer described six strategies for information-processing procedures which operate in short-term memory to allow the language user to manipulate the knowledge accessed and instantiated. These include: (a) macro-generating and micro-generating which are the production of global conceptual units and the filling in of these more general macropropositions; and (b) macro-integrating
and micro-integrating which link together the global and local meaning of the text. The fifth strategy, selecting, connects the internal text world to the external representation of it; i.e., links reading to writing. Selecting involves the reader in scanning for graphic clues to guide schemata location and involves the writer in bringing forth the proper schemata into short-term memory. The final strategy which Kucer stated as linking reading and writing is a constant confirmation which must accompany each of the other five strategies. Again, this final strategy suggests the importance of some kind of monitoring.

These theories provide researchers some commonalities which are fertile ground for investigation and actual description. Observations of subjects' reading and writing can provide support for or can refine some of these theoretical notions.

Observational Research. In an effort to substantiate these theories, researchers in different fields have made a variety of attempts to connect reading and writing. One such examination of the connection looks at the reading that is necessary in writing. Horning (1978) described the similarities between the work done by Goodman (1976) in reading and that done by Shaughnessy (1977) in writing. In doing so, she made a case for attending to the errors made by
students reading while writing in order to help explain to them the processes they are using to complete tasks. Goodman's theory stated that readers make predictions about upcoming text and that their mistakes illustrate the understanding that they have of the text and of comprehension. From these missed transactions, or miscues, teachers can infer the reading problems of the student. Shaughnessy's theory of errors in writing is similar. The errors illustrate the rules as the student understands them. These errors, then, can be important clues for teachers.

A more recent investigation of the importance of reading in writing was conducted by Atwell (1981). Her subjects were college-level, average-ability writers, labeled traditional, and poor-ability writers which she labeled as basic. She introduced a technique of blind writing into subjects' compositions halfway through their composition. Subjects were given a dry pen and continued their composition on paper with a carbon beneath to copy what they produced. She found that while the traditional writers showed an increased dependence on a plan to help them complete the piece without reading, the basic writers had no such plans. As such, the blind writing by basic writers often resembled strings of words which did not come together as true texts. Her conclusion was that reading was an
important recursive element in writing on which many writers depend heavily. Atwell's conclusion concurs with Murray's (1982) explanation of reading as an important monitoring process in writing in which the other self of the writer reads the piece with more objectivity than the involved writer.

Another area of work in writing research which involves a connection between reading and writing is that of audience consideration or awareness during writing. An example of this work was conducted by Kroll (1978) who studied the differences in audience awareness in children while speaking and writing. Taking a developmental stance, Kroll believed that children developed audience awareness late because of their egocentrism. In addition, he called for further study of the "...constructive processes operative in the mind of the writer" (pp. 279-280).

In an attempt to synthesize the study of the role of audience in writing, Ede and Lunsford (1984) compared the theories of "audience addressed" and "audience invoked" to develop a model of the role of audience which would represent its complexity. Their model specified many aspects of the audience to whom a piece is addressed, from past and future audience to critic, colleague, friend, and self. The model provides a clear explication of the roles the audience
may take but does little to clarify how the writer considers these roles while writing.

**Correlational and Experimental Research.** Another important viewpoint taken toward possible connections between reading and writing is represented by the correlational and experimental studies which have tested relationships of specific reading and writing variables. Stotsky (1983), in her review of the correlational and experimental studies of reading and writing, made the following generalizations: (a) better writers tend to be better readers and tend to read more than poorer writers; (b) better readers tend to produce more syntactically mature writing than poorer readers; (c) instruction primarily intended to improve writing does not have a significant effect on reading improvement; (d) writing activities used specifically to improve reading comprehension do cause gains in reading comprehension; and (e) reading activities and literary models used in place of grammar drills or more writing practice produce significant gains in writing improvement.

Further research in this manner has been conducted by Shanahan (1984) and Shanahan and Lomax (1986). Shanahan (1984) used canonical correlations of a multitude of reading and writing measures taken of second and fifth graders ranging from word recognition
and spelling to text comprehension measures and text structure. He found that "at any given point of development, reading and writing consist of both dependent and independent abilities" (p. 475), but that the nature of the reading-writing relation appeared stable across grade-level cohorts.

In a reanalysis of the same data, Shanahan and Lomax (1986) used path analysis to compare and evaluate three alternative theoretical models of the reading-writing relationship which they developed. The models differed in the sequential relationships of the dimensions for reading: (a) word analysis, (b) vocabulary, and (c) sentence and passage comprehension components; and for writing: (a) spelling, (b) vocabulary, (c) sentence structure, and (d) story organization components. The first model allowed for interactions between reading and writing in either direction while the other two models allowed for only influence in one direction, reading to writing or writing to reading. The interactive model best fit the data. In their discussion of this finding, the authors stated that the common practice of teaching reading before writing was not necessarily most efficient; rather, efforts in one area could benefit the other.

While much of this correlational and some experimental research has tested relationships between
and effects of specific aspects of reading and writing on one another, this work may be putting the cart before the horse. This kind of work demands that measures of reading and writing processes be valid for those constructs which have not yet been fully described. Investigations designed to better describe how readers and writers process information should be conducted first. From these descriptive studies more effective measures may be created and seemingly more valid experimental research can be conducted.

Descriptive Research. Several recent descriptive studies of readers and writers have been carried out. Birnbaum's (1982) case study involved four fourth-grade and four seventh-grade subjects who were recommended as proficient by their teachers. The purpose of the study was to identify shared cognitive-linguistic patterns in both processes and between age groups. The design of the study was complex. Each subject was videotaped reading realistic fiction, fantasy fiction, factual exposition, and writing expressive, poetic, and transactional prose. Further data was collected in audiotaped sessions in which the subjects' oral reading was judged for miscues and in writing sessions in which the subjects composed aloud. A third source of data resulted from classroom observations of subjects and teacher and parent interviews.
The data analysis consisted of matching proficient behaviors with highly rated products. When common patterns were found, they became variables. Subjects' products were divided into less and more proficient categories according to the rating of that particular product. Birnbaum found that "the more proficient seemed not only to know how to think but also what to think about while reading and writing" (p. 257). Monitoring, then, was an important function of proficient processing. Also, the proficient readers and writers were more able to consider a wide range of alternatives at each stage of both reading and writing. These findings seem consistent with those found separately in reading and writing process research.

A second study which illustrates qualitative investigation of reading and writing is that conducted by Kirby (1986). Her study involved case studies of five high risk, or basic-level, college freshmen for the purpose of describing what processes these students used to construct meaning. Again, several sources of data were employed. Each subject was videotaped in four sessions which involved reading and writing activities and retrospective interviews on the processes they used during these activities. In the first session subjects read realistic fiction about a childhood memory and wrote a summary. The second
session involved reading a factual text on the family and then writing a summary followed by an introspective interview on their reading background and attitudes. In the third session the subjects wrote an expressive childhood memory, reread it for revision, and read it aloud for miscue analysis. The fourth session involved writing a transactional piece on family social structure, rereading for revision, and reading aloud for miscue analysis followed by an introspective interview on their writing background and attitudes. In addition, the students' instructors were interviewed concerning the students' attitudes and opportunities in reading and writing.

Using a constant comparison method of analysis, Kirby sought relationships upon which to develop categories. Data included: (a) words read or written per minute across episodes, (b) time spent in planning or previewing, (c) time spent in reviewing or revising, (d) number of words written per episode, and (e) number of miscues made per 100 words of oral reading. Upon these baseline measures she built her descriptions. Kirby found that these subjects used a limited number of strategies for reading and planned for both types of writing in similar ways. In both processes personal experience and interest were very important to meaning construction. In addition, she found that
experience and interest were very important to meaning
construction. In addition, she found that
externalization of meaning, i.e., reading their pieces
aloud and writing about their reading, helped these
students to monitor their meaning construction and be
aware of their effectiveness.

In a recent study by Langer (1986) reports of
reading and writing processes obtained from think-aloud
and retrospective report procedures were analyzed to
compare meaning construction in the two processes.
Langer collected protocols of 67 third-, sixth-, and
ninth-grade students reading and writing reports and
narratives. Her Analysis of Meaning Construction was
specific and founded in prior research (Langer, 1984b).

The analysis consisted of rating the communication
units into which the protocols had been divided on
seven dimensions. First, the units were judged as
either reasoning operations or monitoring behaviors.
Reasoning operations included hypothesizing, stating
meaning, questioning, validating, citing evidence,
assuming, and using schemata. Monitoring behaviors
included task goals and subgoals, genre/discourse
structure, lexicon, mechanics, and statements or
refinements of meaning. Monitoring was further broken
into those behaviors which were simply reported, and
those behaviors which reflected more conscious
awareness of choices available. The remaining five analyses were concerned with: (a) time -- before, during, or after reading or writing; (b) strategies -- generation, revising, evaluating, or formulating; (c) text unit -- global or local aspects of the texts; (d) knowledge source -- genre, content, or text; and (e) focus -- process or product.

From this complex analysis, many significant findings were reported. However, only those directly pertinent to reasoning and monitoring will be discussed here. Langer found that the majority of reasoning operations dealt directly with the meaning of the text being written or read. Differences were found between reading and writing on reasoning operations, with reading producing significantly more use of schemata than writing, and writing producing more hypothesizing and metacommments. She concluded that reading and writing required the use of similar strategies for construction meaning, but that patterns of strategy use differed across the two processes.

With regard to monitoring behaviors, Langer found that concern with meaning was dominant in both processes. However, while subjects reported a general concern with meaning while reading, during writing their comments dealt with various concerns. Overall, Langer reported that while reading and writing
required similar processing abilities, patterns of the use of specific processes differed between reading and writing.

While the grade level of the subjects in the studies reviewed varied, ranging from fourth grade to college freshmen, the descriptions of reading and writing resulting from this work are very useful to promote additional research. Each study highlights the importance of adequate monitoring behavior in subjects' ability to comprehend and compose effectively. This ability has received much attention in reading research and some in writing as well. The continuation of such findings in research connecting the two strengthens the importance of monitoring of both, and suggests the need for further, more specific descriptions.

**Think-aloud Protocol Research**

The use of verbal reports as data has its foundations in the work of the Gestalt psychology; it was with the prominence of behavioristic psychology that verbal reports went out of favor. Nisbett and Wilson (1977) presented arguments representative of the behaviorist perception of the use of verbal data in cognitive investigations. Their arguments against verbal reports were grounded in a belief that observable behaviors are more reliable and, therefore, better data for investigating cognitive processes.
They emphasized techniques such as requiring subjects to infer reasoning processes or to remember causes for responses or to report on higher level processes which may be unconscious to the subject. While there is support for their arguments in these areas, if used differently, verbal reporting can provide informative data.

In a later work which responded to Nisbett and Wilson's, Ericsson and Simon (1980) supported the reliability of verbally reported data. Their premise stated that as long as the verbalization requires only attendance to information already in short-term memory, the data can be accurate. If no inference is required of the subject, then the only substantial effect of verbalization is the increase in time required to complete the process. The important difference, then, lies in the instructions given to the subjects with regard to the type of information the researcher requires subjects to verbalize.

With regard to reliability, methods have been established whereby researchers' interpretations of the data produced by the think-aloud procedure may be tested for reliability with other raters. Swarts, Flower, and Hayes (1984) described a method for obtaining reliable interpretations. The researcher
must first develop a coding scheme and train judges in its use. Then, as in other observational investigations, the judges' degree of agreement can be calculated. Depending upon the complexity of the coding scheme, judges may be either familiar or unfamiliar with the theory behind the coding scheme. In other words, the judges may be naive or expert.

In a series of responses and replies, Cooper and Holzman (1983, 1985) raised several objections to the work of Flower and Hayes (1981a) to which Flower and Hayes (1985) replied. With regard to the think-aloud methodology, Cooper and Holzman first labelled it as introspection. In reply, Flower and Hayes pointed out that introspection is something quite different from thinking aloud. Introspection depends on the inference that Ericsson and Simon (1980) explain is questionable. Thinking aloud, however, is the simple attention to and reporting of whatever comes to mind. The further objections of Cooper and Holzman involved the choice of subjects and the research task. They pointed out that Flower and Hayes seem to use trained subjects that are not representative of the population of writers. This need not be a problem if the researcher makes no claims of generalizability and rather explains findings as descriptions of particular cases. While there is substance to the objection that the tasks may be
artificial to the point of invalidity, again, the distinctions must be made by the researcher. Laboratory findings as well as ethnographic findings can be useful.

Schoenfeld (1982) set forth five aspects of the context of the research which must be considered in order to gather valid verbal reports. First, the number of subjects included in a taping session must be considered; the more subjects involved, the more social dynamics are involved in altering the process. Therefore, unless the social aspect is important to the research question, single-subject data collection sessions are better. The second consideration must be the degree of researcher intervention in the subjects' processing. When questions are asked, subjects may target later reports to the matters in question although these had not previously been of consideration to the subject. Relatedly, the third consideration is the freedom allowed under the instructions and within the intervention. While requests for subjects to reflect upon pertinent aspects of their processing may cause some changes, it also may open up interesting areas for investigation which might otherwise have been missed. The fourth consideration is the nature of the environment. While the data might be best if the subjects were totally comfortable and at ease in a
natural situation, sometimes laboratory settings are necessary. Lastly, the researcher must carefully consider all of the variables in the task required of the subjects. If the task does not target the processing concerns in question and other variables cloud the target area of processing, the data collected may be worthless.

The use of think-aloud protocols is described by Newell and Simon (1972) who first used the technique in problem-solving research. Their analyses entailed highly specific formulas of data analysis through which the reports given by subjects while solving various problems provided insights into the cognitive processes involved in the problem-solving tasks. From the data they collected, Newell and Simon wrote computer programs which were capable of solving problems. This type of empirical evidence developed through the use of the think-aloud technique has helped to legitimize think-aloud reports as valid data.

Researchers in both reading and writing have taken a problem-solving perspective on comprehending and composing (Flower & Hayes, 1980a; Olshavsky, 1976-77). The research technique of having subjects verbalize their thoughts while involved in the processes has proven quite fruitful for the research on reading (e.g., Fareed, 1971; Kavale & Shreiner, 1979; Waern.
writing (e.g., Berkenkotter, 1983; Flower, & Hayes, 1977, 1980a, 1980b, 1981a, 1981b; Flower, Hayes, Carey, Schriver, & Stratman, 1986; Newell, 1984; Perl, 1979), and now, on reading and writing relationships as well (e.g., Birnbaum, 1982, Langer, 1986). Hayes and Flower (1980) described the protocol as powerful in that it is rich in data on cognitive processes. While the picture of the complex processes painted by the protocol may only be a fragmented one, it provides "more information about processes by which tasks are performed than does simply examining the outcome of the process" (p. 10).

The descriptions of cognitive processes emerging from the data gathered from subjects' think alouds are proving helpful in substantiating theory and in developing models of reading and writing processes. More investigations of these processes as they work for subjects completing both reading and writing tasks can only benefit the two fields individually and increase our knowledge of how the two processes relate. From this increased knowledge, instruction, too, will benefit.

Summary

As this review reveals, language research has moved toward a holistic viewpoint in which both reading and writing are seen more as complex interactive
processes than orderly arrangements of various subskills. This current holistic view of these processes has raised interesting questions concerning relationships, both within reading and writing and between the two.

The question of how readers and writers comprehend and compose meaning is of central importance. Theoretical models of comprehension and composing both stress recursive, interactive qualities. The procedures by which readers and writers use their prior experiences and organize and control their processing emerge as pivotal to an understanding of how meaning is made in comprehension as well as in composition. With descriptions of these procedures as they occur in response to equivalent reading and writing tasks, researchers can begin to develop a model to explain meaning making, a language process which could encompass large portions of both comprehension and composition. This study attempted to provide such descriptions.
References


Cattell, J. M. (1886). The time it takes to see and name objects. *Mind*, 11, 63-65.


APPENDIX C

PARENTAL PERMISSION LETTER
Dear Parents:

I am a doctoral student in Education at Louisiana State University currently teaching as a visiting lecturer at Eastern Michigan University. I am presently conducting research for my dissertation. My study involves above-average, twelfth-grade students and the manner in which they comprehend text and compose essays. I have selected your child because of excellent teacher recommendations. The proposed study has received the approval of my doctoral committee at LSU and the local school system.

With regard to your child's time, the study will involve not more than eight hours in total. This time will be divided into five sessions which can be arranged so as to fit around your child's schedule. The sessions can be set up at the school, at your home, or at my office at Eastern Michigan University, as you prefer. Your child will be asked to read and write for specific purposes and to think aloud during these processes. Transcripts of the reported thinking processes and follow-up interviews will be the data from which I develop descriptions of how good students read and write.

I am asking your permission for your child to participate in the study and for permission to gain access to your child's test scores. I assure you that the sessions will be in no way detrimental to your child and could, in fact, help by increasing awareness of processing strategies. Your child's name will not be used in the final report of this study. Please sign below if you will agree to your child's participation, and I will contact you regarding a schedule for the data collection.

Thank you for your support and cooperation. Basic research such as this is essential to improving the instruction your child receives.

Sincerely,

Sarah H. Martin

Parent's signature

Date ______________
APPENDIX D

PILOT STUDY
PILOT STUDY

Purpose

The purpose of this pilot study was to determine the following information:

1. The amount of time needed for each session.
2. The appropriateness of the tasks for eliciting meaning-making strategies.

Procedures

The sample consisted of one subject. Randy was a 17-year-old high school senior. He was recommended by one of his teachers as an articulate and proficient reader and writer. He made a composite score of 28 on the ACT.

Randy was involved in the study for a five-day period. The sessions took place in the researcher's home. On day 1 he was given the writing assessment task and practice reading and writing tasks to complete while thinking aloud. On day 2 he completed the reflexive writing assignment, and on day 3, the concrete reading task and comprehension assessments. The extensive writing assignment was completed on day 4, and on day 5 he read the abstract reading task and completed the corresponding comprehension assessments. No session took longer than 1.5 hours.

When the pilot study data collection was completed, all of the explanations and directions to be
used for future data collection were developed from the sessions with Randy. His questions and difficulties with the procedures helped guide this development. In addition, some of the assignment directions were reworded to clarify the tasks.

Analysis of the pilot data revealed that many interesting meaning-making strategies had been elicited from both the reading and writing tasks. Also, the multiple-choice tests and written free recalls seemed to reflect the subject's comprehension as it was observed by the researcher. The composition scoring rubrics seemed somewhat rigorous for the pieces which resulted from the subject’s writing, but this was probably caused by a lack of instruction in producing this type of essay. Because the rubrics were a standard for how the assignments should be completed, they were retained for the following study. It is the meaning making resulting from these difficult tasks which is the focus of this study, not the quality of the resulting product.
DIRECTIONS: Please read the following descriptions of abstract and concrete styles. With these in mind, read the four passages attached. Categorize each passage as being either concrete or abstract in style. Then, because some of the passages may be more or less concrete or abstract than others, rate each passage as such using the rating chart below. For the passage rated as the most concrete one, circle "1". For the most abstract one, circle "4". The middle two passages should be "3" and "4". THANK YOU!!!!!

Just return them to my box when you have finished.
Call if you have questions: 924-6078 or 388-2737.

CHARACTERISTICS OF TEXT STYLES:

An abstract style is subtle, profound, and complex with deliberate use of obscure words and long, periodic sentences. A periodic sentence "...places the main clause at the end, building up to it with initial subordinated phrases and clauses." Abstract style is often an original or unusual means of expressing an idea.

Concrete style is a straightforward, simple means of expressing an idea with short sentences and familiar words. Concrete style is similar to journalistic writing.

RATING CHART

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<td>The Phantom World of TV</td>
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<td>Declining SAT Scores: Some Unpopular Hypotheses</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Changed State of Consciousness</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>The Rise of Multiversities</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
APPENDIX F

PASSAGES
THE PHANTOM WORLD OF TV

In the days before the cultural faucets of radio and television had become standard equipment in each home, the Smiths and Millers used to throng the motion picture theaters where they collectively consumed the stereotyped mass products manufactured for them. One might be tempted to regard it as peculiarly appropriate that the mass product should be thus consumed by a compact mass. Such a view, however, would be mistaken. Nothing contradicts the essential purpose of mass production more completely than a situation in which a single specimen of a commodity is simultaneously enjoyed by several, let alone by numerous, consumers. Whether this consumption is a "genuine communal experience" or merely the sum of many individual experiences, is a matter of indifference to the mass producer. What he needs is not the compact mass as such, but a mass broken up or atomized into the largest possible number of customers; he does not want all of his customers to consume one and the same product, he wants all of his customers to buy identical products on the basis of an identical demand which has also to be produced.
In countless industries this ideal has more or less been achieved. Whether the motion picture industry can ever achieve it seems doubtful, because this industry continues the tradition of the theater: the commodity it produces is a spectacle designed for simultaneous consumption by a large number of spectators. Such a situation is obsolete. No wonder that the radio and television industries could enter into competition with the motion picture despite the latter's tremendous development: for the two newer industries benefited from the possibility of marketing, in addition to the commodity to be consumed, the devices required for its consumption, devices that, unlike the motion pictures, could be sold to almost everyone. And so it came about that many of the evenings the Smiths and Millers had formerly spent together in motion picture theaters, they began to spend at home. The situation that is taken for granted in the motion picture theater -- the consumption of the mass product by a mass of people -- was thus done away with. Needless to say, this did not mean a slowing-up of mass production; rather, mass production for the mass man, indeed mass production of the mass man himself, was speeded up daily. Millions of listeners were served the identical product: each of these was treated as a mass man, "an indefinite article"; each
was confirmed in his character -- or absences of character -- as a mass man. But with this difference, that collective consumption became superfluous through the mass production of receiving sets. The Smiths consumed the mass products en famille or even singly; the more isolated they became, the more profits they yielded. The mass-produced hermit came into being as a new human type, and now millions of them, cut off from each other, yet identical with each other, remain in the seclusion of their homes. Their purpose, however, is not to renounce the world, but to be sure they won't miss the slightest crumb of the world as image on a screen.

It is well known that the principle of industrial centralization, which ruled unchallenged only a generation ago, has now been dropped, mainly for strategic reasons, in favor of the principle of dispersal. It is less known that this principle of dispersal is also applied in the production of the mass man. Although we have so far spoken only of dispersed consumption, we are justified in speaking of production because in this case both coincide in a peculiar way. As the German proverb has it, Mensch ist was er isst, "man is what he eats" (in a nonmaterialistic sense): it is through the consumption of mass commodities that mass men are produced. This implies that the consumer
of the mass commodity becomes, through his consumption, one of the workers contributing to his own transformation into a mass man. In other words, mass consumption and production coincide. If consumption is "dispersed," so is the production of the mass man. And this production takes place wherever consumption takes place -- in front of each radio, in front of each television set.

Everyone is, so to speak, employed as a homeworker -- a homeworker of a most unusual kind: for he performs his work -- which consists in transforming himself into a mass man -- through his consumption of the mass product offered him, i.e., through leisure. Whereas the classical homeworker manufactured his wares in order to secure a minimum of consumer goods and leisure, the modern homeworker consumes a maximum of leisure products in order to help produce the mass man. To complete the paradox, the homeworker, instead of receiving wages for his work, must pay for it by buying the means of production (the receiving sets and, in many countries, also the broadcasts) by the use of which he becomes transformed into mass man. In other words, he pays for selling himself: he must purchase the very unfreedom he himself helps to produce.

This conclusion may seem far-fetched. But no one will deny that for the production of the kind of mass
man that is desired today, the formation of actual mass gatherings is no longer required. Le Bon's observations on the psychology of crowds have become obsolete, for each person's individuality can be erased and his rationality leveled down in his own home. The stage-managing of masses in the Hitler style has become superfluous: to transform a man into a nobody (and one who is proud of being a nobody) it is no longer necessary to drown him in the mass or to enlist him as an actual member of a mass organization. No method of depersonalizing man, of depriving him of his human powers, is more effective than one which seems to preserve the freedom of the person and the rights of individuality. And when the conditioning is carried out separately for each individual, in the solitude of his home, in millions of secluded homes, it is incomparably more successful. For this conditioning is disguised as "fun"; the victim is not told that he is asked to sacrifice anything; and since the procedure leaves him with the delusion of his privacy or at least of his private home, it remains perfectly discreet.

The old saying "a man's own home is as precious as gold" has again become true, though in an entirely new sense. For today, the home is valuable not only to its owner, but also to the owners of the home-owners -- the
caterers of radio and television who serve the
home-owner his daily fare.
Time after time parents note that their children's behavior seems to deteriorate just after they finish watching television. Because such behavior is frequently short-lived, parents don't usually make a great deal of it, but when asked specifically about their child's post-viewing behavior, most do confirm that some temporary crankiness or misbehavior often occurs at those times:

"We notice that they always come away from an hour or two of television watching in a terrible state: cranky, captious, tired, ready to explode. They come away from the set and try to assuage some sort of inner dissatisfaction in some way -- by drinking a lot, eating, jumping up and down aimlessly."

"TV doesn't improve their disposition. They're grouchy and irritable right after they watch."

"Immediately after watching television the kids' behavior plummets downward from the normal. There'll be wild running around and that sort of thing."

"The main thing about television is the fact that you sit there passively, and it's going into you. When you turn that set off, it has to come out again. What I notice in my children is that it comes out in a very mindless way -- mindless, spasmodic energy, a brief
little temper tantrum, blowing up, pushing and shoving, being dissatisfied."

The meaning of that post-television crankiness and misbehavior is significant. A young child's behavior, after all, is a parent's most valuable source of information about the child's mental state and his emotional and physical well-being. An understanding of his behavior patterns, of how his behavior reflects his inner equilibrium, is essential to successful child rearing. A three- or four-year-old rarely talks about his feelings. He is unlikely to tell his mother, "I feel happy," or "I am tired," or "I am sick," or "I feel insecure." But by observing his normal behavior, whether he is playing cheerfully, full of energy and curiosity, or whether he seems uncharacteristically withdrawn or unnaturally wild, the parent may come to understand the child's needs and be better equipped to fulfill them.

When behavior takes a mysterious turn, when a child is disagreeable for no discernible reason or reacts in an unusual and unexpected way to both pleasant and unpleasant experiences -- when, in short, his behavior does not follow the usual and simple rules of cause and effect as the parent understands them -- then the parent has cause for anxiety. Invariably the child's inappropriate behavior pattern proves to have
survival value when it is finally understood. A child, for instance, who comes home from nursery school each day in a wretched frame of mind, fussing and demanding attention, may provoke his parents to investigate his well-being at school; often serious problems are uncovered in this way, even though the child may never complain about school or his teacher, and may even claim that he is having a fine time.

Even more important to the child’s well-being is the watchful mother’s instinctive recognition that unexplained crankiness may be a symptom of oncoming sickness. Long before the child articulates any symptom of sickness or physical discomfort, the knowledgeable mother, inspired by his peculiar behavior, whips out the thermometer, often to discover that the child is feverish and sick. In such a case the child’s crankiness is the organism’s symptom that something is wrong; like all symptoms, its function is to help restore the body to its desired state of homeostasis. The mother is led by the symptom to take steps to help restore the equilibrium that has, for some reason, been destroyed.

Another condition in a child’s life regularly leads to behavior that appears to serve no rational purpose, yet proves to have survival value. That condition is sleep. A night of peaceful, pleasant
sleep may be followed by a dismal irritability upon waking up, both in children and in adults. The mood does not seem to be a result of the pleasant or unpleasant aspects of the activity that preceded it. Rather, post-sleep crankiness represents a sort of reentry syndrome, as the mind moves from one state of consciousness into another. The organism seems to require a certain period of adjustment when making the transition from the state of sleep to the state of wakefulness, a period that is longer for some persons than others. Post-sleep crankiness offers a brief period of protection against the dangers inherent in normal human interactions. Leave me alone, the recent sleeper begs by means of his irritability, I’m not ready to deal with you as my usual self. I’m a different person at this moment and might function in the wrong way. Wait until I’m entirely awake. Then I’ll behave reliably.

Bad behavior, to be sure, is sometimes purposefully used by the child to gain some desired end, to get his way, to compel his parents to submit to his will. In the case of post-television crankiness, however, the child’s behavior is likely to lead to an undesired result: the parent will eliminate the desirable experience (television watching) in order to eliminate the subsequent undesirable behavior. It is
logical to assume therefore that unlike a child's whining and fussing to get his way, the post-television bad behavior is not purposeful or within the child's active control. It is provoked for some inner purpose that the child is unaware of.

Is post-television crankiness a signal to parents that the child is fatigued and needs to rest? Why, then, do parents seem to consider television viewing a restful, relaxing activity and often encourage their overtired children to settle down before the television set? What form of rest is the parent to supply, following a number of hours of television watching? If anything, the child seems in need of physical and mental activity.

It is far more likely that post-television crankiness serves a purpose similar to the unexplained behavior that appears at the onset of illness, or at the end of sleep. Perhaps it must be considered in the light of both. It may be a symptom that a parent should heed, a sign that something about the experience of television watching is harmful to the child and may have adverse developmental consequences. Or it may signal a transition from one state of consciousness to another (post-sleep irritability).

That post-television crankiness represents a reentry syndrome raises a particularly disquieting
question: What, then, is the child's state of consciousness while he is watching television? It is clearly not sleep. Is it something other than waking? We are all familiar with drug-induced states of consciousness. Is the television-viewing child on some kind of trip, then, from which he must reenter the real world with the help of a transitional period of bad behavior?

It is a Hobson's choice for worried parents which of these alternative theories to accept -- television viewing the sickness, or television viewing the trip, or, worst of all, television viewing the sick trip. The curious thing is that none of this has much to do with what children watch on television, the usual concern of parents and educators. It is the fact that they watch that is significant. For if television viewing can be a "trip," then perhaps, like the drug experience, it can become an addiction as well.
APPENDIX G

WRITING ASSIGNMENTS
Writing Assessment Assignment

You are working on a special issue of a magazine that will examine major economic trends that occurred from 1971-1980. You have found out that in 1971, 1.6 trillion kilowatt-hours of electricity were produced; in 1976, 2.0 trillion kilowatt-hours; and in 1981, 2.3 trillion kilowatt-hours. You are now looking at the sources of energy used for the production of electricity. The table below gives the percentage of electricity produced according to the power source. Your job is to explain why most electricity in the United States was produced using coal by the end of 1980. Give a cause for this increased use of coal to make electricity. Be explicit so that the reader can follow the steps in your reasoning.

Percentage of Electricity Produced by Year and Source

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal</th>
<th>Gas/Oil</th>
<th>Nuclear</th>
<th>Hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>44%</td>
<td>38%</td>
<td>2%</td>
<td>16%</td>
</tr>
<tr>
<td>1976</td>
<td>46%</td>
<td>28%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>1981</td>
<td>56%</td>
<td>24%</td>
<td>8%</td>
<td>12%</td>
</tr>
</tbody>
</table>

PRACTICE WRITING ASSIGNMENT: You work for a student organization that is ranking faculty members for your school’s annual teaching award. Your job is to use the data from student evaluations given below to write a report for the selection committee recommending which instructor you think should receive the award this year. You should explain your choices. Be explicit in your reasoning so the committee members will know how you made your choice.

<table>
<thead>
<tr>
<th>Instructor expected a reasonable amount of work and clearly explained the grading policy.</th>
<th>Jones</th>
<th>Taylor</th>
<th>Reed</th>
<th>Bass</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>A</td>
<td>B</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The instructor was enthusiastic about the subject.</th>
<th>Jones</th>
<th>Taylor</th>
<th>Reed</th>
<th>Bass</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>D</td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The instructor explained the course material clearly.</th>
<th>Jones</th>
<th>Taylor</th>
<th>Reed</th>
<th>Bass</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The instructor showed genuine interest in students and was available outside of class.</th>
<th>Jones</th>
<th>Taylor</th>
<th>Reed</th>
<th>Bass</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>E</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

Student evaluations of faculty.

Key: A = Best  
B = Better than Average  
C = Average  
D = Below Average  
E = Worst
Assignment 1

The type of writing called for by this topic may be different from most of the writing you are asked to do in school. The purpose of this writing task is to have you articulate your understanding of the topic for yourself -- to help you get your reasoning on the topic clear for yourself. It is not designed to show that you know a certain amount of something or that you have learned something in particular; rather, you are to try to clarify, for yourself, just how you understand the given situation.

Topic The figures below show the amount of TV watched by males and females of the ages from 12 to 55+ years. In order to understand the part that TV could play in your life, develop one hypothesis for why amount of viewing time varies over the lifespan as reflected in the data below. Your paper should deal only with the data for your sex. Address the explanation to the expectations you have for your own life. Think through the data and its implications specifically so that your written explanation gives a clear reflection of your reasoning.

Weekly Viewing Hours by Age and Sex

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>12--17</td>
<td>20hrs 47min</td>
<td>18hrs 18min</td>
</tr>
<tr>
<td>16--34</td>
<td>25hrs 3min</td>
<td>29hrs 48min</td>
</tr>
<tr>
<td>35--54</td>
<td>25hrs 33min</td>
<td>30hrs 22min</td>
</tr>
<tr>
<td>55+</td>
<td>35hrs 49min</td>
<td>40hrs 14min</td>
</tr>
</tbody>
</table>

Assignment 2

The type of writing called for by this topic should be familiar to you. The purpose of the task is to have you explain something to someone else. Your purpose should be to help someone else understand the given situation as you do -- not to convince or persuade them, but to help them understand.

Topic Your social studies class is working on a project concerning the effect of differing incomes on everyday life. Television was your assigned focus, and you have found the data presented in the table below which gives the amount of TV watched in households according to the income of that household. Your job is to write a report for the class which explains why there are differences in amount of TV watched by households with different incomes. The report is to be a short one, so develop only one reasonable hypothesis. Be explicit so that the class can follow your reasoning.

<table>
<thead>
<tr>
<th>Income</th>
<th>Hours per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10,000</td>
<td>53:56</td>
</tr>
<tr>
<td>10,000-14,999</td>
<td>55:02</td>
</tr>
<tr>
<td>15,000-19,999</td>
<td>54:55</td>
</tr>
<tr>
<td>20,000+</td>
<td>50:44</td>
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<tr>
<td>30,000+</td>
<td>50:52</td>
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</tbody>
</table>

APPENDIX H

THINK-ALOUD PRACTICE DIRECTIONS
THINK-ALOUD PRACTICE DIRECTIONS

EXPLAIN THINK-ALOUD: You are to think out loud--like talking to yourself--while you are reading and writing. I will give you a task to read or write. I will read you the directions and have you get started.

The things you say out loud will probably fall into two categories: CONTENT—in reading you might tell what you understand of what you have read so far; in writing you might tell what you are writing and thinking about writing. PROCESS—in reading you might tell what you are doing to understand, like re-reading, or skimming back, etc.; in writing you might tell what you are going to do next or how you plan to do something.

NOW GIVE WRITING PRACTICE TASK AND ANSWER QUESTIONS THATCOME UP AND ENCOURAGE GOOD REPORTING. THEN DO SAME WITH READING PRACTICE TASK.
APPENDIX I

TASK DIRECTIONS
DIRECTIONS FOR WRITING ASSIGNMENTS:

I am going to give you a writing task to complete. What is important to this experiment is that you say out loud everything you are thinking and writing from the moment you receive the writing assignment until you are finished. Say everything no matter how unimportant or irrelevant you might think it is. Report all thoughts. I realize that you cannot say all of the things that go through your head, but try to say as many as you can. I will only interrupt you if you fall silent. Otherwise act as if I were not here. I will be watching the tape and making observations. When you have finished I will ask you some questions from my observations.

Any questions?

Here is the assignment. You have only 50 minutes during which to complete it. Keep your response short and to the point so that you can produce a finished draft within the time limit. Judges will rate your piece on the basis of how well it completes the assignment.

READ ALOUD THE TOP SECTION OF THE ASSIGNMENT

Assignment 1

The type of writing called for by this topic may be different from most of the writing you are asked to do in school. The purpose of this writing task is to have you articulate your understanding of the topic for yourself -- to help you get your reasoning on the topic clear for yourself. It is not designed to show that you know a certain amount of something or that you have learned something in particular; rather, you are to try to clarify, for yourself, just how you understand the given situation.

ASK FOR QUESTIONS ABOUT TYPE OF WRITING REQUESTED.

Assignment 2

The type of writing called for by this topic should be familiar to you. The purpose of the task is to have you explain something to someone else. Your purpose should be to help someone else understand the given situation as you do -- not to convince or persuade them, but to help them understand.

ASK FOR QUESTIONS ABOUT TYPE OF WRITING REQUESTED.
DIRECTIONS FOR READING ASSIGNMENTS:

I am going to give you a passage on TV to read. What I want you to do is to read the text silently as it is divided into clauses. Stop reading at each slash mark and report all the thoughts you have had or are having at that point. Report any thought regardless of how silly or unrelated you might think it is.

When you have finished reading the passage, your comprehension will be assessed first by a written recall task and then by a multiple-choice test. Therefore, be sure that you are sure of your comprehension before you tell me you are finished. Do anything with the passage that you want in order to aid your comprehension.

Any questions?

Act as if I am not here. I will be watching the tape and making observations. When you are finished, I will ask you some questions from my observations.
APPENDIX J

WRITTEN FREE RECALL
FREE RECALL

On this sheet, write down everything you can remember about the text you just read. Don't worry about whether the things you remember are important or not; just write them down anyway. What you write does not have to be in sentence/paragraph form, but you should express each idea clearly enough that anyone who reads it will be able to understand what you mean. You probably will need only about 10 - 15 minutes for this activity, and it is OK to write on the back if you need to.
APPENDIX K

RATING SHEET FOR MULTIPLE-CHOICE TEST VALIDITY
VALIDITY OF CONTENT, CONSTRUCT, AND APPROPRIATENESS

The following two passages and corresponding multiple-choice test questions are to be used in an experiment involving above-average, twelfth-grade students. You are asked to rate the multiple-choice questions on the basis of three criteria: a) content validity -- Do the questions test the knowledge available from the passage? b) construct validity -- Do the questions test the kinds of things subjects must know if they comprehended the passage? c) appropriateness -- Are the questions clearly worded and appropriate for the twelfth-grade target subjects?

Read each passage and then take the test putting answers in the blanks as requested. Then indicate on the table below your judgment on each of the criteria for each question.

Directions: Please put an "x" if you agree with the content validity, construct validity, and appropriateness of each question. If you disagree with any of these criteria for any question, please comment.

"PHANTOM"

<table>
<thead>
<tr>
<th>Question</th>
<th>Content</th>
<th>Construct</th>
<th>Appropriate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
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<td>2.</td>
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"STATE OF CONSCIOUSNESS"

<table>
<thead>
<tr>
<th>Question</th>
<th>Content</th>
<th>Construct</th>
<th>Appropriate</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>yes</td>
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<td>yes</td>
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APPENDIX L

MULTIPLE-CHOICE TESTS
"PHANTOM" -- POSTTEST II: The purpose of this multiple-choice assessment is to determine how well you understood a few key points from the passage you just read. For each of the following questions choose the best answer from those given and put the letter corresponding to that answer in the space provided by the question number.

1. How is "everyone ... employed as a homeworker?"
a. Each one helps produce the mass man.
b. Each one helps to produce unfreedom.
c. Each one helps to produce leisure.
d. a and b

2. What about a movie theater makes it an inappropriate tool in the economy of mass production?
a. It allows mass consumption of a single product.
b. It produces a communal experience.
c. It increases consumption of products.
d. none of the above

3. Who produces the demand for products that is necessary to make mass production efficient?
a. the producer of the product
b. the consumer of the product
c. the "mass man"
d. all of the above

4. What has caused modern man to "hermit" himself in his home?
a. He wants to renounce the world.
b. He wants to understand himself.
c. He wants to be aware of the world.
d. a and b

5. According to the passage, the theater's commodity is the spectacle. What is the television's commodity?
a. the mass man
b. the receiving device
c. TV programs
d. all of the above
6. What audience does the author most effectively address in this passage?
   a. parents
   b. educators
   c. social scientists
   d. television researchers

7. Which of the following is paradoxical to the author?
   a. the use of leisure for production
   b. the privacy of the home
   c. the dispersal of consumption
   d. a and c

8. What does the author claim that TV produces?
   a. consumers
   b. producers
   c. hermits
   d. all of the above

9. Which of the following best states the author's main point?
   a. Each man is involved in both consuming, producing, and producing more consumption.
   b. Television serves a positive function in our economy.
   c. The making of the mass man no longer requires amassing.
   d. The popularity of movies began what television has brought into effect.

10. What is most "phantom" in the world of TV?
    a. consumption
    b. production images
    c. individualism
    d. leisure
"STATE OF CONSCIOUSNESS" -- POSTTEST II: The purpose of this multiple-choice assessment is to determine how well you understood a few key points from the passage you just read. For each of the following questions choose the best answer from those given and put the letter corresponding to that answer in the space provided by the question number.

1. According to the parents' descriptions of their children's post-television behavior, what is the most common characteristic of that behavior?
   a. fatigue
   b. depression
   c. irritability
   d. confusion

2. Which of the situations below cause behavioral patterns similar to post-television viewing crankiness?
   a. oncoming sickness
   b. school-related anxiety
   c. post-sleep syndrome
   d. a and c

3. What reason does the author give for ruling out intentional bad behavior as a cause for post-television viewing behavior?
   a. Young children do not have active control over their behavior.
   b. Children are unable to use television in such a manner -- as a tool.
   c. Bad behavior used in that way would lead to an undesired result.
   d. Because such behavior is short-lived, most parents ignore it.

4. What does homeostasis mean as used in this passage?
   a. symptoms of illness
   b. the body's equilibrium
   c. mental instability
   d. static behavior

5. Post-sleep syndrome represents what?
   a. misbehavior
   b. oncoming illness
   c. transition
   d. none of the above
6. According to the passage, which of the following is a way in which television viewing is like a drug trip?
   a. It produces trance-like behavior.
   b. It produces aggressive behavior.
   c. It produces passivity in normally active children.
   d. b and c

7. The author seems to be focusing this passage most toward whom?
   a. television researchers
   b. parents
   c. educators
   d. any TV viewer

8. The author purposefully chooses words in the passage to suggest that the information given comes from:
   a. educators
   b. psychologists
   c. social researchers
   d. all of the above.

9. Which of the following best describes the author's final conclusions about the effects of television viewing on children?
   a. not harmful in small amounts
   b. harmful regardless of content
   c. harmful if not monitored
   d. positive on some occasions

10. What type of evidence does the author use most frequently to support the main ideas?
    a. scientific research
    b. reports of direct laboratory experiments on children viewing television
    c. anecdotal evidence
    d. none of the above
APPENDIX M

RATING SHEET FOR WRITING ASSIGNMENTS
# Rating Sheet for Writing Assignments

Dear Helpful TA's:

I have made the copies that I think you will need to make the writing assignments. Enclosed with these is a short rating sheet that I would like for you to complete regarding the assignments. It involves your answering yes or no in the space provided to the three questions about the validity of the assignments. I would appreciate your taking the time to answer these three questions. I will collect them with the student responses.

Thanks!

<table>
<thead>
<tr>
<th>Assignment</th>
<th>#1</th>
<th>#2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content Validity:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Does the assignment require the writer to make meaning via constructing an hypothesis?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Is the assignment appropriate for above-average high school seniors?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construct Validity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Does the assignment call too heavily on other skills rather than meaning making?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX N

PRIMARY TRAIT SCORING RUBRICS
PRIMARY TRAIT SCORING GUIDE FOR ASSESSMENT ASSIGNMENTS

A. Rhetorical Demands
1. The author provides no introduction describing the task of explaining the task at hand (increase in coal use or choice of teacher).
2. An introductory element is given, but is very general.
3. There is an introduction, but detailed attention to the task is lacking and the author doesn't suggest any audience (the magazine or the committee).
4. The introduction clearly, specifically describes the task, including audience and development.

B. Hypothesizing a Reason
1. The author gives no reason (for increase in coal usage or choice of teacher).
2. The author gives a reason, but mentions only coal, or only the chosen teacher, not the other power sources or other teachers.
3. The author gives a reason and mentions the qualities of coal or the teacher plus qualities of at least one other power source or teacher.
4. The author traces his/her reason through each power source or teacher.

C. Providing Specific Grounds for Reason
1. The author gives no specific details supporting the reason given.
2. The author does not use the percentages of power from each source or grades for each teacher for discussion.
3. The author gives specific supporting details for at least two of the power sources or teachers from the chart but does not use the percentages or grades given by the chart.
4. The author gives specific supporting details, including the percentages or grades from the chart, for each power source or teacher.

D. Explanation of Details
1. The author does not explain the applicability of details given.
2. The author provides a general, narrative explanation of facts as a whole.
3. The author explains the details but does not relate them strongly to the reason for change or choice.
4. All details are explained and their applicability to the reasoning is clearly stated.
PRIMARY TRAIT SCORING RUBRIC FOR REFLEXIVE ASSIGNMENT

A. Rhetorical Demands
1. The author provides no introduction describing the task of explaining--for her/himself--why viewing time changes.
2. An introductory sentence or two are given, but are very general.
3. There is an introduction, but detailed attention to the task is lacking and the author doesn’t suggest any audience or suggests someone other than him/herself.
4. The introduction clearly, specifically describes the task, that the paper is targeted at the author, and her/his development is obvious.

B. Hypothesizing a Reason for Increase in Viewing Time
1. The author gives no reason.
2. The author gives a reason, but goes away from his/her expected life plan for explanation.
3. The author gives a reason and mentions at least two of the age categories as she/he has experienced them or expects them to be in her/his life.
4. The author mentions his/her reason with regard to each category, stating expectations for his/her own life at those times.

C. Providing Specific Grounds for Reason
1. The author gives no specific details supporting the reason given.
2. The author does not use the categories from the chart as detailed categories for discussion.
3. The author gives specific supporting details for at least two of the categories from the chart but does not use the numbers given by the chart.
4. The author gives specific supporting details, including the average hours from the chart, for each category.

D. Explanation of Details
1. The author does not explain the applicability of details given.
2. The author provides a general, narrative explanation of facts as a whole.
3. The author explains the details but does not relate them strongly to the reason for change.
4. All details are explained and their applicability to the reasoning is clearly stated.
PRIMARY TRAIT SCORING RUBRIC FOR EXTENSIVE ASSIGNMENT

A. Rhetorical Demands
1. The author provides no introduction describing the task of explaining—for the social studies class—how income affects viewing time.
2. An introductory sentence or two are given, but are very general.
3. There is an introduction, but detailed attention to the task is lacking and the author doesn't suggest any audience or suggests someone other than the social studies class.
4. The introduction clearly, specifically describes the task, that the paper is targeted at the social studies class, and her/his development is obvious.

B. Hypothesizing a Reason for Difference in Viewing Time by Household Income
1. The author gives no reason.
2. The author gives reasons why times are what they are for each category rather than explaining the differences among categories.
3. The author gives a reason and traces it through differences between at least two of the income categories.
4. The author traces his/her reason through differences between each category.

C. Providing Specific Grounds for Reason
1. The author gives no specific details supporting the reason given.
2. The author does not use the categories from the chart as detailed categories for discussion.
3. The author gives specific supporting details for at least two of the categories from the chart but does not use the numbers given by the chart.
4. The author gives specific supporting details, including the average hours from the chart, for each category.

D. Explanation of Details
1. The author does not explain the applicability of details given.
2. The author provides a general, narrative explanation of facts as a whole.
3. The author explains the details but does not relate them strongly to the reason for change.
4. All details are explained and their applicability to the reasoning is clearly stated.
A CHANGED STATE OF CONSCIOUSNESS

Time after time parents note that their children's behavior seems to deteriorate just after they finish watching television.

Because such behavior is frequently short-lived, parents don't usually make a great deal of it.

but when asked specifically about their child's post-viewing behavior, most do confirm that some temporary crankiness or misbehavior often occurs at those times:

"We notice that they always come away from an hour or two of television watching in a terrible state: cranky, captious, tired, ready to explode.

They come away from the set and try to assuage some sort of inner dissatisfaction in some way -- by drinking a lot, eating, jumping up and down aimlessly."

"TV doesn't improve their disposition."

They're grouchy and irritable right after they watch."

"Immediately after watching television the kids' behavior plummets downward from the normal.

Um, title seems to make sense.

Well, implying that watching television is bad for you.

But it's not as bad as people would think.

Again, they're implying that television is the source of the misbehavior of children.

Uh, another statement to affirm that.

Seems like they're saying that television will, makes children restless.

And it doesn't help.

More of the same stuff.

Again implying that watching television makes you hyper.
Um, so, actually it could just be writing out my thoughts. Okay. Um, the, it seems odd that the older a person is, the more TV is watched. I’m gonna go back and see what exactly I have to do again. Why the amount of time, and um only the data for my sex. Okay, so I have to write why it varies with the age, one hypothesis. Okay, I have to address it, the explanation to the expectations for my life. Don’t really understand that part. So, we’ve got 12 to 17, 20 hours, and then 25, 25, and 35, 55 plus. Wonder why it could be. See the 12 to 17 um, probably that’s the lowest because they have less time to spend watching TV. 18 to 34 are the working people, they can watch TV when they get home. 35 to 54 the same deal. And 55 plus are people who are probably retired, so they watch even more. Okay. So, my hypothesis is, it correlates to work or what someone does when they come home. Someone between 12 and 13 will study more than they watch TV. But the working people don’t usually have homework. Okay, I gotta make a statement here. I’m doing this to clarify it for myself. Okay. Why does it vary? Make a statement. Stating that it varies, or should I just give a general why? Um. Maybe I’ll say, I’ll say that it does. The amount, I don’t like...
APPENDIX P

DEVELOPMENT AND SUMMARY OF CATEGORIES
DEVELOPMENT OF CATEGORIES OF MEANING-MAKING STRATEGIES

Initially, the researcher used the descriptions of reading process strategies developed by Olshavsky (1976-77) and the descriptions of writing process strategies developed by Flower and Hayes (1981a) as a basis upon which the strategies reported by the subjects in this study would be described. As this analysis progressed, however, it became obvious that this method of analysis would not accomplish the stated purpose of describing meaning-making strategies in that too much researcher inference would be needed to make the distinction between those reading and writing strategies which were and were not to be considered as meaning making. To remedy this problem, a different method of analysis was sought which would unify the data rather than split it. In one similar study conducted to investigate meaning making, Kirby (1986) employed the constant comparison method of qualitative data analysis described by Glaser and Strauss (1967). Because this method of analysis seemed appropriate to the task of developing descriptions from a large amount of data, it was chosen for use in this study.

To begin the analysis, the think-aloud protocols were read through completely. As descriptions were considered, they were jotted down near the appropriate
portions of the protocols. After this reading of all protocols, the researcher made notes of the various descriptions which seemed appropriate. These descriptions were the basis for further refinement and development as the protocols were read through again. As a portion of the protocols was categorized under a particular description, it was compared to other portions which had previously been placed in that category and to the description written for that category. The categories were thus described and refined through many readings of the protocols. The following summary of the eight categories developed in this manner lists the categories and the major types of strategies included in each.
### Summary of Categories of Meaning-Making Strategies

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>Evaluation of processing</td>
</tr>
<tr>
<td></td>
<td>Evaluation of comprehension/composition</td>
</tr>
<tr>
<td></td>
<td>Facilitation of processing</td>
</tr>
<tr>
<td>Phrasing Content</td>
<td>Restatements of text read</td>
</tr>
<tr>
<td></td>
<td>Restatements of ideas</td>
</tr>
<tr>
<td></td>
<td>Produced (rehearsal)</td>
</tr>
<tr>
<td>Content Knowledge</td>
<td>Use of general content prior knowledge</td>
</tr>
<tr>
<td></td>
<td>Use of personal experience</td>
</tr>
<tr>
<td></td>
<td>Elaboration using prior knowledge</td>
</tr>
<tr>
<td>Text Form</td>
<td>Use of style or form knowledge</td>
</tr>
<tr>
<td></td>
<td>Use of knowledge of text mechanics</td>
</tr>
<tr>
<td>Rereading</td>
<td>Reports of rereading</td>
</tr>
<tr>
<td></td>
<td>Observed acts of rereading</td>
</tr>
<tr>
<td>Questioning</td>
<td>Queries concerning texts or ideas</td>
</tr>
<tr>
<td>Inferencing</td>
<td>Generalizations from data given</td>
</tr>
<tr>
<td></td>
<td>Connections of data from different parts of the texts</td>
</tr>
<tr>
<td>Making Connections</td>
<td>References to intended audience</td>
</tr>
<tr>
<td></td>
<td>References to author</td>
</tr>
</tbody>
</table>
VITA

Sarah Hanvey Martin received B.S.Ed. and M.Ed. degrees from the University of Georgia in Secondary English Education. She completed her doctoral program at Louisiana State University.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Sarah H. Martin

Major Field: Curriculum and Instruction

Title of Dissertation: A Description of the Meaning-Making Strategies Reported by Proficient Readers and Writers

Approved:

[Signatures]

Date of Examination: April 27, 1987