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# Effects of verbally instructing learning disabled adolescents to form internal images while reading.

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EFFECTS OF VERBALLY INSTRUCTING

LEARNING-DISABLED ADOLESCENTS TO FORM

INTERNAL IMAGES WHILE READING


by

Angus Laurence Lloyd


A THESIS

submitted to the

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# ABSTRACT

Forty learning disabled ninth grade students were matched
in two groups for reading comprehension, age, IQ and sex.
Experimental group subjects were instructed to make pictures
in their minds as they read a test story and subjects in the
control group were told to read carefully. Subjects were
administered post-reading cloze tests (immediate condition)
and an oral retell technique after reading the story. Both
groups were re-tested on the post-reading cloze device five
days after the initial reading session (delayed condition).
Analysis of variance detected significant differences
favouring the imagery instructed group on the post-reading
cloze test in the immediate condition (p<.01) and on oral
recall of the story events (p<.01). Imagery instructed
subjects maintained their level of comprehension on the cloze
tests in the delayed condition. Control group subjects
improved between conditions to the extent that few between-
group differences were detected. Findings suggest learning
disabled adolescents are able to activate imagery in response
to reading when instructed to do so and that imagery
activation enhances comprehension compared to instructions to
read carefully.

## DEDICATION

This thesis is dedicated to my wife, Marie. Her support never wavered and her encouragement was always there.

## ACKNOWLEDGEMENTS

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Reading is a complex interactive process whereby meaning is derived from text. Students who experience chronic problems in reading comprehension are seriously handicapped in the acquisition of knowledge and successful progress in school. Reading comprehension impairments are among the most debilitating effects of a learning disability since textual comprehension is critical for almost all school subjects.

Efforts to discover effective remediational methods to assist learning disabled students to improve comprehension have, in the past couple of decades, been drawn from cognitive processing theories of learning. Alley and Deshler (1979) have advocated a learning strategies approach which is designed to teach learning disabled students how to learn rather than to teach specific content. Learning strategies have been defined as "techniques, principles, or rules that will facilitate the acquisition, manipulation, integration, storage, and retrieval of information across situations and settings" (p. 13). Samuels (1987) has suggested that a variety of cognitively based factors can account for poor reading. Factors include: defects in arousal, vigilance, alertness and selective attention; lack of accuracy and automaticity in decoding; lack of automaticity in mapping sound units on to visual units; and, difficulty in accessing lexical word information.

Internal visual imagery as a basis for remediation in reading comprehension is an area of cognitive processing that has received limited attention. Several researchers have, however, explored the effects of instructing subjects to form mental images as they read. Preliminary results from empirical studies have suggested that imagery does have a significant role to play in reading comprehension; however, few attempts have been made to incorporate these findings into present models of reading comprehension. In addition, reading comprehension models which recognize the significance of imagery in the reading process have not emerged. Very little research has been reported in the literature about the effects of imagery on the reading comprehension of cognitively impaired students; (i.e., the learning disabled). Indeed, it is not yet clear from empirical studies that imagery is even available to learning disabled students to enhance comprehension.

The availability of imagery to learning disabled students is the critical issue of the present study. If learning disabled students can be shown to benefit from instructions to image while they read then further research can continue to find effective techniques whereby learning disabled students can be instructed how and when to use imagery as an aid for reading comprehension.

Results of the present study of effects of verbally instructing learning disabled adolescents to form internal images while reading are reported in Chapter III. In Chapter IV, the results are discussed and implications for further research are presented. The characteristics of current explanations of reading comprehension are examined in Chapter I. In addition, a cognitive processing model, which recognizes the significance of non-verbal as well as verbal processing, and characteristics of learning disabled students are discussed in this chapter. Chapter II reviews the application of imagery research to reading comprehension in good and poor readers. The purpose of the present study and rationale are detailed in Chapter II.

# CHAPTER I

## Reading, Imagery and Learning Disabilities

Several models of reading comprehension have emerged over the past decade that have attempted to describe the cognitive processes involved in reading. A common element of these models is the underlying assumption that reading is predominantly an activity dependent on linguistic processes. That is, meaning is derived from text primarily through encoding of words, sentences and paragraphs which are associated and integrated, via verbal mediators, with existing information stored verbally in long-term memory. None of these models recognizes the possibility that imagery, encoding and manipulating information through internal images which represent textual content, plays a significant role in the comprehension of text. While the possibility that internal, pictorial images may contribute to comprehension is not denied in current theories of reading comprehension, imagery is simply ignored. There may, however, be justification for the contention that imagery does play a significant and complementary role in the reading comprehension process. This will be discussed later in the chapter. The first section, however, explores

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some current models which regard reading comprehension as a cognitive, linguistic process.

## Linguistic Approaches to Reading Comprehension

Spiro, Bruce and Brewer (1980) have argued that any adequate model of reading comprehension possesses three essential characteristics. The model must be multi-level, interactive and hypothesis-based. Multi-level means that the reader utilizes knowledge structures at various levels. Knowledge structures may include orthographic, lexical, phonological, syntactic and semantic knowledge at the lower levels. Higher level knowledge structures, such as knowledge of inference , rules and expectations about the story structure are considered essential for adequate comprehension of text. The second characteristic involves the interaction of the various levels of knowledge structures. Knowledge structures, such as syntactic, semantic or inferential structures, are not seen as isolated components which operate independently but rather as elements whose interaction results in comprehension. Hypothesis-based characteristics assume that reading is a dynamic process wherein informational structures are constructed and evaluated as additional information is included. As reading continues hypotheses are accepted, rejected or altered as new evidence is acquired.

Current models of reading comprehension which include the characteristics suggested by Spiro et al. interpret these processes to be primarily linguistic in nature. One such model has been developed by Perfetti (1985). Perfetti's model contains two major components: lexical access and comprehension. Both components assume textual processing to be primarily a linguistic activity.

Lexical access refers to the recognition process whereby words are transformed into mental representations. Words in a sentence must be associated with familiar concepts represented in the reader's memory in order to be recognized. These representations include person's names and general concepts, such as what is meant by various verbs and nouns. Also included are representations about how the word is pronounced. Specific properties of words, such as length and frequency, are part of the reader's memory representation for words. According to Pefetti:

> ...lexical access is the process of finding a written word in long-term memory. It initiates the critical processes of semantic encoding i.e.,attaching a contextually relevant meaning for the word to the on-going text processing.It initiates also the process of phonetic activation that may also play a critical role in reading. (P. 20)

Thus, according to Perfetti, reading initially involves recognition or access to previously stored verbal

representations, determination of contextual relevance and identification of a phonetic representation of the collected symbols which results in vocalization or subvocalization of the text. Lexical access does not imply mere "word-calling", but involves deeper processes. Lexical access is the result of an interactive process that occurs when information at different levels is combined to determine some outcome. The outcome may, for example, be access to the word's location in long-term memory. Interactive processes have two key features: each level of information is separately represented in memory (i.e. grapheme, phoneme, word ); and, information passes from one level to another in both directions. The more extensive the reader's lexicon the stronger the interactive process will be and the more efficient the reading process. Words, then, act as stimuli that activate verbal representations.

Comprehension, the second component of the Perfetti model, is also conceptualized as an interactive process. The construction of meaning from text, called text modelling, occurs when local processes build larger representations of the text. Local text processes involve the encoding and integration of propositions. Propositions are abstract, elementary meaning units that comprise the meaning of a sentence. Encoding individual words leads to the development of propositions or local text units. Integration of local

propositions leads to an overall understanding of the text which Perfetti refers to as text modelling.

The assembly of propositions from interconnections of individual words takes place in short-term or working memory, described by Perfetti as a limited capacity processor. Due to the limitations of short-term memory only a few propositions can be held at any one time. As new propositions are assembled previously assembled propositions are vulnerable to memory loss. To avoid this loss propositions must be rapidly integrated into representations that can survive in long-term memory.

Survival depends on rapid integration. Integrative processes are seen as a continuous part of reading and occur at the local level. Perfetti has suggested that integration involves linkage of propositional elements. Linkage is thought to take place at the local level and is achieved through association of new propositions with recently assembled propositions. For example, a pronoun is linked to a noun or proper noun in a previous sentence. The pronoun triggers an association with the noun to which it refers. Local integration is a process which depends on linguistic signals that trigger attachments in memory and depends on the accessibility of linking propositions in memory.

Text modelling is the process by which the reader combines previously integrated knowledge, such as knowledge

about concepts, inferences, textual forms, and knowledge about the world, with local propositions to form a representation of text meaning. When text modelling is achieved so is comprehension.

Perfetti has argued that previously integrated knowledge is stored in the form of schemata. Schemata allow readers to organize information, predict meaning, and develop hypotheses about where and how new information fits. Rumelhart (1980) has defined schemata as "recognition devices whose processing is aimed at the evaluation of their goodness to fit data being processed." (p. 41). Perfetti (1985) has suggested that deficient schemata knowledge is one of the factors that leads to poor comprehension.

In applying the model to an explanation of reading comprehension proficiency Perfetti has suggested that individual differences in four aspects of the model can account for differences between good and poor readers. First, low ability readers, according to Perfetti, have few useful schemata to be able to comprehend a variety of text. A paucity of prior reading experiences leads to a deficiency of knowledge structures (schemata). This deficiency results in poor application of reading skills and poor comprehension. Second, high-ability readers remember more of what they read because they are faster and more efficient at encoding propositions in short-term memory. Third, high-

ability readers are able to encode more word meanings with more precise understanding of words. Fourth, high-ability readers are faster and more accurate decoders. Differences between ability groups in speed of decoding increase as a function of word difficulty which is measured in terms of frequency and length. Limited-capacity processing in short-term memory means that slow decoding is likely to adversely affect comprehension since a reduced ability to decode propositions is implied.

Perfetti has conceptualized reading as a fundamentally verbal process and has claimed that reading comprehension proficiency is the result of verbal efficiency. The central claim of the verbal efficiency theory proposed by Perfetti is that increased textual demands mean that the reader must make more use of higher level comprehension processes without expenditures of resources at lower level coding processes. Low-ability readers, Perfetti has suggested, have inefficient, slow and effortful coding and therefore use up more comprehension resources at lower levels before reaching higher level comprehension processes. Efficiency is defined by Perfetti as "the quality of processing outcome in relation to the cost to processing resources" (p. 120). Schema activation and lexical access, for instance, are seen as very low in resource cost while propositional encoding is more costly. Comprehension is seen as an essentially

linguistic coding process. Inefficiency in this system produces: access interference with current contents of memory; lower quality word codes; and, problems in memory for language.

Perfetti has suggested that the speed with which information is coded and integrated is crucial to efficient reading comprehension. Another propositional account has been suggested by van Dijk and Kintsch (1983) who have made similar claims.

The discourse comprehension model, proposed by van Dijk and Kintsch, assumes that fast retrieval of large amounts of information is possible only if the information is well organized. According to these researchers the reading process involves the construction of propositions which increase in complexity. At the initial stages, the word and sentence level, information is organized into atomic propositions whereby word meanings are determined. A number of atomic propositions are organized into a propositional schema. The schema is a strategic unit developed by the reader which allows fast analysis of surface structure into relatively simple and fixed semantic configurations. The goal of the reader, according to this model is the construction of a textbase. A textbase is defined as the semantic representation of the input discourse in episodic memory. The textbase is the result of the accumulation of

propositions and the connections and relationships among propositions. The construction of a textbase is successful for the reader as soon as the textbase becomes locally and globally coherent. Local coherence is established when the reader identifies connections between successive sentences or clauses (propositions) which can be organized into a relationship. Global coherence is established when the reader determines the nature of the material he or she is engaged in reading. van Dijk and Kintsch have suggested global coherence is established through the application of, what they have referred to as, macrostrategies. Macrostrategies are of two types: contextual and textual. Contextual macrostrategies refer to expectations the reader develops about reading material. For example, clues about the nature of the discourse may come from the title, first sentence or words in large print or boldface. Textual macrostrategies confirm or deny the hypotheses developed by the contextual macrostrategies. Of significance to the present study is that this model, like Perfetti's (1985), assumes that the development of comprehension of text takes place as a result, almost exclusively, of verbal processes. Imagery is not implicated in either model.

In a similar model, Cook and Mayer (1983) have proposed that reading comprehension is a cognitive process which assumes the reader brings to the reading situation a vast

storehouse of existing knowledge. Three major areas of knowledge are suggested: content knowledge, structural knowledge and process knowledge.

Content knowledge refers to specific facts about the world and the reader's environment. This knowledge allows the reader to relate words and ideas from the text to each other. This is called intra-text cohesion. In addition, the reader assumes the material he or she is reading is in some way related to material which has already been stored in long-term memory. This is referred to as extra-text cohesion. Establishing extra-text cohesion allows the reader to make plausible inferences about the material and to make predictions about the remaining content of the material.

Structural knowledge refers to the organizational aspect of the text elements and the ability to make predictions about letter and word structures. For example, certain letter combinations are more likely than others. For example, the combination ch is common while hc is unlikely. Structural knowledge also includes some understanding of story grammar. Most stories, for example, have characters, a plot, a setting etc. The reader with adequate structural knowledge will expect to find these elements in a story once it has been determined that a story is what is being read.

Process knowledge refers to knowledge of what to do with incoming information while reading. It may include the

encoding processes needed to store the information in memory, knowledge of how to retrieve information or how to manipulate the information for further use.

The efficient reader, from Cook and Mayer's perspective, possesses adequate amounts of each of the three knowledge structures. Deficits in one or more of these structures results in inefficient comprehension.

What all three models have in common is their insistence on the almost exclusive role played by language and verbal structures in the development of comprehension. None of the models, and these are representative of the vast majority of reading comprehension models, suggests that readers may integrate, store, manipulate and retrieve the content of what they read by constructing internal images or pictures of the story content. It is surprising that such an apparently commonly recognized cognitive process should be overlooked by theoreticians attempting to better understand how people read and why some people read better than others. Perfetti (1985) and van Dijk and Kintsch (1983) have recognized the importance of fast and well organized information processing to reading yet have not included the possibility that the construction of internal images as a method of integrating information may facilitate comprehension due to greater processing speed. Some researchers, however, have acknowledged the potential of

imagery as a powerful learning process. Most notable among these is Dr. Allan Paivio of the University of Western Ontario in London, Ontario.

Imagery and Cognition

Paivio (1971, 1986) has suggested that imagery is one of two structurally and functionally independent coding systems which are incorporated in a model referred to as Dual coding theory. Dual coding theory maintains that information is encoded, recoded, organized, elaborated, transformed, manipulated and retrieved via two distinct classes of representational systems: verbal and non-verbal. Cognition, according to Paivio (1986), "consists of the activity of symbolic representational systems that are specialized for dealing with environmental information in a manner that serves functional or adaptive behaviour goals." (p. 53). Human cognition is specialized for dealing simultaneously with verbal stimuli (language) and non-verbal stimuli (objects and events). The basic assumption of dual coding is that two classes of phenomena are processed cognitively through separate subsystems: one specialized for language or verbal representations and the other specialized for processing which is non-verbal or imaginal.

The two subsystems are structurally and functionally distinct. Structurally, they are different in the nature of

representational units and the way those units are organized. Functionally the two subsystems are independent in that one can be activated without the other or both can act together. The two subsystems are also functionally interconnected so that activation of one of the systems may initiate activity in the other. Processing of information refers to:

> functional activities that engage the two classes of representation, including activation of either by appropriate stimuli (encodings), activation of one by the other (recoding), organization and elaboration of information within each, as well as transformation, manipulation and retrieval of information from either class. (p. 54)

Thus non-verbal stimuli (objects or events) activate the imaginal representational system and are processed through a variety of cognitive mechanisms while verbal stimuli (e.g. words or sentences) activate the verbal representational system. Dual coding, however, assumes that internal representations are multi-modal and rely on subsystem interconnections rather than being uni-modal or uni-directional with regard to input or output modality. Verbal input, for example, in the form of verbal instructions to construct images from a text, may result in imaginal output such as the generation of an internal image of what is represented in the text.

VERBAL STIMULI                    NONVERBAL STIMULI

SENSORY SYSTEMS

REPRESENTATIONAL CONNECTIONS

VERBAL SYSTEM

Logogens

ASSOCIATIVE STRUCTURE

REFERENTIAL
CONNECTIONS

Imagens

ASSOCIATIVE STRUCTURE

NONVERBAL SYSTEM

VERBAL RESPONSES              NONVERBAL RESPONSES
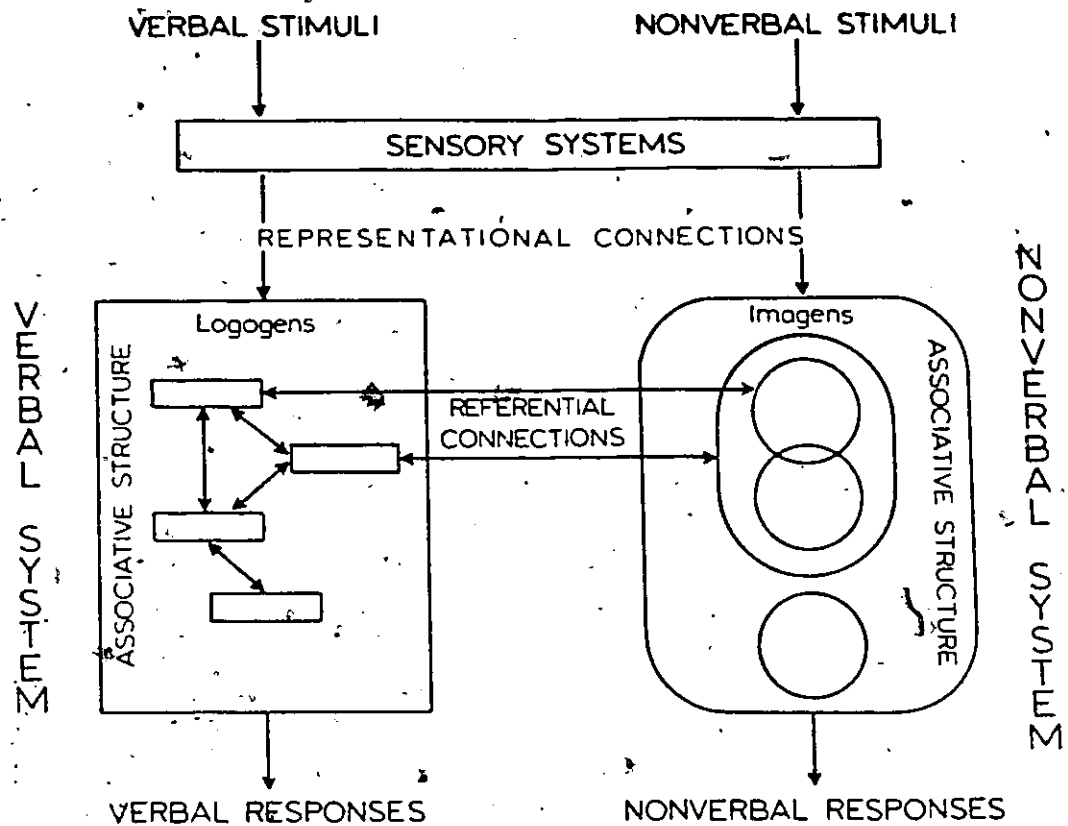
<u>Figure 1</u>. Schematic depiction of the structure of verbal and
non-verbal symbolic systems.

<u>Note.</u> From <u>Mental Representations: A Dual Coding Approach</u>
(p. 67) by A. Paivio, 1986, New York: Oxford University
Press.

Dual coding incorporates three levels of processing:
representational, referential and associative. As can be

seen in Figure 1, interconnections can occur at each of the three levels. Representational processing refers to the activation of each representational system by its respective stimuli. Thus, stimuli in verbal form activate verbal representations and non-verbal stimuli activate non-verbal representations.

Referential processing refers to activation of one system by the other. The non-verbal system may be activated by verbal stimuli or the verbal system may be activated by images. When individuals are instructed to image to verbal stimuli this takes place at the referential level. Associative processing refers to the activation of representations within either system or by other representations within the same system. An associative linking process is assumed. For example, a verbal stimulus may be represented in the verbal system and trigger an association with another "logogen" in the verbal system. This may, in turn, trigger a referential association in the non-verbal system.

The following illustration may serve to clarify. Suppose a reader comes across the word bark. This verbal input activates the verbal representational system which activates an association with the word dog. At the referential level the reader may associate the word dog with an image of the family pet. In this way the verbal stimulus

has activated a verbal association and, consequently, an internal image.

Paivio has not included any control or executive mechanisms to govern this activity. He has suggested that representational activity is controlled by the present stimulus conditions which interact with existing properties of the symbolic systems. The probability that representational activity will take place in one or other of the subsystems is governed by the stimuli or by previously activated representations.

The probability that one of the two subsystems will be activated by any given stimulus is determined by the nature of the stimulus. The non-verbal system is likely to be activated by stimuli that are concrete and of high image arousing value. The verbal system is more likely to be activated when the stimuli are of an abstract nature or have low image evoking potential. For example the word "faculty" could be considered a fairly abstract word and is likely to activate the verbal representational system. On the other hand, for some individuals the word might be a high image arouser and be processed through activation of the non-verbal system. In this case the individual might generate an immediate internal image depicting a building or, perhaps, a staff photograph. The representational system selected by

the individual will depend on past experiences with the stimuli.

In addition to the three levels of processing incorporated in the dual coding model Paivio has identified three processing elaborations: organizational processes, transformational processes and conscious and automatic processes. The nature of elaborative processing differs according to the structural and processing capacities of the two systems. Organizational processes refer to the organization or reorganization of incoming information. Paivio has hypothesized that the verbal system is specialized for organizing and processing sequential units of information, while the non-verbal system is specialized for synchronous or simultaneous processing. Thus, when information is presented in sequential form it is most likely to be organized for processing by the verbal system.

Transformational processes account for the ability to manipulate information and re-order representational components. Both systems are capable of transforming symbolic representations but they do so in different ways in accordance with their structural and functional differences. Verbal transformations operate on a sequential framework imposing changes in temporal order, inserting new elements in an existing sequence, or generating a new temporal sequence. Non-verbal transformations can be likened to the

capabilities of a camera or computer software capable of rotating an image on a screen. An internal image may be changed in size, rotated on a plane, moved from one position in a sequence to another, distorted in shape, or changed in colour at the desire if the imager.

Conscious and automatic processing refers to the awareness of the individual about which processes are being activated. Paivio has hypothesized that non-verbal and verbal systems can function at an unconscious as well as a conscious level (p. 73). This is of particular significance to the present study since subjects in the imagery instructed group were encouraged to attend to the way in which they processed the reading material. Subjects were asked to consciously generate images as they read. It was hypothesized that learning disabled students were capable of actively constructing internal images. If these students were able to do this and reported that they were imaging this could be seen as a prelude to training which could possibly make image generation an automatic response to reading. Paivio has suggested here that automatic non-verbal processing is theoretically viable.

Paivio has listed three basic functions served by the representational systems: evaluative, mnemonic, and motivational-emotional functions. Evaluative functions allow the individual to analyze information contained in mental

representations. Non-verbal analysis may include: a) scanning for relative distances between locations on an image; b) counting corners on an imagined figure (e.g. a three-dimensional image of the letter E); c) identifying information from an imagined matrix; or d) comparing various perceptual differences such as size, colour or weight. Verbal analysis may include activities such as mental arithmetic, analysis of the structure of a mental word (e.g. number of syllables), or analysis of the structure of sentences. The majority of evaluative functions, according to Paivio, implicate both systems to carry out the tasks as well as initiate and control the activity.

Mnemonic functions of the representational systems are implicated in a great deal of research into such things as paired-associate learning, peg memory techniques, loci and chaining. It is assumed that each of the systems has important functions in the encoding, storage and retrieval of information. Paired-associate learning, for instance, activates both systems and relies on referential processing for success. This type of learning often involves word and image pairs. Dual coding theory assumes that the memory trace is a modality-specific, encoded representation of verbal or non-verbal input information. Encoding can take place at any of the three levels. At the referential level, encoding probability is enhanced by instructions to image to

words or name pictures. This interaction results in a "dual trace" (p. 76) which consists of the representation activated by the input items and the referentially related representation which is generated to the input item. At the associative level encoding is related to representations in the same symbolic modality as the input item and can be elaborated according to the encoding cues that accompany the information to be remembered. The use of imagery as a reading comprehension strategy would appear to be most appropriately seen as a mnemonic function.

Motivational and emotional functions served by the representational systems have a bearing on the intensity or vividness with which the information is encoded. Dual coding theory implies that learned emotional and motivational reactions to stimuli are mediated by previous activation of non-verbal or verbal representations. In the case of emotion-arousing objects or events represented in the non-verbal system, the cognitive route may be relatively direct with high probability of connection to the affective systems. Emotion-arousing words implicate processing at the referential level where the referential reaction is a feeling or emotion resulting from a learned experience wherein particular words are associated with various affective situations.

Kosslyn (1980, 1983) has provided additional theoretical support for the prediction that comprehension and retention of prose can be enhanced by imagery. Kosslyn, in a model based on the computer as an analogue of the brain, has suggested that images can be generated from deep representations stored in long-term memory. These deep representations allow the individual to construct new images from parts of the image already stored from past experience and display them on an internal screen, or what Kosslyn refers to as a visual buffer. The resultant image displayed on the visual buffer can then be internally manipulated and transformed as new inputs continue to be added. The image may also be altered as component parts are added or deleted, or reorganized according to verbal instructions. Entirely new images can be generated through production transformations which leave the initial structure intact but use the initial structure to generate a new image. In addition, various regions of the visual buffer can be focussed upon through region-bound transformations which define a particular region of the visual buffer and operate only within those confines. Images, then, according to Kosslyn, are dynamic depictions which can be manipulated by the brain as input data is added.

Kosslyn's approach has a good deal of face validity and helps in understanding how the brain processes information

which requires imagery. Given the inherent cognitive abilities suggested by Kosslyn it can be speculated that additional data in the form of prose is likely to activate the imagery process and allow the individual to develop literal and propositional encodings which will assist in comprehension. Paivio's (1986) dual coding approach is, however, even more applicable to the issue of image generation and reading comprehension. Dual coding implies a cognitive interaction between words (verbal stimuli) and images which takes place at the referential level as a mnemonic function. Instruction to image to words, according to Paivio, maximizes the probability that imaginal representations will be activated by subsequent verbal cues. Paivio has suggested that concrete, easily imageable stimuli are more likely to result in non-verbal processing. Thus, descriptive prose is more likely to be imaginally processed at the referential and associative levels than abstract material which employs little image evoking language.

The major distinction between propositional (Perfetti, 1985; van Dijk and Kintsch, 1983) and representational theorists (Kosslyn, 1983; Paivio, 1986) involves the attitude these researchers have taken to imagery. Representational theorists have suggested that imagery plays a distinct and significant role in cognition while propositionalists do not acknowledge this significance.

Nevertheless, Kosslyn and, in particular, Paivio have provided theoretical foundations on which to investigate the potential for imagery to enhance reading comprehension in learning disabled students.

## Characteristics of Learning Disabled Students

Learning disabled students experience learning problems which involve disorders in "the processes necessary for the proper use of spoken language or the symbols of communication." (Ontario Ministry of Education, 1984; p.19) According to the Ontario Ministry of Education, Special Education Information Handbook (1984), learning disabilities are characterized by deficits in receptive language (listening, reading); language processing (thinking, conceptualizing, integrating); and expressive language (talking, spelling, writing). Deriving meaning from text involves various cognitive processes whereby the reader decodes symbols, stores, manipulates, integrates, organizes, transforms and retrieves information. Reading comprehension is an interactive process which involves cognitive processing (Perfetti, 1985). Clearly, many of the processes implicated in reading comprehension have been identified as deficit processes in learning disabled students. Remediational approaches, then, must take into account the

particular cognitive handicaps experienced by learning disabled students.

The Handbook for Teachers of Students with Learning Disabilities (Ontario Ministry of Education, 1986) has described learning disabilities as cognitive processing deficiencies which are developmental in nature.

> Cognitive development refers to the growth in a person's ability to acquire, interpret, organize, store, retrieve and employ concepts and knowledge. Students with learning disabilities have gaps of varying severity in their cognitive development. Many of them do not appear to learn higher-level concepts incidentally. They need to be taught how to think, plan, classify, solve problems, understand abstract language, and generalize or transfer learning to new situations. (p. 22)

Training is aimed at assisting students to use active, intentional, cognitive processes to help them learn.

Feuerstein (1981) has identified several characteristics of learning disabled students. These students, according to Feuerstein, are poor problem-solvers and tend to use impulsive, unplanned, unsystematic approaches to problem-solving. They have impairments in verbal skills which make understanding complex relationships involving abstract components of communication more difficult. Learning disabled students exhibit a passive attitude toward learning and tend to see themselves as recipients rather than active participants in the learning

process. Planning skills, such as goal-setting and evaluation are lacking. Learning disabled students often have short attention spans, poor memory and underdeveloped general knowledge.

Feuerstein has stressed that impaired functions are not considered as elements which are totally absent from the cognitive repertoire of the individual but rather are seen as elements that are weak and vulnerable.

> A state of impairment or deficiency is to be understood in the sense that these functions do not appear spontaneously, regularly, and predictably in the cognitive behaviour of the individual. (p. 72)

This conception of impaired rather than absent cognitive functioning is of particular relevance to the present study. Studies have shown (e.g. Gambrell and Bales, 1986) that poor readers tend not to spontaneously induce imagery while reading but when instructed and/or trained to do so are successful in prose comprehension.

Feuerstein's conception of cognitive deficiency as an explanation for learning problems in some students is a valuable contribution to research. Nevertheless Swanson (1987) has argued that a cohesive theoretical framework of information processing is needed to provide a basis for predictions about the value of various remediational

approaches. Swanson has suggested that for the past three decades research on learning disabilities has not provided significant theoretical or practical direction toward a science of learning disabilities. Swanson has suggested there are two main reasons for this situation: the fluctuating and elusive nature of the term "learning disabilities", and the predominance of differential or psychometric theories of learning disabilities. Differential theories assume that individual differences are related to mathematically derived factors. A factor analytic approach, Swanson has argued, is aimed at isolating differential scores on standardized tests. This approach, according to Swanson, has at least four limitations. First, the mental processes necessary for learning have not been clearly defined, yet are assumed in standardized tests. Second, the subprocesses underlying academic tasks required for school learning are difficult to identify. Third, differential or psychometric approaches do not provide a link between cognitive theories and educational practice. Fourth, such an orientation obscures the specific learning disability being sought. Deficit performance on one or more of the subtests of a standardized test may reflect a generalized performance deficit which is ascribed disproportionate weight because some subtest items measure the generalized deficit better than others.

Information processing theories, according to Swanson, hold more promise for the learning disabled because they assume learning is a continuous, interactive process. While information processing models are made up of component parts, those parts are not conceptualized as operating in isolation from one another but as interactive elements. Swanson has argued that it is the nature of the interaction which is of prime importance rather than the strength or weakness of one or more of the component parts.

If a meaningful link is to be obtained between information processing abilities and classroom learning a fine-grained analysis of the learning tasks and processes by which those tasks are mastered is required. Swanson has suggested that the tasks be described as a series of mental operations or processes on which executive functions operate. Swanson has suggested eight processes which require investigation since they are implicated in cognitive processing of information. These processes include: encoding, the process whereby input information is analyzed and perhaps matched against past learning; elaboration, the process whereby connections are made with previously stored information; transformation, the application of previously acquired rules to incoming information; storage, the process whereby new information is added to existing information; retrieval, the process whereby previously stored information

is made available; searching, the process which determines the presence or absence of additional properties concerning the information; comparing, the process which compares input information to previously stored information; and, reconstruction, the process whereby recalled information is reconstructed by connecting fragments or pieces of stored information. Swanson has concluded that a better understanding of these processes and the manner in which they operate in combination in the individual will lead to a better understanding of the educational needs of learning disabled students.

Swanson has argued that "specific skill deficiencies do not represent difficulties in specific processes, but rather reflect difficulties in the co-ordination of such processes." (p. 159) Co-ordination or executive control of cognitive processes has been referred to as metacognition (Flavell, 1976) which has been defined in the following terms.

> Metacognition refers to one's knowledge concerning one's own cognitive processes and products related to them... Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective (p. 232)

In theories of human memory, metacognitive skills have been attributed to an hypothesized executive process and include predicting, checking, monitoring and the control of deliberate, purposeful attempts to learn or solve problems (Brown, 1978). Torgesen (1981) has suggested that it is precisely these type of control-processing skills that learning disabled students lack, especially with regard to memory which is implicated in reading comprehension.

Torgesen (1981) has asserted that "L.D. (sic) children typically take a less active, planful, or organized approach to memory tasks than do children who learn normally." (p. 53) Further, Torgesen has concluded that learning disabled children are deficient in elaborative encoding processes of learning including activities such as cumulative rehearsal of information and the establishment of connections to previously learned information. Torgesen has concluded that one of the major distinctions between learning disabled children and non-learning disabled children is a lack of many of the initial processing behaviours that allow information to be stored effectively for later use.

Torgesen (1977) found, in a study of the reading habits of fourth graders, that poor readers failed to activate efficient memory strategies compared to their non-learning disabled peers. Non-learning disabled students consistently approached reading tasks in an organized manner and actively

participated in the reading activities. Importantly, when all children were instructed in the use of efficient strategies, appropriate to the task, poor readers performed as well as good or average readers. These findings lend support to theories (e.g. Feuerstein, 1981) which have claimed that learning disabled children are equipped with the necessary information processing capabilities but do not necessarily activate these process at appropriate times in the classroom.

Further support for this viewpoint has come from research into the flexibility of strategy use. Forrest-Pressley and Gillies (1983) have suggested that three major characteristics of mature readers indicate flexible strategy use. Mature readers: are knowledgeable about possible alternative strategies; spontaneously use reading strategies; and, actively monitor and adjust strategies according to the task demands. These researchers have argued that poor readers have little knowledge of how to monitor reading comprehension, are less apt to use strategies during reading, and fail to adjust and monitor their strategy use according to what they are asked to do. Poor readers, for example, reported that they were ready to write a test after reading the story only once even though they were given ample opportunity to read the story as many times as they liked. Poor readers tended not to adjust their rate of

reading according to the type of information to be retained, and tended not to re-read, pause or look back at points where the processing load became greater.

In summary, reading comprehension is thought to require active, purposeful, cognitive interaction with text. Many of the cognitive skills considered necessary to efficient comprehension of text are precisely the skills with which learning disabled students experience difficulty. While models of cognitive processing which involve imagery have been developed (e.g. dual coding) there has been limited application of these models to the comprehension of prose. Further research into potential applications of dual coding to reading comprehension in learning disabled students is needed.

# CHAPTER II

## Review of Applied Studies

Interest _in imagery as a facilitator of reading comprehension has burgeoned over the past two decades. Empirical studies have provided increasing evidence that students comprehend and retain more of what they read when they are instructed to generate mental images while reading. In spite of mounting evidence concerning the effectiveness of imagery usage as a comprehension facilitating and monitoring strategy it continues to be largely ignored by educational practitioners. Gambrell, Kapinus and Wilson (1987) have cited a recent study by Belcher (1982) in which she surveyed a large number of basal reader guides for examples of suggestions to teachers to have students use imagery as a reading comprehension strategy. Belcher found none.

Translation of research findings into practical teaching methodologies for classroom use is often a slow process. Few examples of techniques which suggest teachers use imagery in their teaching exist. Recently however, Gambrell, Kapinus and Wilson (1987) have suggested a method to teach regular class students to induce imagery as a text processing strategy. They have argued that skilled

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comprehenders employ two types of strategies: text reorganization strategies, which follow after reading and assist the reader to clarify meaning and remember what was read; and, text processing strategies, which are used during reading and encourage the reader to actively engage the reading material and sustain attention during the reading task. Imagery is categorized by Gambrell et al. as a text processing strategy.

The teaching method suggested by Gambrell et al. entails three steps based on principles of metacognition suggested by Brown (1980). In the first stage the teacher explains and models the strategy for the students. During modeling the teacher describes what he or she is doing by verbalizing the self-instructions or thinking aloud. Following the "thinking aloud" stage the students are guided through practice activities which encourage them to use the strategy independently. Finally, in the third stage, students practice independently and are encouraged to use imagery while reading in content subject texts and during leisure reading. Unfortunately the authors of this article have not provided any evidence of the strategy's use in experimental or natural settings.

Imagery Research in Reading Comprehension

Imagery research has included subjects ranging in age from five years to adult. Pressley (1977) has suggested that as children grow older they derive increasing benefit from imagery use to enhance comprehension and recall. He has referred to this phenomenon as a "developmental hypothesis" (p. 586). The developmental hypothesis has mostly been applied to studies of imagery use in paired-associate learning tasks but may be applicable to imagery use in prose recall and comprehension.

Gutteman, Levin and Pressley (1977) read stories to children in kindergarten, second and third grade under four conditions. In the picture condition, subjects were presented with complete pictures and instructed to look at the pictures as they listened to the stories because the pictures showed everything included in the stories. In the partial picture condition, half of the subjects were presented with pictures identical to those used in the complete picture condition except that a critical object was missing. The missing object formed the focus of questions asked after the story reading session. All subjects in the partial picture condition were instructed to form mental images of the missing objects while listening to the stories. In the control condition, subjects were read the stories but were shown no pictures or instructed to use

imagery. All subjects were asked to complete a series of ten short answer questions about the stories. Kindergarten children showed improved comprehension and recall when shown pictures illustrating the story (the complete picture condition). For third graders both picture conditions and imagery facilitated performance on the comprehension questions. For grade two subjects, the complete picture condition was facilitative in comparison to no pictures but the partial picture condition was significantly inferior to the complete picture condition. Gutteman et al. hypothesized that from kindergarten (age five) to grade three (aged eight) there is a pronounced development in ability to use imagery while reading or listening to prose to enhance memory and comprehension of a story.

Gutteman et al. employed two types of imagery: imposed, where subjects were presented with pre-constructed images; and, induced, where subjects were required to generate their own images in response to prose. Induced imagery was facilitative for eight-year-olds, less so for seven-year-olds and scarcely at all for five-year-olds. Imposed imagery was, however, facilitative for five-year-olds.

Lesgold, Levin, Shimron and Gutteman (1975) investigated the ability of young children to construct images from manipulative objects. In one experiment about thirty plastic figures were used with cut-out scenes. Six-

years-olds constructed three-dimensional figures to illustrate a story to which they were listening. A control group completed simple geometry problems as they listened to the story. The illustrative condition did not prove facilitative in prose recall. In fact, the control group fared better on a test of comprehension and recall of the story. Differences in favour of the imagery condition were reported however when subjects were shown experimenter-constructed figures. Externally these children were very poor at constructing pictures and figures. In a second experiment the number of figures from which the subjects had to choose was significantly reduced. Experimental group subjects scored significantly better on comprehension measures in this circumstance. Lesgold et al. concluded that children can benefit from imposed imagery but experience problems when required to externally construct illustrations of stories.

Lesgold, McCormick and Golinkoff (1975) trained nine-year-olds to illustrate stories with stick figure drawings. Control group subjects read the same passage and answered the same multiple-choice comprehension questions as subjects in the experimental group. The cartoon training period took several weeks. During the training session cartooning was gradually phased out until the children were apparently able to construct internal mental images. On a paraphrase-recall

test cartoon-trained subjects were 42% better than control group subjects. The hypothesized improvement on a standardized reading comprehension test was not, however, achieved. In a third experiment, subjects in the experimental group were instructed to use imagery on the standardized reading test, but failed to show any significant difference in comprehension on this measure. Lesgold et al. concluded that "the effects of imagery training lie in the organization and storage of information rather than the preliminary understanding of consecutive segments of prose" (p. 666). These researchers suggested their results be interpreted cautiously since the imagery effect shown on the paraphrase-recall measure may have been brought about incidentally by providing training, not just in imagery, but in attention to details.

Pressley (1976) showed that training eight-year-olds to form pictures in their minds increased comprehension and recall of concrete events mentioned in the story. Training, which took about twenty minutes, involved verbally presenting a sentence and asking subjects to make a picture in their heads. The subjects were then shown a slide of what the picture might look like. Control subjects were presented with the same material (without slides) and told to do whatever they had to in order to remember. After the training sessions all the children were required to read a

story which was a continuation of the training sentences. The story was printed in capitals on five pages in a booklet. A blank page was inserted between each printed page. Experimental group subjects were instructed to construct a mental picture while looking at the blank page. Control group subjects were told to do whatever possible in order to remember for later. All subjects were given a twenty-four item short answer test on events in the story. An analysis of variance detected a significant difference ($p<.05$) in comprehension favouring the experimental group. Pressley concluded:

> When eight-year-old children are told to use mental imagery to facilitate their memory of prose, are given practice at forming mental images, and it is guaranteed that the subjects do not attempt to read and image at the same time, then eight-year-olds' memory of a very concrete, easily imageable story can be improved by using mental imagery. (p. 358)

Another study which addressed the issue of imagery and potential interference from simultaneous processing was reported by Levin and Divine-Hawkins (1974). These researchers investigated the facilitative effects of imagery on reading and on listening. Levin and Divine-Hawkins reasoned that "the act of reading requires the processing of visual information" (p. 24). Since imagery also presumably requires visual processing it may not be an overly effective

reading comprehension strategy, in spite of facilitative effects for listening. To test this hypothesis forty-eight grade four children were selected and randomly assigned to two treatment conditions. In the experimental condition, students were presented with a short passage and instructed to make pictures in their minds. Subjects in the control group were presented the passage without any instructions to image. Half of each group was required to read the passage while the other half listened to the story read aloud by the experimenter. Subjects instructed to image out-performed the control subjects in both conditions. However, subjects who listened while imaging scored significantly better than readers on comprehension measures ($p < .05$).

In a second experiment the rate of presentation of the material was controlled. For subjects in the reading condition the passage material was photographed and mounted on slides which were then shown at two different rates: a fast rate of 3.5 seconds per slide, and a slow rate of 7 seconds per slide. In the listening condition, the passages were tape-recorded and played back at the same intervals as the material presented in the reading condition. Again, half the subjects were instructed to induce mental images of the material they heard or read. Subjects were tested on retention of passage content and, in addition, were asked to rate, on a four-point scale, the extent to which they used

imagery. Recall was better at the slower rate and listening was superior to reading at the fast rate but not the slow. While imagery instructions were facilitative at both rates the differences were not significant. More imagery was reported at the slow rate than at the fast. At the fast rate more imagery was reported in the listening than in the reading condition regardless of instructions given.

Levin and Divine-Hawkins concluded that, to the extent that both reading and imaging use the same visual processing system, executing both systems concurrently may be more difficult than generating images while listening. Listening, they argued, utilizes another system: the verbal-auditory system. These findings lend support to Paivio's (1986) contention that dually coded information (i.e. information coded through the verbal and non-verbal systems) will be remembered better than unitarily coded information.

In a related study Linden and Wittrock (1981) hypothesized that ten-year-olds would comprehend prose material better when induced imagery preceded verbal generative activities. Four treatment groups were established: 1) imaginal to verbal generation; 2) verbal to imaginal; 3) no instruction to generate, and 4) control group taught by the classroom teacher any way she liked. All subjects received instructions in three one-hour sessions over three consecutive days. Students were presented with

three different reading passages (1100-1300 words) on each day and tested on comprehension of the passage at the end of each session. A multiple-choice test of factual information and a sentence completion test were devised for this purpose.

On the first day, subjects in the first treatment condition read the story and immediately constructed and named illustrations for the story. The next day, these subjects wrote summary sentences about the story after reading. On the third day subjects generated and wrote metaphors and analogies for the third story after reading. Subjects in the second group performed the same tasks but in reverse order. Subjects in the third group were instructed in conventional techniques for reading, (e.g. identification of: the main idea, the events of the stories, characters and vocabulary). Subjects in the fourth group were taught the stories by their classroom teacher who was instructed to use whatever techniques she felt appropriate.

Subjects in the first two groups scored significantly better than the second two groups on fact retention. No significant differences, however, were found between the first two groups. Linden and Wittrock concluded that while sequencing of generative activities does not affect comprehension, performance is affected by the use of

generative activities which cause students to interact with the text.

Kulhavy and Swenson (1975) showed that extensive training sessions in imagery usage were not necessary to achieve comprehension improvements in ten-year-old subjects. Subjects in the imagery condition in this experiment were presented with booklets which contained a twenty paragraph prose passage about the way of life of a fictitious tribe. Each paragraph, with an incomplete sentence about the paragraph, was presented on a separate page. The incomplete sentences were of two types: one type required a verbatim response, the other solicited a paraphrase response. Typed at the bottom of each page was the following instruction: "Form a mental picture of these events before turning the page"(p. 49). Booklets distributed to control group subjects contained the same material except that instructions to generate images were omitted. In their place control group subjects were instructed to read the paragraph and answer the question correctly. Immediately after completing the task half of each group was given a test made up of the questions in the booklets. One week later all subjects were given a "surprise" test using the same questions. Although there was a trend favouring the imagery group on the immediate test the difference was not statistically significant. On the delayed test, however, image instructed

subjects recalled significantly more than control subjects on paraphrase recall items but not on verbatim recall questions. Kulhavy and Swenson concluded that ten-year-olds remember more of what they read if they are instructed to try and form mental images after reading. Image instructions, they concluded, act to increase the amount of text content available over time.

Sadoski (1983) found ten-year-old readers could be divided into two groups: those who reported a climax image of a story, and those who did not. Forty-eight grade five students were asked to read, into a tape recorder, a 1400 word passage taken from a basal reader. They then completed three comprehension measures: a post-oral cloze test, a multiple-choice test comprised of items demonstrated to be story dependent (i.e. could not be answered without reference to the text ), and an oral retelling of the story. The retelling was tape recorded to facilitate scoring. After the retelling task subjects were asked to report any memorable images from the story. Sadoski observed that subjects reported imagery without hesitation or confusion. Images were reported in random order and were seldom in chronological sequence. Most notable was that about half the group spontaneously reported an image of the climax of the story and about half reported other images but not the climax. Based on this distinction Sadoski analyzed

differences between two groups of subjects: those who reported climax images and those who did not.

Comprehension measures yielded nine variables. Six variables came from the oral retell measure: recall of characters, recall of character development, recall of events, recall of plot, recall of theme, and a total retell score. One variable each came from the post-oral cloze test, the multiple-choice test and a "comprehension process score" was computed from the oral reading of the story. The comprehension process score was derived from an analysis of the first twenty-five oral reading miscues. The score represented the ratio of miscues considered semantically acceptable in the context of the story to miscues considered semantically unacceptable. The post-oral reading cloze test is similar to conventional cloze tests except that it is administered immediately after oral reading (Page, 1975,p.383). The first two hundred fifty words of the passage were selected for the cloze test with every fifth word deleted.

Analysis of comprehension score variables by group showed significantly higher ratings favouring the climax image group on retelling of theme, total retell and comprehension process scores. Sadoski reported the most significant difference between the groups was on the theme retelling measure. Forty-eight percent of subjects in the

climax image group received full or partial credit for theme compared to only 17% of the no-climax-image group. Sadoski concluded that:

> Deeper levels of semantic processing and text integration...seem to characterize the measures significantly related to reporting an original image of the climax of the story, a behaviour which itself requires the reader to go beyond the specific illustrations of the story for that imagery. (p. 116)

Sadoski has argued that inferred deeper level processing of text was reinforced by the differences found in higher comprehension process scores. Higher scores in this measure, according to Sadoski, indicated the reader was producing story-appropriate meaning, but not necessarily specific wording from the text.

Two other findings from this study are worthy of note. First, the number of images reported was not related to higher comprehension but to identification of the climax image. Second, all subjects (regardless of group) made an average of nearly three times as many oral reading miscues during the climax passage as during the rest of the story. A comparison of readability of that passage and other parts of the story showed no significant differences in readability. Sadoski has hypothesized that the dramatic increase in miscues during the climax passage may have been caused by

the disrupting influence of active visualizing of the climax.
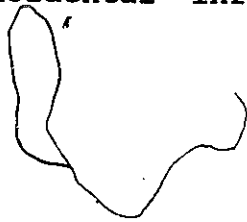
Sadoski reached three major conclusions from the study. First, imagery ability was both naturally present and functional in ten-year-old children reading in school settings. Second, original imagery seemed to be as robust as imagery related to illustrations in the text. Third, the unmanipulated generation of climax or central images appeared to be related to better comprehension and deeper levels of meaning in the story.

By age ten, average and good readers appear to have developed the ability to induce imagery to assist them in recall of factual information from prose passages and comprehension of deeper structures in prose passages. What happens to these abilities as children grow older ? Do these abilities remain intact, develop, or are they replaced by other processing abilities which predominate?

Peters and Levin (1986) taught grade eight students (thirteen year-olds) to use a mnemonic imagery strategy to assist in the recall of information about famous people. The passages were about fifty words in length and each contained three sentences. The first sentence contained the name and accomplishment of the person. The next two sentences elaborated on the central theme. All the surnames of the people described in the passages could be transformed into

an occupation (e.g. Larry Taylor = tailor). Subjects in the mnemonic imagery condition were taught a two-step strategy to recall the person's name and accomplishment. During the first step, students were instructed to change the name into something with which they were already familiar. For example, the name "Taylor" could be changed to "tailor". In the second step students were taught to form an interactive image combining the keyword and the accomplishment. During training students were shown illustrations of what this image could look like. Subjects in the control group were instructed to use their own best method to remember the name of the person mentioned in the passage and the accomplishment for which that person was famous. After the subjects had been exposed to twelve passages cued-recall questions were presented. The twelve questions involved the central information from the passage (the person's name and accomplishment). A further twenty-four questions about the additional information contained in the passage were then presented. One week after the test session subjects were seen individually and tested again on the passage information.

On both the immediate and delayed tests subjects who had been taught the mnemonic imagery strategy remembered substantially more central information than did subjects in the control group. On recall of incidental information,

contained in the second and third sentences, no significant differences were found on comprehension measures in either the immediate or delayed conditions.

After completing the comprehension tasks in the first session subjects were asked what strategy they used to try to recall the passage information. The majority of subjects in the experimental group reported using the strategy they had been taught. Most of the subjects in the control group reported using either a semantic association strategy, in which passage information was incorporated into a sentence which they tried to remember, or a rote rehearsal strategy, where the information to be remembered was repeated over and over. It was significant that the majority of subjects regardless of treatment condition were able to identify that they had used a strategy of some type. Peters and Levin recognized that the effect may have been an artifact of the type of passage used in the experiment since the passages were somewhat contrived for the purposes of the experiment and contained highly image evoking material.

In a second experiment Peters and Levin used the same training procedure but students read passages of about two hundred words taken from a commonly used reading text. Each of the passages selected (ten in all) was about a person and his or her accomplishments. Subjects were grade seven students and the reading passage was reported by the

publisher to be at a grade five reading level. Subjects were divided into two groups according to their scores on a standardized reading test. Students who scored at or above the sixty-fifth percentile were designated good readers. Students who scored below the thirty-fifth percentile were identified as poor readers. Equal numbers of good and poor readers were assigned to each of the two conditions. In addition, half the subjects in each condition received passages where the central information had been underlined.

Three tests were constructed to measure the students' recall of passage information. In an immediate cued-recall test, administered after each passage, subjects were asked to write two or three sentences describing what they remembered about each person. A name-accomplishment matching test was then administered. Third, a detail-discrimination test in multiple-choice format was administered. A second name-accomplishment matching test was administered one week after the session.

As in the first experiment, the mnemonic imagery instruction led to a higher level of recall of central information in the cued-recall task. This was the case for both good and poor readers, although the good readers benefitted slightly more than the poor readers. On recall of incidental information, no significant differences were found. On the immediate matching task subjects in the

imagery group significantly outperformed their control counterparts. Delayed matching tests confirmed anticipated results from the first experiment. Subjects in the imagery group maintained their superiority over control group subjects. This was, however, only true for good readers. Among poor readers the effects of mnemonic instruction were not significantly different in the delayed condition. Peters and Levin have suggested that poor readers were less able to benefit from imagery use over time than good readers. Good readers in the mnemonic condition were superior to control group subjects both immediately after reading the passage and one week later on most measures.The multiple-choice test of detail discrimination, however, produced very different results. On this test good readers in the imagery group performed significantly worse than good readers in the control group.

Multiple-choice Tests in Imagery Research

Studies reported by Peters and Levin (1986) and Sadoski (1983) have raised questions about the effectiveness of multiple-choice test usage in imagery research. In a factor analysis of study variables Sadoski found that multiple-choice test scores loaded on two of four factors. One factor received loadings from the standardized reading test, the verbal mental ability test, the post oral- reading cloze

test and the comprehension process score. Sadoski has interpreted this factor as reflecting "a deeper level of comprehension that is associated with verbal processes" (p. 117). Another factor, which Sadoski has suggested was also associated with verbal processes, loaded significantly on scores from the standardized reading test, the post oral-reading cloze, the multiple-choice test and event recall. Sadoski has associated this factor with "relatively literal comprehension and some simpler inferencing" (p. 118). He has also suggested that the dual loading of the cloze test on both of these factors might indicate that cloze is basically a sentence-bound task that relies heavily on syntactic verbal processes.

Lesgold, McCormick and Golinkoff (1975) failed to show imagery effects on the reading comprehension sub-test of the Metropolitan Achievement Test (a multiple-choice test) even after subjects had been instructed to use imagery as they completed the test. Differences favouring imagery instructed subjects were found, however, on paraphrase recall measures for the same subjects. Kulhavy and Swenson (1975) discovered that students in grade five and six, who were instructed to use imagery, performed significantly better than control group subjects on paraphrase test items but not on verbatim recall.

Tirre, Manelis and Leicht (1979) used two devices to test the comprehension of eighty undergraduate psychology students. Half the subjects were instructed to use a verbal strategy while the other half were instructed to make pictures in their minds. A multiple-choice test was developed to measure comprehension of the one thousand word passages subjects were given to read. Response alternative required the subjects to identify the most accurate statement to describe the relationship of words presented in a word set. Scores on the multiple-choice test favoured the group instructed to use a verbal strategy.

In summary, results from several studies, such as those cited above, have suggested that the multiple-choice tests do not effectively discriminate effects of imagery instruction on prose recall. Conversely, comprehension differences have been found in imagery instructed groups on test instruments which rely on paraphrase and retell abilities. In a replication of his 1983 study Sadoski (1985) omitted the multiple-choice test as a comprehension measure but retained all of the other devices he had used.

Reading Time and Imagery   -

If students tend to miscue more frequently while imaging a particular part of a story (Sadoski, 1983, 1985) more reading time might be needed by students who are

imaging as they read. Denis (1982) conducted a series of experiments to investigate: 1) if students instructed to image while they read required additional time compared to students not so instructed; 2) if the nature of the material they were reading affected their ability to benefit from imagery; and, 3) if abstract material took longer to read than descriptive prose.

In the first experiment, first year university students were asked to read a two thousand word passage of descriptive prose. They were instructed to read carefully but at their own pace. Reading times were recorded. After reading the passage a twenty-four item two-alternative test was administered. The test referred to information which had been explicitly stated in the text. Following the test, subjects completed the Marks Vividness of Visual Imagery Questionnaire (Marks, 1973). High scorers on the questionnaire were found to have taken significantly longer (+14%) to read the passage than low image scorers. In addition, high imagers obtained significantly higher scores on the recall test. Denis (1982) interpreted this result as support for the hypothesis that individuals prone to spontaneously use imagery require longer to read narrative/descriptive texts than individuals not given to using imagery.

In a second experiment, Denis asked another group of first year university students to read a slightly shorter, and more abstract passage, taken from a psychology textbook. The same procedure was used as in the first experiment. In this instance no significant differences in self-paced reading times were found between high and low imagers. Further, no differences were found in scores on the recall test. Denis concluded that individual differences in imagery ability seem to affect processing of verbal/abstract material only insofar as the material is likely to elicit imagery activity.

A new group of subjects was selected for the third experiment and subjects were instructed to read the passage as fast as possible. The passage was the same one used in the first experiment. No differences in reading times were found between high imagers and low imagers; however, high imagers scored significantly better on the comprehension recall measure. Denis concluded that if high imagers still generated internal images in this circumstance they tend to shorten the length of time they maintain the image. In a final experiment, all subjects (again, a new group) were instructed to construct visual images as rich and vivid as possible for places, characters and actions in the passage. High imagers maintained higher comprehension scores although low imagers were significantly better than low imagers in

the first experiment who had not received imagery instructions. In addition, low imagers took significantly longer times to read the passage compared to low imagers in the first experiment. Being instructed to use imagery presumably slowed low imagers' reading times considerably. Denis's results have provided evidence which suggests that individuals not prone to employ imagery while reading are able to benefit from imagery use when instructed to form internal images. Thus, further support for Paivio's (1986) dual coding approach was provided. Paivio has suggested that imagery use is likely if individuals are verbally instructed to image.

## Imagery Research with Poor Readers

If, as studies already cited have suggested, comprehension and recall of prose is facilitated by instructions to use imagery in good and average readers from eight years old to adult, could imagery be used to assist poor and learning disabled readers? Several studies have addressed themselves to investigating imagery effects on poor readers' comprehension.

Gambrell and Bales (1986) have studied imagery affects on comprehension of students from grades four and five who scored one to two grade levels below grade expectancy on a standardized test of reading comprehension. A brief (thirty

minute) training period was provided to acquaint subjects with imagery instructions. Experimental group subjects were presented with three short, high imagery sentences and two short, high imagery paragraphs and encouraged to make pictures in their minds to help them remember what they read. Control subjects were presented with the same material and instructed to do whatever they could to help themselves remember. On the day following the training session all subjects were tested on passages especially constructed for the experiment.

The passages each contained a piece of information which was inconsistent with the remainder of the passage. The inconsistency was explicit in one of the passages and implicit in the other. In the explicit passage, the contradictory information was explicitly stated in adjacent sentences. In the implicit passage, the contradictory information was not located in adjacent sentences, but was implied across two sentences. All subjects read two passages: one containing an explicit inconsistency, the other containing an implicit inconsistency. Prior to reading the passages, subjects were reminded that they were to determine if there was anything not clear and easy to understand about the story. In addition, subjects in the experimental group were told to make pictures in their minds to help them determine if there was anything not clear and

easy to understand in the story. Control group subjects were told to do whatever they could to help themselves determine if there was anything not clear and easy to understand about the story.

When subjects finished reading the story a ten-item probe questionnaire was administered to determine the level at which the subjects detected the inconsistency. The probe contained three levels. At the first level the subjects detected the inconsistency without prompting. Subjects were asked, for example, what they thought about the passage. At the second level, the subjects detected the inconsistency during indirect confrontation. For example, the inconsistency might have been detected in response to the question: "Was there anything that was not clear and easy to understand?" (p. 458). At the third level, the subjects detected the inconsistency during direct confrontation. For example: "Did everything make sense?" (p. 458).

The mental imagery group detected more inconsistencies earlier in the probing and more children in the imagery group detected the inconsistencies compared with the control group. In fact, the overwhelming majority of the control group failed to detect the implicit and explicit inconsistencies at all: 73% and 71% respectively.

Gambrell and Bales concluded that poor readers do not spontaneously use induced imagery as a strategy for

monitoring comprehension, even when they encounter comprehension difficulties such as information which is inconsistent with the remainder of the passage. Consistent with other studies (e.g. Peters and Levin, 1986; Pressley, 1976) these researchers found that when specifically directed to induce imagery while reading the majority of subjects performed significantly better on measures of comprehension than subjects who did not receive imagery instructions.

Levin (1973) studied imagery effects on reading comprehension performance in good readers and two types of poor readers. Good readers were students who scored at or above grade level on a standardized test of reading comprehension (Iowa Test of Basic Skills). Students who scored below grade level were assigned to the poor reader group which was further subdivided into two groups. Difference poor readers were those who scored at a grade equivalent less than one year below grade level on the vocabulary subtest of the Iowa Test of Basic Skills. The remainder, those who scored more that one year below grade level on the vocabulary test, were assigned to the deficit poor reader group. Difference poor readers were assumed to possess the prerequisite skills for comprehension (e.g. decoding or vocabulary knowledge) but experienced comprehension problems because spontaneous reading habits

differed from good readers. That is, the complex organizational strategies involved in comprehension assumed to be available to good readers were not incorporated into the difference poor readers' strategy repertoire. Deficit poor readers, on the other hand, were assumed to experience comprehension problems because they lacked adequate decoding and vocabulary knowledge and skills.

Levin assigned subjects (fifty-four grade four students) to three treatment conditions: reading; reading with instructions to use imagery; and, pictorial presentation. Subjects in the pictorial group received picture cards representing a twelve sentence story. The remainder of the subjects received a printed text version of the story. Half of this group was instructed to use imagery. Imagery instructions consisted of suggesting to the subjects that they think of a picture in their minds of the content of each sentence as they read the passage. Non-imagery instructed readers were simply told to read carefully because a few questions about the passage would follow. The three types of readers (good, difference poor, and deficit poor) were equally represented in each treatment condition. Testing consisted of thirteen questions about the passage presented orally by the experimenter. Each subject was tested individually.

For good readers the imagery instruction condition was most facilitative for comprehension. The prediction, however, that poor readers would benefit relatively more from a pictorial representation of the story than would good readers was not supported ($\underline{p}$>.10). Deficit poor readers scored at about the same level as good readers in the picture condition while difference poor readers scored at substantially poorer levels than either good readers or deficit poor readers in this condition. Instruction to form images while reading benefited difference poor readers more than deficit poor readers. Deficit poor readers were actually 2% worse on the imagery condition compared with reading carefully. Both good readers and difference poor readers showed increased comprehension from imagery instruction. Difference poor readers were as much as 26% better in the imagery condition compared to reading carefully and 19% better using imagery compared to the pictorial representations.

Levin has suggested two hypotheses for the lack of significant effect in the picture condition overall: either the pictures were not good representations of the story; or, some kind of linguistic accompaniment is necessary for optimal comprehension results. According to Levin the pictorial condition might have been more facilitative if subjects had been asked to translate verbally each picture

to themselves as it was presented. Levin has suggested that his findings were consistent with the hypothesis that younger students are less likely to generate imagery strategies spontaneously but do benefit from imagery usage when instructed to activate this strategy.

Belcher (1985) studied the effects of induced mental imagery upon reading comprehension of above and below average third and fourth graders. Significant differences were found in favour of imagery instructed groups in literal comprehension, inferential comprehension, free recall and cued recall. Good readers and poor readers benefited from imagery instructions although good readers benefited more than poor readers.

## Spontaneous Use of Imagery

Several researchers have concluded that poor readers do not spontaneously use imagery strategies to facilitate reading comprehension (e.g. Gambrell and Bales, 1986; Levin, 1973). Do average or good readers spontaneously employ imagery in reading tasks? Levin and Divine-Hawkins (1974) examined spontaneity of imagery use in average and good fifth grade readers. Students were required to either read or listen to a story in preparation for oral test questions. Half the subjects had been instructed to induce imagery while the remainder had not. At the end of the task

subjects were asked to indicate on a four-point scale the extent to which they generated visual images during the passage presentation. Forty percent of the "most frequent" imagery reporters came from the non-imagery-instructed condition. Levin and Divine-Hawkins concluded that a significant number of ten-year-old average and good readers spontaneously induce imagery as an organizational strategy to assist with the processing of language, in written or oral form, regardless of the presence (or absence) of imagery instructions.

Anderson and Kulhavy (1972) found similar results among high school seniors. Students were required to read a prose passage of about two-thousand words, complete a series of comprehension questions, and complete a questionnaire on imagery. The questionnaire asked whether or not the student had tried to use "mental pictures" to learn. More than half the control group reported using mental imagery as a reading strategy even though they were not instructed to do so. In addition, performance on the comprehension tests was related to imagery reports. Those students, regardless of treatment condition, who reported using imagery for all of the passage comprehended and recalled more of the passage information than students who reported less imagery use.

Studies have suggested that many good readers (perhaps at least 40-50%) spontaneously employ imagery strategies in

reading ( Anderson and Kulhavy, 1972; Gambrell and Bales, 1986; Levin, 1973; Levin and Divine-Hawkins, 1974). Conversely, poor readers seem far less likely to generate mental images to assist with comprehension and recall of prose material unless specifically instructed to do so.

Generally, research has suggested that poor readers who are learning disabled lack organizational skills and strategies to apply to a variety of learning situations. Learning disabled students have been characterized as students who approach tasks passively and are less likely than their normally achieving peers to spontaneously use specific cognitive operations such as visual imagery, verbal rehearsal, meaningful grouping and manipulation of stimuli, when asked to memorize material for later recall (Deshler, Schumaker, Alley, Warner and Clark, 1982). Brown (1978) has described skills which monitor cognitive processes as executive skills. Executive, or metacognitive skills ensure the goal of a task or problem is clear, determine an appropriate plan of attack, and evaluate implementation of those plans. Research has shown that normally-achieving students are superior to learning disabled and low-achieving students in the use of executive skills (Deshler, Schumaker, Alley, Warner and Clark, 1982).

The effectiveness of visual imagery as a strategy to assist learning disabled adolescents to monitor their

comprehension skills, and thereby improve them, was studied by Clark, Deshler, Schumaker, Alley and Warner (1984). Six learning disabled secondary school students were taught to use an imagery strategy through an extensive, individual training program. Students were taught to: read a sentence and make an image in their minds; describe the image verbally; evaluate the image to ensure it contained as much detail from the sentence as possible; and, repeat the process for subsequent sentences. Students were tested on their comprehension of reading material at their individual reading ability levels initially, and finally on reading material appropriate to their grade level. All students made significant gains over their own baseline scores on ability level material. All but one achieved mastery level (80%) on comprehension of grade appropriate material. Although these results appeared promising the authors recommended caution in interpreting the results. They pointed out that a very small number of students were involved in the study and that the results should be replicated with additional students before statements about the generalizability of the results could be made.

Jenkins, Heliotis, Haynes and Beck (1986) experimented with a comprehension monitoring strategy comparing average and learning disabled primary and junior division students. Each student was tested under three conditions:

individually, seated next to an examiner; in the classroom group; and, individually with a restatement strategy. In the restatement condition students were instructed to write a brief statement summarizing each paragraph of a short story as they finished it. Comprehension was measured by short-answer comprehension questions as well as a recorded retell of the story. Learning disabled students answered more questions correctly under the restatement condition than under individual or classroom conditions. Although both normal and learning disabled readers benefited from the restatement condition the effect was more pronounced for the learning disabled students.

Research has suggested that when learning disabled students are provided with strategies which cause them to cognitively engage the reading material comprehension is improved. Levin, McCormick and Golinkoff (1975) observed that the beneficial effects which accompanied cartoon drawing in eight and nine-year-olds may have been more the result of providing a mechanism for students to attend more closely to the passage information. Encouraging students to "read carefully" may be an instruction which some students are unable to follow because they do not possess the requisite skills which are components of reading carefully. Preparing restatements to summarize reading or paraphrase

what was read possibly gives students a method by which they can read carefully.

Darch and Gersten (1986) trained secondary school learning disabled students to use an "advance organizer" to approach reading tasks and concluded that this facilitated reading comprehension and recall. Students in the experimental group were given instructions in preparing and using an advance organizer in the form of a text outline. The advance organizer was assumed to assist the students to make predictions about the material they read, and through this close interaction with the text, improve comprehension. The control group was taught using traditional methods in teaching reading: (i.e. developing student interest and motivation; highlighting the relevance of the passage to the students' past experience; and, offering a general introductory discussion). Of significance here is that strategies which require learning disabled students to manipulate text in some way which requires cognitive interaction generally have been found to be facilitative for comprehension. Manipulating text by intentionally forming pictures in the mind may prove to be an effective remediational approach for learning disabled students to become better comprehenders.

## Purpose of the Study

The purpose of the present study was to determine if imagery is available to learning disabled adolescents and if so, to find out whether its use would facilitate reading comprehension. It was hypothesized that verbally instructing learning disabled students to construct internal images as they read would increase comprehension and recall. This enhancement was expected to have an immediate effect and be maintained over time. Further, it was hypothesized that many learning disabled students do not spontaneously employ imagery as an aid to comprehension.

## Rationale

Learning disabled students have been described as passive learners (Torgesen, 1977, 1981) who: have difficulty retaining information in short-term memory (Perfetti, 1985); do not spontaneously select, implement and monitor effective learning strategies or cognitive processes (Brown, 1980; Feuerstein, 1981; Torgesen, 1981); and, experience a multitude of classroom learning problems (Swanson, 1987). Traditional reading comprehension activities such as developing student interest in the text, highlighting the relevance of the passage to the students' past experiences and offering general introductory discussions have been demonstrated to be not as effective in facilitating reading comprehension and recall as approaches which involve active

text processing such as writing restatements of the text (Jenkins, Heliotis, Haynes, and Beck, 1986) or using an advance organizer in the form of a text outline (Darch and Gersten, 1986).

Approaches which have focused on inducing the generation of internal images while reading, as a method of text interaction have shown imagery to be facilitative for reading comprehension and retention for average and good readers (e.g. Kulhavy and Swenson, 1975; Levin, 1973; Peters and Levin, 1986) and poor readers (e.g. Gambrell and Bales, 1986; Peters and Levin, 1986). Limited research, however, has been undertaken into the effects of imagery generation instruction on reading comprehension of learning disabled students. One promising study, (Clark, Deshler, Schumaker, Alley and Warner, 1984) which included learning disabled subjects, suggested some very real potential for imagery as a strategy for learning disabled readers. This study, however, has limited application since the number of subjects was very small and no control group was included in the design. Improved comprehension scores may have been attributable to factors other than imagery usage. For example, the students received considerable amounts of individual instruction in the training sessions. Experimental effects may have been largely due to the attention the subjects received, or could have been due to

exhortations to read more carefully than they normally would.

The present study attempted to isolate imagery instruction as the dependent variable from instructions to read more carefully. It differed from the study by Clark et al. in that it did not include an extensive training period in imagery usage and did include a control group of learning disabled students as a matched sample.

While students included in the present study were definitely poor readers they differed from subjects included in other studies of poor readers in one important respect: subjects in the present study had all been identified as learning disabled. Poor reading may be the result of many factors which are not usually identified as causes of learning disabilities. Poor reading may, for example, be due to mental retardation, vision or hearing impairments, physical handicaps, emotional disturbance, cultural differences, poor school attendance or motivational factors (Ontario Ministry of Education, 1986).

Reading comprehension has been described as a cognitive process which occurs when the reader builds relationships between the text and his or her knowledge and experience (e.g. Perfetti, 1985). Textual information is comprehended as a result of cognitive integration and interaction with the text by which means information is encoded, elaborated,

organized, transformed, manipulated and stored (Swanson, 1987). Learning disabled students have been shown to have impairments in many of the cognitive processes implicated in reading comprehension abilities (Feuerstein, 1981). Remediational approaches, however, which assist learning disabled students to become aware of, and monitor their own cognitive processes have proven successful in laboratory and natural settings (e.g. Deshler, Schumaker and Lanz, 1984; Sheinker, Sheinker and Stevens, 1984).

Paivio (1986) has presented a framework in the dual coding approach from which it may be predicted that, at least in normal readers, verbal instructions to image words may result in enhanced comprehension. According to Paivio, verbal instructions to image words activate the non-verbal representational system at the referential and associative levels of processing. Such instructions result in higher levels of complexity in the integration of textual information, better understanding of text and more durable memory traces.

Paivio's dual coding approach differs from other approaches to language processing in a variety of ways. Perhaps the most significant departure, for the present discussion, lies in the differences between dual coding and propositional accounts of processing such as those proposed by van Dijk and Kintsch (1983) and Perfetti (1985).

Propositional accounts do not deny the existence of imagery but fail to apportion any significance to it as a text processing activity. In this sense propositional accounts are uni-modal in character. That is, mental representations (the deep structures for language) are themselves language-like. What is missing from such theories is the possibility that language (spoken or written) is profoundly influenced by a separate, non-linguistic representational system which differs structurally and functionally from linguistic processes. According to Paivio (1986):

> Referential activity, as in naming an object or imaging to a name, is a probalilistic reaction influenced by the verbal and nonverbal context, including such highly constraining events as verbal instructions to name or image... (p. 215)

The likelihood that referential processing will be activated varies in accordance with: the concreteness or abstractness of the stimuli; the cognitive processing preferences of the individual; and, the presence of verbal instructions to image. Imagery, according to Paivio, "plays an essential role in the comprehension of concrete, high imagery verbal material..."(p.222).

## CHAPTER III

### Method and Results

#### Method

**Subjects**

Forty learning disabled adolescents, enrolled in four Kent County secondary schools, were selected. Subjects were in grade 9, General level courses, in their first year of secondary school. All subjects had been identified as learning disabled by the Kent County Board of Education Special Education Identification, Placement and Review Committee.

**Design**

A matched group design with post-test was used. The following procedure was used to develop two matched groups.

Sixty-nine students were administered the Canadian Achievement Tests (CAT) reading comprehension subtest using level 18 of the test. Students who scored at extremely high or extremely low levels were eliminated from the sample. The remaining 40 students were rank ordered by reading comprehension raw score. Students were then allocated to one of two groups, based on their CAT raw scores, in order to form twenty matched pairs. Twelve pairs were created with identical raw score matches. A further six pairs were

created with a one raw score point difference. The remaining two pairs had scores no more than three raw score points difference.

Preliminary tests of significance (t-tests) detected no statistically significant differences between the groups on reading comprehension level ($\underline{t}(38)=.168,\underline{p}>.10$), age ($\underline{t}(38)=.449,\underline{p}>.10$), verbal IQ ($\underline{t}(38)=.627,\underline{p}>.10$), performance IQ ($\underline{t}(38)=.729,\underline{p}>.10$), or full scale IQ ($\underline{t}(38)=.940,\underline{p}>.10$). Scores from the Wechsler Intelligence Scale for Children-Revised (WISC-R) were used to determine IQ. Table 1 summarizes these results.

Table 1

Means(M) and Standard Deviations(SD) for Reading

Comprehension(CAT), Age and IQ.

| Variable | Groups | | | | |
| --- | --- | --- | --- | --- | --- |
| | Group A (N=20) | | | Group B (N=20) | |
| | M | SD | | M | SD |
| CAT | 19.1* | 4.7 | | 19.3* | 4.7 |
| Age(months) | 185.4 | 4.8 | | 186.0 | 4.4 |
| Verbal IQ | 87.5 | 8.2 | | 89.0 | 7.4 |
| Performance IQ | 96.1 | 10.6 | | 98.4 | 9.8 |
| Full Scale IQ | 90.5 | 6.6 | | 92.6 | 7.2 |

* a raw score of 19 on the CAT reading comprehension subtest at level 18 equates to a grade equivalent of 4.2.

Each group was comprised of 12 males and 8 females.

Group A was selected as the experimental or imagery instructed group, and Group B was selected as the control or read carefully group.

## Materials

An eight hundred and twelve word passage was selected as the test passage. The story is included in a reading anthology (Stanchfield and Granite, 1979) intended for use with below grade level readers. The passage, <u>Fifteen Honest Coins</u> (Kuo and Kuo, 1979), was selected because it was a self-contained short story of reasonable length for experimental purposes and was easily imageable. The story is a Chinese folk tale about the wisdom of a magistrate named Pao Kung. The magistrate arbitrates between a merchant and a poor boy about the rightful ownership of a bag of coins. According to the Dale-Chall formula (Harrison, 1980) for predicting vocabulary difficulty the passage was computed to have a readability level equivalent to 5.9. The Dale-Chall formula is based on the number of unfamiliar words present in the passage and the average number of words per sentence. Unfamiliarity of words is judged by comparing passage words with a three thousand word vocabulary list. Harrison has rated the Dale-Chall formula as the most valid and accurate of nine readability measures reviewed by him. In the reading

anthology, the passage included one illustration depicting the climax of the story. The passage presented to the subjects was re-copied with the illustration omitted.

The training passage, called Shark (Malocsay, 1979), was excerpted from another reading anthology for below grade level readers. Only the first one hundred and thirty words of the story were used. The passage was re-typed and the accompanying illustration omitted.

Instruments and Scoring

Two instruments were used to assess reading comprehension and recall.

1) Post-reading cloze test. The post-reading cloze test is essentially the same as traditional cloze techniques developed by Wilson Taylor (1953). In a cloze test the subject is presented with a passage from which certain words have been removed. The subject is required to complete the passage by inserting the appropriate words. Conventional cloze tests are administered without prior exposure to the passage. The post-reading cloze test is administered after reading the complete passage. The test consists of selections of the passage reproduced with certain words omitted.

The relationship between conventional cloze tests and post-reading cloze tests was investigated by Page (1975) who

concluded that the relationship was strong enough to warrant the use of post-reading cloze tests as comprehension criteria in reading research.

Two passages were taken from the test story for use as cloze passages: the first 279 words, and the last 122 words. These passages were selected because they were generally representative of the story as a whole. The first passage presented the story's setting and most of the main characters. The last passage contained the story's climax and resolution. Fifth word deletion was used as this is most widely preferred in reading research (Harrison, 1980; Page, 1975; Sadoski, 1983, 1985). Harrison (1980) has suggested the optimum passage size for fifth word deletion is 250 words with 50 deletions. In the present study, the two passages combine for 401 words with 80 deletions.

Administration instructions for the cloze tests included the following directions suggested by Harrison.

> i) it is important to make an attempt at every blank if at all possible, ii) only one word must be put in each blank; and, iii) spelling errors will not be marked wrong if it is clear which word was intended. (p. 102)

Verbatim and synonym substitution scoring were employed. That is, non-verbatim substitutions were analyzed for semantic acceptability. Non-verbatim responses were judged to be semantically acceptable if the substituted word was a synonym for the verbatim response and did not change

the meaning of the sentence or paragraph. The following example was taken from the cloze test used in the study. Verbatim reponses have been included and semantically acceptable responses are listed below.

> ...the 1) boy was already carrying bundles 2) to the marketplace while his 3) mother returned to their thatched 4) hut to attend to her 5) duties.

| Verbatim Response | Semantically Acceptable Responses |
|---|---|
| 1) boy | son, lad |
| 2) to | ---- |
| 3) mother | mum, mom |
| 4) hut | house, home |
| 5) duties | work, chores, jobs |

Scores were of two types: number of correct verbatim responses; and, number of semantically acceptable, non-verbatim miscues plus correct verbatim responses. The cloze tests provided six scores: passage 1, verbatim responses (I1V); passage 1, verbatim plus semantically acceptable responses (I1VSA); passage 2 verbatim responses (I2V); passage 2 verbatim plus semantically acceptable responses (I2VSA); passage 1 plus passage 2 verbatim responses (I12V); and, passage 1 plus passage 2, verbatim plus semantically acceptable responses (I12VSA).

2) Oral retelling. The retelling format suggested by Goodman and Burke (1972) was used. Initially, retelling was elicited

by asking the subject to recall all he or she could remember about the story. Following each subject's response, the examiner used non-directive, standardized probes which adhered to the guidelines suggested by Goodman and Burke. Guidelines ensured that the questions themselves did not provide story information to the subject. Questions were general in nature and any mispronunciations or name changes which the reader instituted were retained by the examiner. The retelling was tape recorded and later compared to a prepared outline of the story. The retelling was scored in five categories: a) character-analysis-recall, the names of characters in the story (maximum of 15 points); b) character analysis-development, information concerning the characters' physical appearance, attitudes and feelings, behaviour and relationship to other characters (maximum of 15 points); c) event recall, actual happenings in the story (maximum of 30 points); d) plot, the plan upon which the sequence of events is organized (maximum 20 points); e) theme, the generalizations around which the story is built (maximum 20 points); and f) total retell score, the sum of the above scores (maximum of 100 points). As a check on researcher reliability, five subjects were chosen randomly from each group and their retelling scores recalculated. Using the Pearson procedure a correlation of .92 was obtained.

3) <u>Imagery Use Report.</u> An incomplete sentence with five alternative responses was used for subjects to report the amount of the story for which they used imagery. Possible responses ranged from "none of the story"(1) to "all of the story"(5).

Instructions to Subjects

According to treatment condition a standard set of instructions was read orally to the subjects at the beginning of each session. Instructions to subjects in the experimental group (i.e. imagery instructed) were as follows.

> In a moment I am going to ask you to read a short story called <u>Fifteen Honest Coins</u>. You will have as much time as you need to read the story! When you are finished reading I will ask you to do a couple of exercises to see how much of the story you remembered.
> Before we begin I want to talk to you about reading. Many people say that when they read they make pictures in their minds of what they are reading. Do you make pictures in your mind when you read? (record response) It is as if you had a movie screen in your head and, as you read, the story appears on the screen. A good way to remember things you read is to make up pictures in your mind as you are reading.
> As you read this passage I want you to try to make pictures in your mind of what you are reading as it will help you to remember the story. Let's practice before we start. Here is a short passage about a shark and a diver. As I read it aloud, follow along from the sheet and try to make pictures in your mind of what is happening in the passage.

### Shark

Beth forgot all about the abalone she was after and let herself rise slowly back to the surface. She had just spotted a dark shape moving out of the deep water. She knew it was a shark, knew before the outline got sharper and closer. She wondered if Lisa saw it too.

Beth had seen many sharks before because she did so much snorkeling here at her uncle's place. The sharks never did much, but spotting one was always scary. It was disappointing, too, for that meant she had to go back to shore for the day. But something was different about this nine-footer. Then she knew; this was no after dinner cruise. This shark was hunting. It was hungry and looking for something to eat - right now!

Tell me about the pictures you made in your mind as we read that story. (Subjects responses and elaborative questions from the examiner). Good. Now you are going to read a longer story to yourself. Remember to make pictures in your mind as you read the story. When you've finished reading please close the booklet. Open the booklet and begin reading now.

After subjects responded to the request to tell about the images they made in their minds from the Shark passage the examiner asked probing questions to help subjects elaborate their images. Questions included: "What does Beth look like? Can you describe her? What colour is her hair? What is she wearing? Where is the shark in relation to Beth? Is there anything on top of the water? As you look back toward the shore, what do you see?"

Instructions to control group subjects followed the same format except that references to imagery were replaced with encouragement to read carefully. Instructions to

subjects in the read carefully (control) group were as follows.

> In a moment I will ask you to read a short story called Fifteen Honest Coins. You will have as much time as you need to read the story. When you are finished reading I will ask you to do a couple of exercises to see how much of the story you remembered.
> Before we begin I want to talk to you about reading. One reason why some people have trouble understanding and remembering what they read is that they don't read carefully enough. Some people just read words without thinking about what they are reading. If you read something carefully it will help you to remember more of what you read.
> Let's practice reading carefully before we begin. Here is a short passage about a shark and a diver. As I read it aloud, follow along from the sheet and try to read carefully.
> (Examiner reads Shark passage)
>
> Tell me what the passage was about. (Subject responds). Good. Now you are going to read a longer story to yourself. Remember to read carefully. When you finish reading the story please close the booklet. Open the booklet and begin reading now.

Procedure

The subjects were seen individually by the experimenter in a small room in each secondary school during the school day. Each session lasted approximately 40 minutes with approximately 10 minutes required for the "training" period. Subjects were put at ease and told they were helping the experimenter learn more about reading. The instructions were then read to the subjects according to treatment condition. Following the training period subjects were asked

to read the story to themselves. Reading times were recorded from the time the subject opened the booklet to the time the booklet was closed. When subjects finished reading the story the tape recorder was turned on and the oral retell was introduced. At the completion of the retelling all subjects were asked to complete the imagery use report question. Subjects then completed the cloze tests.

Five days after the session subjects completed the cloze tests a second time. The delayed cloze was administered by the school resource teacher. No instructions, other than those related to completion of the cloze tests, were given. Students were not encouraged to use any particular strategy to help them complete these tests.

Approximately five weeks after the initial session, control group subjects were asked if they usually made pictures in their minds as they read. Answers were recorded as "yes", "no", or "sometimes".

## Results

Analysis of variance (ANOVA) detected statistically significant differences favouring the imagery instructed group on: certain parts of the cloze tests completed immediately after the reading session (immediate condition);

one of the variables measured by the oral retell; and, one of the delayed cloze variables.

On the cloze tests in the immediate condition, mean differences were significant at the .02 level on passage 1 when verbatim and semantically acceptable scoring was employed (I1VSA). Verbatim scoring for passage 1 (I1V) resulted in mean differences which favoured the imagery instructed group and approached, but did not reach statistical significance at the .05 level. On passage 2, mean differences favoured the imagery instructed group for verbatim scoring (I2V) but, were not statistically significant (p>.10). When passage 2 was scored for verbatim plus semantically acceptable responses (I2VSA) mean differences again favoured the imagery instructed group and achieved significance at the .05 level of confidence. When scores on the two passages were combined and verbatim scoring used (I12V), mean differences once again favoured the imagery instructed group and approached, but did not reach, statistical significance. Finally, when both types of scoring and both passages were combined (I12VSA) mean differences, favouring the imagery instructed group were statistically significant at the .01 level. These results are summarized in Table 2.

Table 2

Means(M), Standard Deviations(SD) and Univariate F's on

Immediate Cloze Tests.

| Variable | Imagery Instructed (N=20) | | Read Carefully (N=20) | | df | F-ratio | p< |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | |
| I1V | 26.6 | 5.6 | 23.0 | 6.2 | 1/38 | 3.65 | .06 |
| I1VSA | 37.8 | 5.9 | 31.2 | 8.4 | 1/38 | 6.04* | .02 |
| I2V | 11.9 | 2.4 | 11.0 | 2.1 | 1/38 | 1.59 | .22 |
| I2VSA | 15.0 | 2.5 | 13.4 | 2.4 | 1/38 | 3.97* | .05 |
| I12V | 38.3 | 7.2 | 34.0 | 7.8 | 1/38 | 3.29 | .08 |
| I12VSA | 53.4 | 7.4 | 45.6 | 10.0 | 1/38 | 7.85** | .008 |

* p<.05, ** p<.01

Analysis of variance (ANOVA) of the oral retell measure detected statistically significant differences in favour of the imagery instructed subjects for recall of events ($p<.01$). Imagery instructed subjects recalled significantly more of the events from the story than did subjects instructed to read carefully. None of the other variables measured by the oral retell device showed significant differences between groups ($p>.10$). Results of the oral retell measures are summarized in Table 3.

Table 3

Means(M), Standard Deviations(SD) and Univariate F's on Oral

Retell Measures

| | Group | | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Imagery Instructed (N=20) | | Read Carefully (N=20) | | df | F-ratio | p< |
| | M | SD | M | SD | | | |
| Recall | 14.3 | 1.5 | 13.7 | 1.8 | 1/38 | 1.40 | .25 |
| Development | 12.4 | 3.4 | 12.3 | 3.7 | 1/38 | .02 | .89 |
| Events | 23.6 | 4.8 | 18.4 | 7.1 | 1/38 | 7.37** | .01 |
| Plot | 8.5 | 4.4 | 9.8 | 4.7 | 1/38 | .81 | .37 |
| Theme | 12.1 | 5.3 | 11.6 | 6.3 | 1/38 | .07 | .79 |
| Total | 71.1 | 12.0 | 65.4 | 18.3 | 1/38 | 1.46 | .24 |

** p<.01

The delayed cloze test gave mixed results. As Table 4 shows, on passage 1, imagery instructed subjects scored higher on both verbatim scoring (D1V) and verbatim plus semantically acceptable scoring (D1VSA). Analysis of variance (ANOVA) detected no statisically significant difference for verbatim scoring ($p>.10$), but achieved significance at the .05 level when scored for verbatim and semantically acceptable responses. On passage 2, means for verbatim scoring (D2V) and verbatim plus semantically acceptable scoring (D2VSA) were almost identical. Analysis of variance (ANOVA) detected no significant difference. For both passages combined, imagery instructed subjects were slightly superior to controls for verbatim scoring (D12V) with means of 38.8 and 36.8 respectively. The difference, however, was not statistically significant ($p>.10$). Mean difference on both passages combined with verbatim plus semantically acceptable scoring (D12VSA) slightly favoured the imagery instructed group. The difference approached, but did not achieve statistical significance at the .05 level.

Table 4

Means(M), Standard Deviations(SD) and Univariate F's for

Delayed Cloze Tests.

---------------------------------------------------------------

|  | Group | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Imagery Instructed (N=20) | | Read Carefully (N=20) | | df | F-ratio | p< |
|  | M | SD | M | SD |  |  |  |
| D1V | 27.5 | 5.3 | 24.8 | 5.4 | 1/38 | 2.64 | .11 |
| D1VSA | 39.3 | 5.6 | 35.4 | 6.2 | 1/38 | 4.40* | .04 |
| D2V | 11.3 | 2.3 | 11.5 | 2.2 | 1/38 | .13 | .72 |
| D2VSA | 14.4 | 3.0 | 14.4 | 2.6 | 1/38 | .01 | .91 |
| D12V | 38.8 | 7.2 | 36.8 | 7.2 | 1/38 | .78 | .38 |
| D12VSA | 53.8 | 8.0 | 49.3 | 7.4 | 1/38 | 3.43 | .07 |

---------------------------------------------------------------

* p<.05

In general, means for the imagery instructed group remained fairly stable in the delayed condition while mean scores for the control group increased in the delayed condition compared to control group means in the immediate condition. A comparison of results in the immediate condition (Table 2) with results in the delayed condition (Table 4) shows mean gains for control group subjects on all the variables, while means for the imagery instructed group stayed approximately the same. Standard deviations for the control group were slightly lower on most of the variables, reflecting a closer clustering around the mean in the delayed condition.

Both groups had been matched for reading comprehension ability, and t-tests showed no significant difference in means on intelligence meaures. However, an analysis of covariance (ANOCOVA) was conducted on dependent variables, with Full Scale IQ as the covariate or control variable, to determine possible confounding effects related to IQ.

On the immediate cloze test variables, analysis of covariance (ANOCOVA) detected statistically significant differences on two of the variables which had not previously reached significance. Means for verbatim scoring for passage 1 (I1V) and verbatim scoring for passages 1 and 2 combined (I12V) favoured the imagery instructed group with mean differences significant at the .05 level. On the remaining

four immediate cloze measures F ratios increased with consequent decreases in p-values. The results of the analysis of covariance (ANOCOVA) of immediate cloze tests are detailed in Table 5.

Table 5

Analyses of Covariance (ANOCOVA) of Immediate Cloze Tests Performance of Two Groups of Twenty Subjects with Full Scale IQ as the Covariate.

| Variable | Source of Variation | Sum of Squares | Mean Square | df | F | p< |
|----------|---------------------|----------------|-------------|-----|---------|------|
| I1V      | Between             | 144.87         | 144.87      | 1   | 4.21*   | .05  |
|          | Within              | 1274.21        | 34.44       | 37  |         |      |
| I1VSA    | Between             | 392.18         | 392.18      | 1   | 8.025** | .007 |
|          | Within              | 1808.18        | 48.87       | 37  |         |      |
| I2V      | Between             | 11.38          | 11.38       | 1   | 2.33    | .14  |
|          | Within              | 108.02         | 4.87        | 37  |         |      |
| I2VSA    | Between             | 32.10          | 32.10       | 1   | 5.93*   | .02  |
|          | Within              | 200.18         | 5.41        | 37  |         |      |
| I12V     | Between             | 222.57         | 222.57      | 1   | 4.04*   | .05  |
|          | Within              | 2038.85        | 55.10       | 37  |         |      |
| I12VSA   | Between             | 742.51         | 742.51      | 1   | 10.64** | .002 |
|          | Within              | 2582.49        | 69.80       | 37  |         |      |

* p<.05, ** p<.01

Analysis of covariance (ANOCOVA) of cloze tests in the delayed condition detected a significant difference, favouring the imagery instructed group, on verbatim and semantically acceptable scoring for both passages combined (D12VSA) with an F-ratio of 4.043, $p<.05$. The F-ratio for verbatim and semantically acceptable scoring for passage 1 (D1VSA) increased to 4.92, showing a significant difference, at the .03 level, favouring the imagery instructed group. Mean differences on other delayed cloze measures failed to reach significance ($p>.10$).

Analysis of covariance (ANOCOVA) of the oral retell measures increased the magnitude of the effect of imagery instruction for recall of events. The F-ratio value increased to 8.73 with $p<.005$. Significance was not achieved on other retell measures.

With regard to subjects' reports of imagery usage while reading the story, imagery instructed subjects reported more imagery use than did controls. Although the difference in means was not great, (imagery instructed group: $M=3.8$, $SD=.77$; read carefully group: $M=3.25$, $SD=.97$) it was significant at the .05 level ($F(1,38)=3.971, p<.05$). Clearly, this result must be interpreted with caution since imagery instructed subjects may have reported higher usage in an effort to please the examiner. Report of imagery usage, however, correlated significantly, in the positive direction

(using Pearson coefficients) with the accumulated total score on the immediate cloze test (I12VSA: $df=38$, $r=.32$, $p<.05$), recall of events on the oral retell ($df=38$, $r=.43$, $p<.01$), and analysis of character development ($df=38$, $r=.41$, $p<.01$). Report of imagery usage did not correlate with scores on the delayed cloze test (D12VSA: $df=38$, $r=.10$, $p>.10$).

As shown in Table 6 more imagery instructed subjects than subjects in the read carefully group reported higher levels of imagery usage while reading the story. According to their own reports, then, the majority of imagery instructed subjects followed the instructions they were given. A substantial number of subjects in the read carefully group, however, had not been instructed to make pictures in their minds, yet reported using imagery for some, most, or all of the story.

Table 6

Frequency Distribution of Report of Imagery Usage for Test

Story.

| Report of Imagery Use | Group | |
|---|---|---|
| | Imagery Instructed | Read Carefully |
| | $f$ | $f$ |
| None(1) | 0 | 1 |
| Little(2) | 1 | 3 |
| Some(3) | 6 | 7 |
| Most(4) | 10 | 8 |
| All(5) | 3 | 1 |

Control subjects, instructed to read carefully, took longer to read the passage than imagery instructed subjects when means for reading times were compared (imagery instructed group: $\underline{M}$=5.9 minutes, $\underline{SD}$=1.1; read carefully group: $\underline{M}$=6.7 minutes, $\underline{SD}$=2.5). An analysis of variance (ANOVA) detected no statistically significant difference ($\underline{F}$(1,38)=1.530,$\underline{p}$>.10).

Analysis of variance (ANOVA) of sex detected no significant differences between means on any of the dependent variables (immediate cloze, delayed cloze, oral retell, reading time, or report of imagery usage during the story). F-ratios were all less than 1 on these variables.

In response to the question: "Do you usually make pictures in your mind when you read?" 28% of the subjects (11 out of 40) responded negatively. Half of the subjects (20 out of 40) responded positively and the remaining 9 said they sometimes use imagery while reading. The vast majority of the "no" responders (9 out of 11) came from the imagery instructed group. More control group subjects (12 out of 20) were "yes" responders and twice the number of the "sometimes" responders came from the control group. In essence, more control group subjects reported use of imagery, all or some of the time than did subjects in the imagery instructed group (18 control group subjects compared to 11 imagery instructed subjects). Clearly, these

-results suggest that many subjects in the read carefully group may have been using imagery during the reading session although not instructed to do so.

Tests of significance (t-tests) were conducted on dependent variables for subjects who responded positively to the question concerning normal use of imagery (imagery instructed, $n$=8; read carefully, $n$=12). On the cloze tests in the immediate condition, scored for verbatim and semantically acceptable responses with both passages combined (I12VSA), "yes" responders in the imagery instructed group were superior to "yes" responders in the read carefully group. The difference was statistically significant at the .02 level ($t$(18)=2.589,$p$<.02). The mean for the imagery instructed group on this measure was 55.9 with a standard deviation of 9.7. The read carefully group mean was 45.0 with a standard deviation of 8.9. On the cloze tests in the delayed condition, mean differences again favoured the imagery instructed group but the difference did not achieve statistical significance ($t$(18)=1.531,$p$<.14). On the oral retell measure, total retell means again showed the imagery instructed "yes" responders superior with a mean score difference of 5.7; however, the difference was not significant ($t$(18)=1.097,$p$<.10). Imagery instructed "yes" responders were also superior on recall of events; however,

the difference was not statistically significant
($\underline{t}$(18)=1.272,$\underline{p}$<.10).

Independent variables were also analyzed for
differences between the two groups of "yes" responders in
reading comprehension ability and IQ which might have
affected the results. No statistically significant
differences were found between the groups on these variables
when tests of significance (t-tests) were conducted ($\underline{p}$>.10).
Results are presented in Table 7.

Table 7

Means(M) and Standard Deviations (SD) on Reading Comprehension(CAT) and IQ(WISC-R) for "yes" Responders.

| Variable | Group | | | | |
|---|---|---|---|---|---|
| | Imagery Instructed (n=8) | | | Read Carefully (n=12) | |
| | M | SD | | M | SD |
| CAT | 21.0 | 3.9 | | 20.2 | 4.0 |
| Verbal IQ | 90.0 | 8.7 | | 87.4 | 6.4 |
| Performance IQ | 94:8 | 12.2 | | 96.8 | 7.9 |

Across groups comparison of independent and dependent variables with subjects grouped by habitual use of imagery response showed a trend of higher mean scores for the "yes" responders, lower means for "sometimes" responders, and lowest means for "no" responders. Table 8 summarizes these results.

Table 8

Means(M) and Standard Deviations(SD) on Dependent and Independent Varaibles by Response Group.

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Response Group

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| Variable | Yes (n=20) | | Sometimes(n=9) | | No(n=11) | |
|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD |
| CAT | 20.5 | 3.9 | 18.6 | 5.8 | 17.2 | 4.6 |
| I12SAV | 49.4 | 10.5 | 47.9 | 8.3 | 47.2 | 10.6 |
| D12SAV | 51.8 | 8.2 | 50.2 | 6.5 | 48.3 | 8.2 |
| Retell-total | 69.3 | 11.6 | 71.8 | 20.5 | 63.4 | 18.1 |

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Summary of Results

Imagery instructions were more facilitative for reading comprehension than instructions to read carefully. Imagery instructed subjects performed better on cloze comprehension tests and were able to recall more of the story events. Analysis of covariance (ANOCOVA), with IQ held constant, showed even more pronounced effects of imagery instructions.

Imagery instructed subjects reported significantly higher levels of imagery usage for the test story. Higher levels of imagery usage correlated significantly with higher comprehension scores.

No significant differences were found between groups on reading time. There was no relationship between sex and reading comprehension performance.

With regard to habitual use of imagery, more control group subjects than subjects in the experimental group identified themselves as normal imagery users yet imagery instructed subjects out-performed subjects in the read carefully group on comprehension measures.

Subjects who were instructed to use imagery and who reported themselves as habitual imagery users were significantly better on comprehension measures than subjects in the read carefully group who reported themselves as habitual imagery users. Mean differences in comprehension

between these two subgroups could not be accounted for by
differences in reading comprehension ability or IQ.

# CHAPTER IV

## Discussion and Implications for Further Study

The purposes of this study were: to determine the availability of imagery to learning disabled students; to investigate the potential application of imagery to reading comprehension; and, to determine the durability of imagery effects on reading comprehension. Findings suggest that learning disabled students are able to make pictures in their minds as they read and when they do reading comprehension is enhanced. In addition, imagery effects are maintained over time.

The groups were matched for reading ability, IQ and age. Each group contained the same number of males and females. All subjects were identified as learning disabled. The prime difference between the groups lay in the instructions each group received about how to process information during the reading exercise.

Imagery instructed subjects showed better comprehension on the cloze tests in the immediate condition. Mean differences favoured the imagery instructed group on verbatim scoring and differences were statistically significant when semantically acceptable miscues were scored. Semantically acceptable responses were those which, although not the

verbatim words from the text, were synonym substitutions which kept the meaning of the passage intact. This finding suggests that subjects in the imagery instructed group had a better grasp of deeper levels of comprehension than did controls and had, perhaps, constructed schemata of the text to which they were able to refer when verbatim responses were not available. The development of appropriate schemata has been referred to by Perfetti (1985) as necessary for text modelling which has been identified as an indication of deeper levels of processing where information is integrated and stored.

On most of the oral retell measures differences between groups were minimal. Imagery instructed subjects, however, recalled significantly more (p<.01) events of the story. Most control group subjects who scored poorly on this measure failed to adequately recall events which took place in the last part of the story. This part of the story contained the resolution of the story and its recall was vital to an understanding of the story's theme. In order to relate the story's theme, subjects needed to: recall the majority of story events (including the events which took place at the end of the story); integrate these events into a story framework; compare this framework with existing knowledge about human behaviour; and, possess the language and vocabulary to verbally describe the theme. In spite of superior recall by the imagery instructed group, both groups were equally poor in

describing the theme and plot of the story. This finding may be attributable to the generally low reading comprehension ability of all of the subjects. On the CAT reading comprehension subtest, the mean grade equivalent for the whole group was 4.2 (18th percentile) with a standard deviation of 4.6 raw score points. The majority of subjects scored between the 8th and 37th percentiles. Retell of theme correlated highest with verbal IQ ($r$=.41), followed by CAT reading comprehension scores ($r$=.34), but was unrelated to treatment condition. Findings suggest these students are generally weak in inference skills required to identify themes or generalizations upon which stories are built. These students clearly require considerable instruction in this area. Imagery may have a contributory role to play in this process.

In contriving the two groups every effort was made to match subjects. This was initially accomplished by matching CAT reading comprehension scores. Although t-tests detected no significant differences in IQ, an analysis of covariance (ANOCOVA) was conducted with Full Scale IQ as the control variable. This procedure allowed the researcher to examine the performance of subjects on the dependent variable (reading instruction) as though the groups were equal with respect to IQ. As means in Table 1 show, the read carefully group had a very slight advantage in terms of Full Scale IQ (imagery instructed group: $M$=90.5; read carefully group: $M$=92.6). With

IQ held constant, imagery instructions had an even more pronounced effect on reading comprehension. The magnitude of the differences between the groups increased substantially on most of the comprehension measures. ANOCOVA results further support the hypothesis that reading comprehension is significantly enhanced by instructions to form internal images of prose material.

Paivio (1986) has claimed that the likelihood that imagery will be activated is determined by: the nature of the stimulus material; the presence of instructions to image; and, the preferences of the individual. In the present study, the stimulus material (narrative prose) was selected for its image-evoking potential. Subjects in the experimental group were given verbal instructions to image. Imagery preferences of the subjects, however, were not known at the out-set. A substantial number of subjects, according to their own reports, do not usually make pictures in their minds as they read. The vast majority of these subjects happened to be in the imagery instructed group. In spite of an apparent weighting in favour of the control group regarding imagery preferences, subjects in the imagery instructed group out-performed those in the control group.

Reports of imagery usage during the story suggest that imagery instructed subjects used imagery for more of the story than did controls even though more control subjects identified

themselves as normal imagery users. Higher reports of imagery usage during the story may be suspect since subjects in the imagery instructed group may have been simply trying to tell the examiner what they perceived he wanted to hear. However, if these reports are accurate, they suggest that although many control group subjects identified themselves as frequent imagery users they may not have used imagery while reading the test story or they would have performed as well as imagery instructed subjects on comprehension measures. They may have been distracted by the instructions to read carefully and this interfered with one of the processes which they reported they would normally use: namely imagery.

Further support for the hypothesis that imagery use facilitates reading comprehension was found in an analysis of correlations between subjects' report of imagery usage, during the story reading, and comprehension measures. Regardless of treatment condition, higher scores on the immediate cloze test (I12VSA), correlated with higher reports of imagery usage; significant at the .05 level. For oral retell of character development and for recall of events the correlation was significant at the .01 level. These results suggest that greater amounts of imagery usage is associated with better comprehension of the story. These findings are especially significant since the relationship includes control group subjects. While higher reports of imagery usage may have been

expected from imagery instructed subjects, control group subjects did not have the same motivation to report higher than actual levels of imagery use. Indeed, for the control group alone, correlation between report of imagery usage and recall of events was significant at the .01 level (df=18, $r$=.49).

Gambrell and Bales (1986) have suggested that poor readers do not spontaneously employ imagery strategies. The findings of the present study tend to confirm this position. Subjects who reported themselves as normal imagery users could. be expected to spontaneously use imagery for the test story. Yet when subjects who reported normal use of imagery ("yes" responders) were compared across treatment groups, imagery instructed subjects out-performed their control counterparts on comprehension measures. If all subjects in this subgroup were indeed spontaneous imagery users the instruction to one group to image should have had no effect since they could all be expected to be using imagery anyway.

It may be argued that the instruction to read carefully interfered with control subjects' normal processing. Perhaps without the read carefully instructions control group subjects would have performed as well as subjects in the imagery instructed group. If this is so it suggests that when teachers tell students to "read carefully" this instruction should be accompanied by some advice and training in how to read

carefully. This may involve instructions to "make pictures in your mind" if the material has image-evoking potential, to use an advance organizer (Darch and Gersten (1986), paraphrase the material if it is abstract in nature, or a combination of these strategies. Not only do students need to be instructed in these techniques but also to be able to discern when the application of each approach is appropriate. In addition, it cannot be concluded that reporting oneself as a normal imagery user is the same as being a spontaneous imagery user. Indeed, a predilection to use imagery may be impotent, in terms of enhancing comprehension, without some instruction to image. The findings of the present study tend to support the contention that, for learning disabled students, imagery instructions are necessary before imagery is effectively activated.

Further support for the suggestion that learning disabled students do not spontaneously employ imagery was found when results of imagery instructed "no" responders and read carefully "yes" responders were compared. When students who reported that they do not normally use an imagery strategy while reading (non-spontaneous imagery users) were instructed to do so they performed better on comprehension measures than students who say they do use imagery (spontaneous imagery users) but were not instructed to do so. A comparison of comprehension scores on the immediate cloze test (I12VSA)

between image instructed "no" responders ($n$=9) and read carefully "yes" responders ($n$=12) showed the former group were superior (imagery instructed "no" responders: $M$=49.7, $SD$=7.7; read carefully "yes" responders: $M$=45.0, $SD$=8.9). Control group "yes" responders were superior to imagery instructed "no" responders in reading comprehension ability (CAT means of 20.2 and 16.8 respectively), verbal IQ (WISC-R means of 87.4 and 84.0 respectively) and performance IQ (WISC-R means of 96.8 and 93.4 respectively). In spite of lower reading comprehension ability and IQ, imagery instructed subjects who reported that they do not normally use imagery performed better than non-imagery instructed subjects who reported that they do normally use imagery. These findings lend further support to the argument that many learning disabled students do not spontaneously (i.e. without instruction) use imagery but when instructed to do so improved reading comprehension results.

That imagery is available to learning disabled students was further confirmed by the responses of subjects in the imagery instructed group to the training passage called Shark. Subjects responded confidently and quickly in describing their images. Although the passage offered few details about the incident with the shark, subjects were all able to describe vivid images. Questions about Beth, the diver, were answered with elaborative details including the colour of her hair and

eyes, her approximate height and age, her clothing, and her looks (all male subjects and most female subjects stated that Beth was pretty). When asked to survey the shore, subjects again gave vivid but different descriptions of the shore. Some saw a beach which was heavily populated while some described an empty beach. One subject described a beach of golden sand from which a long wooden pier extended. In this subject's image, Beth's little brother was playing on the pier, but began to look concerned when he realized Beth's predicament. Some subjects described various kinds of boats on the water including sailing boats with coloured sails or fishing boats with long poles protruding from the deck. All subjects were able to describe the images they had constructed and each supplied different details.

Imagery instructed students maintained their level of comprehension in the delayed condition. However, subjects instructed to read carefully improved their scores to the point where mean differences between the groups disappeared. When both passages were combined, and verbatim and semantically acceptable responses scored (D12VSA), the imagery instructed group mean changed very little (immediate condition: $\underline{M}$=53.4, $\underline{SD}$=7.4; delayed condition: $\underline{M}$=53.8, $\underline{SD}$=8.0). For the read carefully group on this variable a larger difference was found between immediate and delayed conditions with a smaller standard deviation in the delayed condition

(immediate condition: $\underline{M}$=45.6, $\underline{SD}$=10.0; delayed condition $\underline{M}$=49.3, $\underline{SD}$=7.4). Sixty-five percent of subjects in the read carefully group scored the same or higher in the delayed condition compared to the immediate condition. Approximately the same proportion of subjects (75%) in the imagery instructed group improved or maintained their scores on this variable from the immediate to the delayed condition. In general, however, subjects in the control group made more substantial gains on delayed cloze scores than did imagery instructed group subjects. Control group subjects made a mean gain of 4.6 ($\underline{SD}$=4.9) while imagery instructed subjects gained a mean of 2.1 ($\underline{SD}$=2.4). A test of significance showed the difference in gains to be statistically significant at the .05 level ($\underline{t}$(38)=2.068,$\underline{p}$<.05) favouring the read carefully group.

As predicted, imagery instructed subjects performed better on the immediate cloze tests than subjects instructed to read carefully. Why did subjects in the read carefully group not do as well in the immediate condition as they did in the delayed condition? The answer may lie in the instructions each group received. Subjects in the control group were told to read carefully but were given few, if any, instructions on how to read carefully. Theories of reading comprehension discussed in Chapter I have recognized the importance of cognitive interaction with the text to comprehension. They have suggested that the reader must integrate the information

through a variety of levels in order for comprehension to take place. van Dijk and Kintsch (1983) have referred to this process as the establishment of global coherence. Cook and Mayer (1983) have referred to extra-text cohesion, and Perfetti (1985) has suggested that the establishment of text modelling and schemata (the result of linking propositions) is necessary for comprehension. Darch and Gersten (1986) have argued that the development of an advance organizer by learning disabled students assisted them to cognitively engage the text and resulted in better comprehension than traditional teaching methods. Jenkins, Heliotis, Haynes and Beck (1986) found that teaching learning disabled students a method of monitoring their comprehension as they read resulted in improved comprehension.

Subjects in the imagery instructed group in the present study were given instructions which potentially gave them a means of interacting with and integrating the text (establishing global coherence, extra-text cohesion, or text modelling): namely imagery. Advice given to control group subjects was clearly not as helpful. The failure of control group subjects to perform as well as imagery instructed subjects in the immediate condition may have been due to lower levels of textual interaction on the part of control group subjects. While instructions from teachers to "read carefully" are frequently given, studies (e.g. Forrest-Pressley and

Gillies,1983) have suggested that learning disabled students are less able than non-learning disabled students to carry out this instruction effectively because they have few strategies by which to activate careful reading. Levin (1973) identified these readers as "difference poor" readers who lacked the organizational strategies necessary to comprehend effectively. Feuerstein (1981) has suggested that learning disabled students do not spontaneously select, implement and monitor effective learning strategies. Given the difference between the results on the cloze tests in the immediate and delayed conditions it would appear that instructing subjects to read carefully may actually have had a detrimental affect on their comprehension. In Perfetti's (1985) terms, instructing students to read carefully may have increased expenditure of lower level, lexical access resources resulting in the reduction of resources available for comprehension. Instructing students to use imagery, however, may provide learning disabled students with text processing strategies which lead to more efficient reading with less emphasis on decoding and enhanced comprehension.

Implications for Further Study

The experiment described in the present study was designed to determine if imagery is a factor which contributes to enhanced reading comprehension in learning disabled

adolescents. Findings suggest this aim was achieved. One structural limitation of the study's design, however, may have reduced the magnitude of the effect. Before completing the cloze test, which measured subjects' comprehension, subjects were asked to retell the story in their own words without reference to the original text. It is possible that paraphrasing the story may have assisted subjects to organize the information and recall more than they would have if paraphrasing had not been introduced. Since all subjects, regardless of treatment condition, completed this exercise the effect should have been equalized for both groups. It may be argued, however, that imagery instructed subjects, in effect, were instructed to activate two text processing strategies: imagery and paraphrasing. Control group subjects were also required to activate two processing strategies: read carefully and paraphrasing. Findings suggest that imagery plus paraphrasing was superior to reading carefully plus paraphrasing. However, it is not known what proportion of the effect was due to the paraphrasing factor and if paraphrasing should be included with imagery in instructional programs which might be developed from these findings. Findings suggest that instructing learning disabled students to image as they read is likely to enhance comprehension. Before construction of an imagery training program, however, further study is needed to determine the role paraphrasing should play in such

an instructional model. This might be achieved using the design presented in this study but with the oral retell measure eliminated for some subjects. Learning disabled subjects would be allocated to one of four treatment conditions. One group would be required to read a story with instructions to image while another group would be instructed to read carefully. Half of each group would be asked to paraphrase the story before completing a comprehension test and half would read the story and complete the comprehension test without paraphrasing. Thus, paraphrasing plus imagery, paraphrasing plus reading carefully, imagery alone and paraphrasing alone could be compared.

Levin (1986) has claimed that, in the context of reading comprehension, several cognitive strategies (e.g. advance organizers, paraphrasing, skimming, asking question, mapping, and imaging) have become popular but "distressingly little" (p. 4) research has been undertaken into the comparative effectiveness of each. He has argued that few studies have been conducted and replicated in which optimally designed versions of these strategies have been compared. Further, Levin has suggested, if such research were conducted it is unlikely any one strategy would emerge the winner. The good strategy user, according to Levin, uses a variety of strategies and selection of strategies varies from one prose-learning context to the next.

Findings from the present study of imagery effects on reading comprehension suggest that imagery is likely one of the strategies learning disabled students can use to become more efficient readers. Its effectiveness, however, is likely to depend on a number of factors. Factors include: the nature of the reading material (how conducive it is to imagery usage); the ability of the reader to recognize reading material which is conducive to imagery; the training which the reader has had in each of the possible strategies which might be applied to a given situation; and, the ability of the reader to recognize the most appropriate strategy for him or her to use in a given situation. Selection of appropriate strategies may well depend on the information processing preferences of the individual and the individual's knowledge of his or her own processing abilities.

In a review of learning strategy instruction, Levin (1986) has identified four cognitive principles. First, different learning strategies serve different cognitive purposes. He has suggested that strategies may be grouped by three main purposes: understanding, remembering and applying. Different strategies are required for different purposes. The efficient strategy user is able to choose from a variety of strategies for a variety of purposes. Findings from the present study suggest that learning disabled students are capable of including imagery in their strategy repertoire. A

substantial number of learning disabled students, however, do not spontaneously activate an imagery strategy to help them understand and remember more of what they read. When learning disabled students are instructed to construct internal images while reading, and are given training in imagery usage, comprehension and recall are enhanced.

Second, Levin has suggested that effective learning strategies should have identifiable components. He has urged researchers to "conduct routine component analyses in relation to the specific strategies they are investigating" (p. 11) with the objective of mapping strategy components onto presumed cognitive processes and learning outcomes. Paivio's(1986) dual coding approach to cognitive processing assumes that imagery plays a significant role in information processing for individuals who are cognitively intact. The present study aimed to determine the availability of imagery to learning disabled students as a prelude to identifying the components parts of potential imagery strategies which could be applied to reading comprehension. Findings suggest that learning disabled students, although not "cognitively intact", can benefit from utilization of an imagery strategy. Further research should focus upon the development of instructional programs to assist learning disabled students to recognize learning situations for which imagery is an appropriate

strategy, and to activate imagery strategies of their own volition.

Third, learning strategies must, according to Levin, be considered in relation to students' knowledge and skills. Levin has suggested that "blanket statements about strategy effectiveness or ineffectiveness need to be replaced by statements about the applicability of a particular strategy for particular learners or groups of learners" (p. 12). Findings from other studies, such as those reviewed in Chapter II, have suggested that induced imagery is applicable and effective for several groups of good readers and poor readers. The present study investigated the potential for use of an imagery strategy for a particular group of learners with special learning needs: (i.e. learning disabled adolescents). Findings suggest that imagery is applicable and can be effective for this group of learners.

Fourth, Levin has called for the empirical validation of "thought-to-be-effective" (p. 12) learning strategies. The present study was designed to empirically investigate the potential for imagery as a reading comprehension strategy prior to the development of an instructional program to teach students how to use imagery. Findings suggest that potential exists. Further research would entail the development of instructional methodologies, the identification of their component parts and their evaluation through empirical study.

Afterword

Imagery is a potentially powerful cognitive process available to students of different ages and learning abilities. Images form part of what Broudy (1987) has referred to as the allusionary base: a rich conglomerate of concepts, images, and memories available to the reader to help make sense of the world. The allusionary base is constructed from past interactions with all types of sensory information and continues to evolve as new interactions are experienced. Our ability to appreciate written or spoken discourse depends, in large measure, on the robustness of our allusionary base. Consider for example Coleridge's masterful work "Kubla Khan".

> In Xanadu did Kubla Khan
> A stately pleasure-dome decree:
> Where Alph, the sacred river, ran
> Through caverns measureless to man
>    Down to a sunless sea.
> So twice five miles of fertile ground
> With walls and towers were girdled round:
> And there were gardens bright with sinuous rills,
> Where blossomed many an incense-bearing tree;
> And here were forests ancient as the hills,
> Enfolding sunny spots of greenery... (p. 44)

One hopes that all students, at some point in their academic careers, will encounter "Kubla Khan" and be helped to integrate its images and lyrical beauty into the allusionary base. How sterile that meeting would be without the power to transform Coleridge's words into images in the mind. What

reader has not built their own Xanadu, seen the sacred river and measureless caverns, followed in their mind the walls and towers surrounding the fertile ground, painted their own blossoms on the incense-bearing trees, and peered into sunny spots of greenery in the ancient forests? For the reader, the images that appear in the mind's eye on reading "Kubla Khan" are his or her very own. By picking up the poem and reading the reader can be instantly transported to a pleasure-dome uniquely of his or her own making.

Reading comprehension goes well beyond merely encoding information for some utilitarian purpose. If the purpose of formal schooling is to produce the educated mind, distinguished by the range of experience it can accommodate and the intensity of that experience, then teaching children to read must encompass more than functional literacy. Yet efforts to help learning disabled students to read frequently identify functional literacy as their prime objective. Certainly, the ability to read and comprehend a want ad, a driver's manual or assembly instructions for the VCR are important but if education for the learning disabled stops at this point because the system has lost heart then these students' education is incomplete. The intensity of such an educational experience must be considered shallow. Encouraging students to be aware of, and to appreciate, the images evoked by what they read can help students, especially learning

disabled students, to experience the richness of literature and the intensity of feeling that is evoked by the arts. Indeed, too often in striving to help learning disabled students to become functionally literate the beauty which literature has to offer is overlooked: subverted by the desire to simply comprehend the meaning of what has been written. Learning disabled students are capable of constructing pictures in their minds and should be given every opportunity to experience the beauty of the arts in poetry and prose. Our cultural heritage is centuries of poetry, drama, prose, music, visual arts and history. Educational institutions must find ways to ensure that no student, including and especially the learning disabled, is denied their inheritance.

The role of imagery in learning has been vastly overlooked, or worse, relegated to the merely functional. Imagery is more than a technique to aid in comprehension but a powerful cognitive process available to enrich and stimulate the imagination. Imagery is as necessary to the scientist as it is to the artist. Ideas are related metaphorically. J.P. Dougherty (1985) states that:

natural science is so permeated with metaphor that its employment goes almost unnoticed....In physics we speak of light <u>waves</u>, talk about heat as <u>fluid</u>, gases as if they consisted of plastic <u>particles</u>, electricity as a <u>current</u>, <u>drops</u> of electricity, <u>anti-matter</u>, <u>right-handed</u> and <u>left-handed</u> spin on a K meson.....In spite of the widespread employment of metaphor in the sciences, one encounters few theories of their function. Theories of analogy first came into being in an attempt to understand how metaphysics could speak of things divine and not slip into agnosticism or anthropomorphisms. (pp. 117-129)

Imagery is integral to the process of learning and understanding. Whether we are engaged in understanding the natural world, or appreciating the aesthetics of art, language and imagery are inseparably connected and equally powerful. Education which exploits this inseparability and equality will fulfill its fundamental intent: the development of the educated mind.

## SHARK

Beth forgot all about the abalone she was after and let herself rise slowly back to the surface. She had just spotted a dark shape moving out of the deep water. She knew it was a shark, knew before the outline got sharper and closer. She wondered if Lisa saw it too.

Beth had seen many sharks before because she did so much snorkeling here at her uncle's place. The sharks never did much, but spotting one was always scarey. It was disappointing, too, for that meant she had to go back to shore for the day. But something was different about this nine-footer. Then she knew; this was no after-dinner cruise. This shark was hunting. It was hungry and looking for something to eat -- right now!

From: Shark. (p. 1) by S. Malocsay (1979) In J.M. Stanfield and H.R. Granite (Eds), Tempos. Boston: Houghton Mifflin Company.

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FIFTEEN HONEST COINS (PAGE 52)
BY LOUISE AND YUAN-HSI KOU (1979)
IN PACES
EDITED BY J.M. STANFIELD AND H.R. GRANITE
HOUGHTON MIFFLIN COMPANY
BOSTON

# FIFTEEN HONEST COINS

### by Louise and Yuan-Hsi Kuo

In a little village away from the noise and rush of the city, there once lived a poor old woman and her son. Every day they arose before dawn to gather twigs from the nearby mountains. When the sun arose, the boy was already carrying the bundles to the marketplace while his mother returned to their thatched hut to attend to her duties. With the money from the firewood, he usually bought some oil, rice, vegetables and, once in a while, a few eggs or a very small amount of meat. By noon, he would be on his way home. Without exception, this was their daily simple way of life.

One morning when he went to the marketplace, there was the usual crowd bargaining, but nobody came to purchase his twigs. As he waited patiently, he suddenly caught sight of a small bag lying near his twigs. "Someone must have dropped it," he said to himself, and looking hastily into the bag, he saw some coins. Without waiting any longer, he hurried home.

"Why have you come back so early today?" his mother asked.

"I had good luck! I found this bag containing some coins. The firewood wasn't sold, but perhaps whatever is in the bag will make up for it," he replied.

The mother and son eagerly opened the bag to count the coins that amounted to fifteen in all.

"Someone must be very unhappy over the loss," she sighed. "My son, you must return this to the owner. He or she may need it — just like us — to buy rice and oil. The owner's family may even be starving," she added, trying to persuade him to hurry.

"But Ma, I've never seen the owner. To whom should I give the money?"

"Just stay at the same spot where you found the money and wait until someone comes looking for it. I don't feel right about keeping these coins. I insist that you go right now."

So he returned to the marketplace and stood there to watch the passing crowds. It was nearly noon, and the morning market was almost over when a merchant walked by. He turned his head in all directions as if searching for something.

"Good master! What are you looking for? Have you lost something?" asked the boy.

"Yes, I'm looking for a purse. I must have dropped it somewhere in the marketplace."

"Well then, is this yours?" the young fellow asked, holding out the bag.

"It certainly is!" the merchant exclaimed as he grabbed it and began counting the coins. "One, two, three, four, five . . . fifteen! Why — how is that — only fifteen! I had thirty coins in my purse," he shouted angrily. "You must have kept fifteen for yourself. How dare you return my purse with only half the money!"

"There were only fifteen coins. I'm an honest person. Really I am, truly, truly," the youth pleaded.

An argument started, and in no time at all, a big crowd gathered to hear what was happening. The argument went on endlessly, each accusing the other of dishonesty.

At last the crowd urged them to see Pao Kung, the magistrate. The whole procession followed them to the *yamen* where the two angry fellows were given a hearing.

"How many coins did you find in that bag?" the magistrate asked the youth.

"Fifteen."

"Did you count the coins by yourself?" the magistrate inquired.

"No, my mother and I opened the bag, and we counted them together."

Thereupon the magistrate asked an officer to fetch the mother instantly.

"How many coins did you count in the bag?" the magistrate questioned her.

"There were fifteen coins. I urged my son to go back to the same spot in the marketplace where he picked up the bag and wait for the owner so it could be returned."

The magistrate looked at the old woman and the youth from head to foot. After this appraisal, he asked the merchant, "How much money have you lost?"

"I lost thirty coins. That fellow returned only fifteen. He has kept fifteen. He is dishonest. I want my thirty coins," he yelled in a demanding voice.

The magistrate looked at the merchant from head to foot. After this scrutiny, a faint smile passed over his face. Then suddenly banging on the table for attention so that all could hear, he turned to the merchant and said, "Since you are sure that you have lost a purse with thirty coins, this bag with only fifteen coins is clearly not yours. Therefore, you cannot claim it."

Then addressing the youth, the magistrate said, "Since you found this bag with the fifteen coins and no one has claimed rightful ownership, you may keep it to buy some food for your old mother. The case is now closed."

Everyone in the courtroom felt satisfied with the wise, just decision of the magistrate.

## Post Reading Question on Imagery Use.

Name: _____

I made pictures in my mind as I read:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| For none of the story | For a little of the story | For some of the story | For most of the story | For all of the story |

## Post Reading Cloze Test - Passage 1

Immediate ☐

Delayed ☐

Name:_____

Date:_____


In a _____ village away from the _____ and rush of the _____, there once lived a _____ old woman and her _____. Every day they arose _____ dawn to gather twigs _____ the nearby mountains. When _____ sun arose, the _____ was already carrying bundles _____ the marketplace while his _____ returned to their thatched _____ to attend to her _____. With the money from _____ firewood, he usually bought _____ oil, rice, vegetables and, _____ in a while, a _____ eggs or a very _____ amount of meat. By _____, he would be on _____ way home. Without exception, _____ was their daily simple _____ of life.

One morning _____ he went to the _____, there was the usual _____ bargaining, but nobody came _____ purchase his twigs. As _____ waited patiently, he suddenly _____ sight of a small _____ lying near his twigs. "_____ must have dropped it," _____ said to himself, and _____ hastily into the bag, _____ saw some coins. Without _____ any longer; he hurried _____.

"Why have you come _____ so early today?" his _____ asked.

"I had good _____! I found this bag _____ some coins.

Post Reading Cloze Test - Passage 1

The firewood _____ sold, but perhaps whatever _____ in

the bag will _____ up for it," he _____.

The mother and her _____ eagerly opened the bag _____

count the coins that _____ to fifteen in all.

"_____ must be very unhappy _____ the loss,"

she _____. "My son, you must _____ this to the owner.

_____ or she may need _____ - just like us - to

_____ rice and oil. The _____ family may even be

_____," she added, trying to _____ him to hurry.

## Post Reading Cloze Test - Passage 2

Immediate  ☐                    Name:_____

Delayed    ☐                    Date:_____


The magistrate looked at the _____ from head to _____.
After this scrutiny, a _____ smile passed over his _____.
Then suddenly banging on _____ table for attention so _____
all could hear, he _____ to the merchant and _____, "Since
you are sure _____ you have lost a _____ with thirty coins,
this _____ with only fifteen coins _____ clearly not yours.
Therefore, _____ cannot claim it."

Then _____ the youth, the _____ said, "Since you
found _____ bag with fifteen coins _____ no one has claimed
_____ ownership, you may keep _____ to buy some food
_____ your old mother. The _____ is now closed."

Everyone _____ the courtroom felt satisfied _____
the wise, just decision _____ the magistrate.

Story Outline for: "Fifteen Honest Coins"

Name:_____

Date:_____

Character Analysis

Recall                              Development

Son         15              hard working, good, poor      15

Mother                      poor, honest, unselfish

Merchant                    rich, greedy, ungrateful

Magistrate                  fair, wise


Theme        20

Honesty is rewarded.


Plot         20

The boy and his mother get the money because they are honest.


Events       30

A poor boy goes to the marketplace to sell twigs.

He finds a purse in the marketplace and takes it home to his mother.

They count fifteen coins in the purse.

Mother tells the son to take the purse back to the marketplace to
try and find the owner.

A merchant claims the purse but complains that fifteen coins are missing.

Story Outline for: "Fifteen Honest Coins"

There is an argument and the crowd convinces them to go to the magistrate.
The magistrate sends for the mother. She agrees that the purse
contained fifteen coins.

The Magistrate decides that since the merchant claims his purse had thirty
coins, this one, with only fifteen is not his.

Since no one has claimed the purse the magistrate gives it to the boy.

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## VITA AUCTORIS

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