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MEMORY FOR EVERYDAY TEXTS AND THE WMS
The usefulness of the Logical Memory subtest in clinical settings

Pamela-Anne GRAY

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DECLARATION

I declare that this thesis reports my original work, that no part of it has been previously accepted or presented for the award of any other degree or diploma by any other University, and to the best of my knowledge no material previously published or written by another person is included, except where due acknowledgement is given.
This thesis describes original research carried out by the author in the Department of Psychology at the Australian National University during 1988 and 1989.
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ABSTRACT

The aim of this study was to explore the usefulness of the Logical Memory subtest from the Wechsler Memory Scale (WMS) as an effective means of assessing everyday text-processing ability in clinical settings.

The text recall performance of a group of well-educated normal memory and memory impaired subjects was assessed on the paragraph-length texts (Anna Thompson & the American liner New York) from the WMS Form 1 and on a set of three everyday texts (representative of different text genres and modes of presentation). The everyday texts were a short story which was read to subjects, a newspaper article subjects read and a documentary film. Text recall was gauged across three time periods - immediately, 30 minutes and one week after presentation. Logical Memory scores were computed for each subject as per the test instructions. All texts including the WMS texts were analysed into gist (i.e. the key information which contains the main meaning of the text) and details (supporting information). Scores for gist and details were computed across texts and subjects.

The results of the study found that the American liner passage (WMS) did not adequately distinguish between well-educated normal and memory impaired subjects. Furthermore, the WMS passages were found to be poorly written examples of news reports and judged by subjects to be difficult to recall.

Some items from each text were found to be substantially and consistently more memorable over time than others. The Logical Memory subtest, however, does not acknowledge the different memorability of items and, thereby loses power as an assessment device. Brain trauma clients who are able to recall key information from a text are less disabled than those who cannot.

Recall of the everyday texts was also found to be different in nature to that of the WMS texts across a number of dimensions.

For the everyday texts but not for the WMS texts, gist was consistently more memorable than details across subjects and time. This indicates that with everyday texts subjects use strategies which appropriately select the gist or the main meaningful structure from a text given free-recall instructions. The WMS texts, on the other hand, were found to encourage details recall and rehearsal strategies because of the details focus in the texts themselves and the verbatim recall instructions.
For the everyday texts, the recall of the memory impaired subjects (although diminished and prone to decay) was characteristic of normal memory functioning ie. memory impaired like normal memory subjects recalled the most memorable items and more gist than details. In contrast, the WMS texts presented lists of details which were largely irrelevant to the meaning of the text. Normal memory subjects could cope with this difficult and unnatural task but it overtaxed memory impaired individuals.

Logical Memory scores were found to be the most predictive of the recall of the short story for memory impaired subjects but did not successfully predict the recall of the documentary film or the newspaper article. Case study data found that Logical Memory scores did not convincingly predict the recall of everyday texts (but particularly the gist recall) for most memory impaired individuals over time.

The study discussed the problems inherent in the Logical Memory subtest, specifically problems with:- the texts not being representative of everyday texts; the lack of acknowledgement of the different memorability of items and of the important distinction between gist and details items; the verbatim test instructions which discourage high-level text-processing strategies; the delayed recall period of only 30 minutes not being adequate to assess text recall for educational purposes; and the questionable predictive validity of the subtest for everyday text recall.

The study highlighted the need for an assessment device for clinical purposes to be developed which uses everyday texts and everyday contexts as recall tasks.
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CHAPTER 1: LITERATURE REVIEW AND RESEARCH

QUESTIONS

1.1 Introduction

Memory is the preservation of experience over time. It is the foundation of a person's knowledge about the world and as such is crucial to all cognitive activity. Amnesia resulting from disease or trauma can severely disrupt an individual's life-style and limit his or her prospects for the future. For example, memory impairment can have a deleterious effect on a person's ability to plan daily activities, to carry on a normal conversation or to retain what s/he has read or viewed on television. Diminished ability in everyday activities such as these can cause a memory impaired person considerable frustration and distress. But, perhaps of even greater impact on a person's life-style and sense of well-being is that his or her study or career goals may need to be curtailed or at least reduced.

Adequate clinical assessment of memory functioning is of paramount importance if clinicians hope to advise memory impaired individuals of what they can realistically expect to accomplish in life post-trauma. In order to achieve such practical diagnoses, tests will need to provide accurate information as to the particular memory loss suffered; the extent of the disability in functional terms; and guidelines for an effective rehabilitation program.

Conventional tests that are available for assessing memory in clinical settings are useful in establishing pathology but have poor predictive validity in terms of everyday memory functioning. It is increasingly being argued in the literature that this is because such tests are out-dated in relation to current research in the field which emphasises a cognitive
approach to memory functioning and the use of ecologically valid assessment tasks.

The recent literature has shown particular interest in how people process complex textual material in everyday contexts and schema theory has been developing in sophistication in order to explain these processes.

In a literate society, and particularly for individuals who have ambitions of a higher education, the ability to process complex texts is crucial. Therefore, the research reported here is designed to explore the nature of memory functioning of normal and amnesic subjects on three texts representative of typical modes of presentation, namely listening to a short story, reading a newspaper article and watching a documentary film.

Research such as this is expected to have important implications for clinical diagnosis and rehabilitation and to provide the basis for the development of memory tests that are ecologically valid.

1.2 The Nature of Memory Functioning

Memory is most often defined as the capacity for collecting, storing over time and retrieving information or knowledge (e.g. Baddeley, 1982 c). However, as is increasingly being stressed in the literature (e.g. Neisser, 1976; 1982 b; Mandler, 1985; Cohen, 1983, 1989), it is a capacity that needs to be considered within the broader definition of cognition. Neisser (1976, p.2), for example, defines cognition as the "activity of knowing: the acquisition, organization, and, use of knowledge": a definition which illustrates the active interrelatedness of all an individual's cognitive activities - ie. perceiving, learning, remembering, thinking and reasoning being among the most commonly identified. Therefore, it is difficult to extricate what is memory from what is "knowing", because
memory is not just involved in the maintenance and retrieval of "knowing", but what is remembered is also intimately related to what is known and the individual's ways of knowing. Craik (1985, p.200) supports this view in his definition of "remembering as an activity" that is "essentially a form of perceiving" or "an interaction between external events and mental activities". Consequently, it will be this broader cognitive based definition of the memory process that will be developed as the theoretical construct for the research presented in this study on memory for texts.

However, first it is important to look at the traditional model of memory which is the precursor to current research and the theoretical construct behind the most commonly used memory assessment instruments in neuropsychological and clinical settings.

1.3 The Traditional Perspective of Memory

1.3.1 Short- and long-term memory stores

Memory research, until more recently, has concentrated almost entirely on an information processing model inspired by theorists such as Broadbent (1958), and Atkinson & Shiffrin (1968, 1971). In this approach, memory is conceived as a structural system divided into a number of specific stores that are organised in a linear sequence and through which information flows and is processed.

Environmental stimuli are received and recognised by the modality specific, sensory registers which preserve the sensorily intact information very briefly. This information then passes into a short-term memory store where it is held briefly (for a few seconds) unless renewed by rehearsal (eg. subvocal repetition). Atkinson and Shiffrin (1968, 1971) refer to the short-term store as the locus of conscious control within the
memory system because this store, according to these authors, determines what information is attended to and how information is processed and also governs the retrieval of existing memories which aid in establishing new memories. The short-term store has a limited capacity, plus or minus seven bits of information, although this capacity may be increased by "chunking" or grouping isolated bits of information following some rule that is relevant to the individual (Miller, 1956).

Information which is rehearsed or otherwise processed is then transferred into a more permanent, long-term memory store which has a much greater capacity and durability. Long-term memories are preserved as permanent memory traces which subsequently provide the basis for restoring information to consciousness. Finally, Atkinson and Shiffrin (1968) proposed important feedback loops from the long-term to the short-term store and the sensory register in order to acknowledge that permanent memories have an influence over what is processed at the earlier stages in the model.

Research in this tradition tended to focus on the scientific measurement of the dimensions of and the capacity differences between the stores; information transfer from one store to another; and the remembering/forgetting functions relevant to each store. To facilitate measurement, stimuli were kept as scientifically precise or as 'pure' as possible, for example, arrays of digits and letters; word lists; simple pictures of objects; geometric figures etc. Such limited and meaning-restricted stimuli were also reflected in the traditional memory assessment devices, many of which are still in common use today, for example, the Wechsler Memory Scale (1945); the Williams Scale for the Measurement of Memory (1968); and the Benton Visual Retention Test (Benton, 1974, see Lezak, 1983).
Experimental evidence commonly cited as support for the short-term, long-term memory store differentiation is the pattern of free recall of a list of unrelated words (Postman & Phillip, 1965). Typical performance on a list-learning task demonstrates a primacy and recency effect with immediate recall such that words appearing first and last in the list are the most likely to be recalled. However, the advantage of the recency effect disappears with delayed recall whereas the primacy effect is maintained. The theoretical explanation for this result is that all items are preserved in the long-term store through rehearsal apart from the last few items which are held in the short-term store and are, therefore, vulnerable to decay after a short time.

What is considered to be even more powerful support for the dual-store distinction comes from clinical observations which indicate that short-term and long-term memory may be selectively impaired. Two famous case studies are the most widely reported:- The Milner (see Milner et al., 1968) case H.M. who suffered bilateral hippocampal involvement and, as a result, demonstrated an intact short-term memory but was unable to retain any material in long-term memory. And, Warrington & Shallice's (1969) client K.F. who suffered a lesion in the left cerebral hemisphere and is described as having a normal long-term memory in the presence of an impaired short-term memory.

It should be noted, however, that some authors (eg. Cermak, 1982) warn that although experimental and amnesic evidence may seem persuasive in substantiating the dual-store position, we also need to be aware of its major short comings:-

Firstly, the experimental and memory assessment tasks on which this evidence was gathered are limited such that performance may be highly task-related. For example, short-term memory capacity, the duration of the retained information and the recency effect have since been found to
vary considerably depending on the stimulus material used and its meaningfulness to the subject.

And secondly, the fact that neuropsychological evidence also exists which indicates that all amnesics do not perform precisely the same on tests of short-term and long-term memory and, furthermore, that their performance may be qualitatively different to that of normal subjects with normal memory functioning.

There remains, however, considerable support for the notion of short-term (also referred to as primary and immediate memory) and long-term (secondary) memory stores in the current clinical literature as a functionally useful framework for understanding memory dysfunction (Lezak, 1983; Mayes, 1986), although the dimensions of the two stores tend to be less rigidly defined. Immediate memory is currently conceived as a limited capacity store of sufficient duration (up to a few minutes and even longer - see Lezak, 1983) to enable a person to respond to ongoing events such as the processing of speech or visual-perceptual experiences. Baddeley and Hitch (see Baddeley, 1982 c; Morris, 1986) capture this more functional and active approach to understanding short-term memory in their preference for the term 'working memory'. They propose two temporary storage systems, the articulatory loop (phonological or speech-like information) and a visuo-spatial scratch pad (for manipulating visual images). Both systems are coordinated by an attention component called the central executive which is responsible for short-term, conscious information-processing activity.

Long-term memory is seen to contain information that is consolidated where a range of strategies are applicable (these will be more fully discussed) and where old and new learning is held more or less permanently. Much of the information in the long-term store appears to be organised on the basis of meaning whereas information in the short-
term store is organised more in terms of contiguity or of sensory properties, although the dichotomy is by no means absolute (Lezak, 1983). However, as will be addressed at a later stage in this review, the current literature also puts considerable emphasis on the complex interrelationship between the stores. New information coming into the system is seen to be very much dependent on the individual's currently available schemata by which s/he organises his or her experiences (eg. Bransford, 1979; Mandler, 1985).

1.3.2 Verbal/non verbal sub-systems and hemispheric specialisation

Modality specific sub-systems, in particular the verbal and visual codes, were also investigated within the traditional model with Paivio's dual-processing system being the most influential. Paivio (eg. 1971) proposed and continues to propose (1986) that there are essentially two coding systems or modes of symbolic representation within the memory system - a verbal or linguistic code and a non-verbal or imaginal code which arise from external or internal sources (ie. perceptions of current sensory events and self-generated thoughts and imaginings, respectively). The two systems are conceived as being functionally separate but richly interconnected, such that when both codes are operating, the effect is additive and memory is enhanced. For example, concrete words which can also conjure up an image are more memorable than abstract words which can only be represented verbally. Furthermore, according to Paivio, pictures are remembered better than words (ie. the picture superiority effect) because pictures are more likely to be dual-coded (Paivio & Csapo, 1973).

The experimental paradigms that Paivio presented to demonstrate his theoretical position have come under attack (eg. see Richardson, 1980),
but the distinction between verbal and non-verbal memory remains a popular one and has received strong support over the years from the literature on hemispheric specialisation (eg. see Bradshaw & Nettleton, 1981; Perecman, 1983; Segotowitz, 1983).

It is generally considered that for the majority of dextral people the left hemisphere is involved primarily in verbal or linguistic functioning which includes generating and understanding oral and written language; verbal ideation; verbal memory; and the numerical symbol system. The right hemisphere, on the other hand, is related to imaginal and visuo-spatial functioning; spatial orientation; non-verbal ideation; non-verbal memory; many aspects of musical ability and emotional perceptiveness. In particular, the right hemisphere is specialised to process stimuli that do not lend themselves readily to verbalisation.

Lezak (1983), however, cautions that the two hemispheres should not be thought of as modality specific, that is, the left hemisphere having to do with auditory and the right to do with visual stimuli, because it has been repeatedly demonstrated that each hemisphere is "supramodal" and mediates stimuli entering through all sensory channels. According to Lezak (1983), hemispheric specialisation appears to be based on the capacity to process verbal or configural materials rather than in terms of sensory modalities.

In keeping with the theoretical construct of hemispheric specialisation, it is well established clinical practice to distinguish between verbal and non-verbal (predominantly visuo-spatial) memory in the assessment and diagnosis of memory dysfunction. The neuropsychological test items that are generally recommended for this purpose because they have been found to be particularly useful in a clinical setting include; for the assessment of verbal memory - Digit Span, Paired Associate Learning (list of paired words) and Logical Memory (short passages) from the
Wechsler Memory Scale; and the Rey Auditory-Verbal Learning Test (word lists); and for visual memory - Corsi Non-Verbal Digit Span; Wechsler Visual Reproduction (simple geometric figures); and the Rey-Davis Osterrieth Figure (complex geometric figure) (see Lezak, 1983; Brooks & Lincoln, 1984; Walsh, 1985).

Current research, however, is beginning to question the nature of the verbal and non-verbal dichotomy. A number of researchers (eg. Bradshaw & Nettleton, 1981; McKeever, 1981) point out that many of the reported studies in hemispheric specialisation have employed simple and often limited stimulus materials (eg. letters, numbers & words as verbal stimuli; pictured objects & geometric figures as non-verbal stimuli) so that findings of specialisation may be to some extent an artefact of this type of stimulus material. This criticism applies equally to the majority of memory assessment devices in current use. In support of this line of argument, when tasks in either the verbal or non-verbal domains become more complex, a contribution from both hemispheres appears to be required. For example, in the comprehension of extended texts such as narratives, which would generally be considered to be verbal or left hemisphere tasks, there is considerable right hemisphere involvement in understanding the overall message of the text and in interpreting the non-literal meaning such as jokes and metaphors (eg. Foldi et al., 1983; Gardner et al., 1983). Similarly in drawing (a visuo-spatial or right hemisphere task), the left hemisphere appears specialised for reproducing the internal details while the right is specialised for the overall spatial organisation and the relationships between the component parts (Gardner, 1974; Walsh, 1978).

Evidence such as this has convinced Bradshaw & Nettleton (1981) that mode of processing is a more fundamental distinction between the two hemispheres than the nature of the preferred stimuli. Drawing on the
work of Luria (1978), they define the left hemisphere as being specialised for dealing with information that is time-dependent, sequential, propositional, linear and analytic and the right hemisphere for dealing with information that is holistic, synthetic and appositional. These authors emphasise that this differentiation in terms of process specialisation occurs across sensory modalities and stimulus material, although language lends itself more to left hemisphere type processing and visuo-spatial materials, such as abstract designs and faces lend themselves more to right hemisphere processing. Furthermore, to account for the evidence based on the processing of more complex materials such as whole texts, they hypothesise a continuum in function rather than a rigid dichotomy "the differences being quantitative rather than qualitative, of degree rather than kind" (p. 51).

1.3.3 Summary

In summary, traditional research provides two important constructs for the understanding and assessment of memory dysfunction, namely the notions of temporary and permanent memory stores and of hemispheric specialisation. These constructs are also well supported in the neuropsychological literature (see Lezak, 1983; Walsh, 1985) as being diagnostically and functionally useful in a clinical setting. However, at the same time, the literature (eg. Neisser, 1982 b; Cohen, 1989) is beginning to acknowledge a need for research to explore these constructs across a wider range of stimulus materials, in particular materials that are more complex and meaningful.
1.4 Current Perspectives on Memory Functioning

The more recent literature on memory functioning (eg. Horton & Mills, 1984; Craik, 1985; Cohen, 1989) has changed direction in two important ways:

(i) Firstly, memory is viewed in a much more holistic manner as an integral and active part of the cognitive system ie. away from memory as "a thing in the head" - and towards "remembering as an activity" (Craik, 1985 p.200).

(ii) And secondly, the trend is to investigate the function of memory in everyday, practical situations - a push for experimental paradigms to reflect "ecologically valid" material or situations (eg. Gruneberg et al., 1978; Neisser, 1982 b; Cohen, 1989).

1.4.1 Memory and cognition

The concept of memory that is developing in the recent literature (eg. Bransford, 1979; see Neisser, 1982 b; Baddeley, 1982 c) is indebted historically to Bartlett (1932). Memory is broadly described as an active system whereby selected information is organised in a meaningful and functional way by the individual employing the cognitive strategies available to him or her (ie. the individual's internal cognitive processes) with which s/he relates new material to already stored information or past experiences (ie. the individual's world knowledge). Remembering involves accessing this stored information, given the appropriate internal (eg. thoughts) or external (eg. task demands) retrieval cues.

As was the assumption in traditional paradigms, the structure and dynamics of this stored information or memories can be inferred from how, in what form and with what ease a given set of information is
recalled or recognised amongst sets of distractors. However, unlike the traditional model, the stimulus materials used to investigate these paradigms are becoming increasingly more complex and more in line with experiences that occur in everyday contexts, for example narratives instead of words (e.g., Mandler & Johnson, 1977; Kintsch & van Dijk, 1978; Bower et al., 1979; Mandler, 1984), films instead of pictured objects or designs (e.g., Chafe, 1980; Berry et al., 1981).

1.4.2 Strategies used to remember and organise information

Over at least the past fifty years, researchers have explored the ways subjects go about remembering the stimulus material that is presented to them experimentally (i.e., the strategies they use). It is generally recognised that the strategies used in a given situation vary with the nature of the stimulus materials; the abilities, skills, knowledge and cognitive style the individual brings to the task; and the remembering task itself (e.g., Jenkins, 1974 see Horton & Mills, 1984; Bransford, 1979; Cohen, 1983, 1989). However, it is widely accepted that information is remembered best:

(i) When it is rehearsed or repeated eg. by subvocalising to oneself or otherwise reviewing the information. This may be simply verbatim repetition which is a strategy often used in the laboratory with meaning-restricted tasks. Or, it can be in the sense that Mandler (1979) uses where rehearsal is viewed as a tendency for people to 'mull over' or to ruminate on events or experiences.

(ii) When it has the potential to be organised i.e. has relational or associative properties, for example, when items such as words, pictures or objects etc, can be categorised or clustered into meaningful networks in some way by the individual. In forming these associations, the
individual can use a variety of strategies or systems, to list just a few - mnemonic techniques; functional and taxonomic or conceptual categories; imagery i.e. visualising things that "go together"; temporal and spatial organisation; and subjective associations related to background experience (e.g. Anderson & Bower, 1973; Hunt & Einstein, 1981; Baddeley, 1982 c; Kail & Bisanz, 1982). Neisser (1982 b) reporting on strategies used by expert mnemonists describes a particularly elaborate system whereby a complex but meaningless mathematical formula was recalled even after many years by using a mnemonic which turned the information into a story.

(iii) When it is presented in a familiar context to which the individual can bring prior knowledge, skills and expertise. For example, experts in their field are able to recall more information on their subject than non-experts because they are familiar with and knowledgeable in the area and can, therefore, chunk information at a higher level of sophistication (e.g. Chase & Simon, 1973, Chiesi et al., 1979; Cohen, 1989).

(iv) Or, when a higher level of integration of information is possible, as in the case of stories where the content is predictable and redundant; there is a coherent, generic structure; and a central theme or focus (e.g. Smith, 1982; Mandler, 1984; Bartlett, 1985; Halliday & Hasan, 1985). Similarly, with memory for a documentary film when the visual format highlights and reinforces the content and structure of the verbal message (Berry et al., 1981). This type of integrative strategy will be discussed in more detail below in the section on schemata.

As mentioned above, strategies vary considerably with the stimulus material to be remembered. Materials such as letters and words, which were highly popular in traditional research, lend themselves to rehearsal and association strategies. However, simple strategies such as these are not appropriate when the stimulus material becomes more complex and
contains a meaningful structure or context (for example, in the case of processing on-going conversation and events or whole texts such as stories or films). This situation is well illustrated by a series of experiments conducted by Bransford & Johnson (1972 see also Bransford, 1979), where subjects were given a passage to remember under two experimental conditions - one where the context or theme was withheld which severely limited the meaningfulness of the passage as a whole and one where subjects were given the context as an overall structure for their remembering. Subjects under the first condition tried various strategies such as repetition, visualisation and forming simple associations which quickly broke down under the information load, whereas the context subjects were able to remember significantly more of the information. Experiments such as this demanded new theoretical constructs, and the most popular in recent research is the concept of a schema.

1.4.3 Schema theory

Schema is an important part of the active, cognitive model of memory functioning and has received considerable recent attention, particularly in the area of memory for complex verbal material (eg. Mandler & Johnson, 1977; Bower et al., 1979; Mandler, 1984 etc.), although it has also been used to explain the recall of pictures (see Friedman, 1979; Goodman, 1980) and events (eg. Neisser, 1982 a).

Schemata are memory reconstructions based on past experience (Bartlett, 1932) and the dynamics of how they are acquired is indebted to Piaget's notion of assimilation and accommodation (eg. see Flavell, 1963). Schema theorists propose that "what is encoded, or stored in memory is heavily determined by a guiding schema or knowledge framework that selects and actively modifies experience in order to arrive at a coherent,
unified, expectation-confirming and knowledge consistent representation of experience". (Alba & Hasher, 1983 p.230). Furthermore, a schema is conceived as a unitary representation such that activation of parts implies activation of the whole (eg. Bernado, 1980; Mandler, 1985). Thus, cues and other reminders are seen to be successful in recalling information because they can call up the schema or have it in ready accessibility.

Three types of schema have been discussed in the literature:

1. A frame (Minsky, 1975; Tannen, 1979), which is a schema that contains knowledge or structural expectations about a familiar event such as a 'film frame' or a 'story frame' which allows the individual to interpret new examples of films and stories;

2. A script (Schank & Abelson, 1977; Bower et al., 1979) one form of a frame which is knowledge about the causal chain and expected context for frequently experienced events or routines (eg. going to a restaurant, attending a lecture etc.);

3. And, a scene (Mandler, 1985) which is a knowledge framework about what objects typically appear in a given context and information about their spatial layout etc. Scenes are generally discussed in terms of static pictorial events although frame, script and scene knowledge are likely to merge in a film presentation where scenes are temporally ordered in a systematic way to, for example, tell a story or present information as in a documentary.

Schema theory predicts that in memorising discrete items such as lists of words, where no obvious schema exists, individuals will impose a schematic-like organisation onto the list as much as the material and their ingenuity will allow. For example, they will form the material into meaningful clusters, use mnemonic systems etc. However, material that is predictable and contains an inherent schematic structure (eg. a story
or a scene) is infinitely more memorable (Mandler, 1984). Furthermore, a great deal more information can be recalled with greater ease than is the case in recalling discrete and unrelated items.

Memory for material that has schematic form is characterised by individuals recalling the gist or substance of the material (eg. a story or a conversation) and remembering the supporting details as they relate to the theme and the individual's expectations about the information based on prior knowledge. Such memories are also frequently characterised by reconstructive elements, particularly with delayed recall, such that individuals remember "probable details" relative to the theme (eg. Alba & Hasher, 1983; Horton & Mills, 1984).

Considerable support for schema theory comes from recent and highly comprehensive research into how people recall narratives (eg. Mandler & Johnson, 1977; Kintsch & van Dijk, 1978; Mandler, 1984; Trabasso & Sperry, 1985) and films (see The Pear Stories - studies based on a film story without dialogue - Tannen, 1979; Chafe, 1980). For both types of presentation format, subjects when asked to retell the story consistently remember the most important features of the narrative organisation, that is, the overall theme based on their interpretation of the underlying message of the story; the most salient characters and events; and the appropriate temporal organisation of the plot and how the main events are causally related - ie. the setting, initiating events, goals and outcomes. Inclusion of these important elements is found to be maintained across subjects, even across subjects from different cultures (see Tannen, 1979; Mandler, 1984).

Research such as this indicates that it is possible to predict a person's story schema (ie. mental representation of narrative stories) based on the story grammar (ie. the invariant way narratives are organised). Thus, an important part of current research design is to map the pathway of
narrative stories in terms of idea units, main characters and important episodes. Different types of texts (e.g. newspaper articles, manuals, documentary films etc.) will, of course, have different structures to those typical of narratives and, therefore, different structural expectations or schemata.

Subjects in the above studies (see in particular Tannen, 1979; Mandler, 1984) did vary in other aspects of their recall, for example, they made elaborations and omissions of details in their retellings to fit their overall interpretation of the story. These individual and cultural differences are also explained by a schema theory such that individuals with differing backgrounds and, therefore, differing world views impose different interpretations on their 'story telling frame'.

It is generally agreed (e.g. see Mandler, 1984) that an individual's story or narrative schema (i.e. his internal mental representation) reflect many of the structural regularities found in stories. First, a story schema is organised hierarchically such that more important episodes are recalled more often than episodes of lesser importance; secondly, it is ordered in terms of narrative structure; and thirdly, it is abstract in that it does not specify the content of a story in any detail as content can vary across stories. A narrative story schema is the organising structure behind the encoding and recall of a particular example of a narrative and people use this pre-existing structure to support and to fill in the gaps in their memory. Bartlett (1932) and Mandler (1984), for example, provide evidence to suggest that people do, in fact, recall more schematically relevant than irrelevant information about stories as time passes.

Finally, schema theory stipulates that what is perceived and remembered is based on the way events are interpreted, organised and thought about. Thus, it can explain much of the richness and complexity of human memory. Some non-schematically relevant information which
is accurate in sensory detail, is also retained often for surprisingly long periods of time (e.g. Keenan et al., 1977 - memory for the typescript of texts; Kolers, 1979 - memory for where information is placed on a page or in a text); and the verbatim recall of particular phrases (e.g. Cohen, 1989). However, this does not detract from a schema theory approach as Alba & Hasher (1983) suggest it does. Johnson & Raye (1981), for example, propose that two intimately related classes of memory co-exist. A class of externally generated memories that are largely automatic, sensorily intact representations of reality and, a class of internally generated memories of thoughts that are more intentional and tend to be schematic or interpreted representations. The former or perceptual system, however, is consistently seen to be highly influenced by an individual's thought processes or the schemata which guide and interpret his perceptions (e.g. see Neisser, 1976).

1.4.4 Ecologically valid memory tasks

Traditionally memory tasks have been restricted to containable stimuli, eg. lists of words and sentences (verbal) or geometric patterns of varying complexity (visuo-spatial), with the trend over the past ten years being towards more meaningful stimuli ie. faces instead of complex patterns, passages instead of words. However, in the most recent literature, there is an increasing interest in practical, everyday memory experiences, such as how people remember to keep appointments; recall conversations and autobiographical experiences; find their way around a city; give eye witness accounts etc. (see Gruneberg et al., 1978 and Neisser, 1982 b for many examples of the above).

Memory for complex material that has educational as well as practical significance is also featuring more in the literature, namely remembering information from a wide range of presentation modalities
such as reading (eg. Mandler & Johnson, 1977; Kintsch & van Dijk, 1978; Voss et al., 1982); television news broadcasts (eg. Berry et al., 1981); films (eg. Chafe, 1980) and interviews (eg. Clarke et al., 1986) etc. This type of research is providing a direct and functional link between psychology - how people process and remember information; education - how people learn; and clinical assessment and rehabilitation - how individuals can overcome their disabilities after brain damage from both a practical and an educational perspective.

1.4.5 Overview

To conclude this section: (i) Memory is defined as an integral part of the overall cognitive functioning of an individual. A powerful organisational component of the comprehension and memory process can be described by the concept of schemata which are structural expectations and knowledge frameworks through which the individual interprets, processes and recalls his or her present experiences.

(ii) It is accepted that memories can be held temporarily in a short-term store for the purpose of the interim processing of information and that such information is highly vulnerable to decay. Memories that are held more permanently over time are seen to be stored in long-term memory. It is proposed, furthermore, that schematic strategies apply to both short- and long-term memory stores.

(iii) The notion that the cerebral hemispheres may be specialised for verbal and visuo-spatial materials or for analytic and holistic processing remains a popular one although, as stimulus materials used in research become more complex, this differentiation may become less clear.

(iv) And finally, there is a developing recognition in the literature that memory needs to be investigated with reference to practical and natural
occurrences of memory functioning, in particular memory for complex textual material.

1.5 Clinical Implications

This section of the review focuses on the clinical implications of the above understandings about the nature of memory functioning with particular reference to: (i) memory assessment and (ii) the amnesic syndrome.

1.5.1 Memory assessment

Few memory assessment devices for use in a clinical setting have been developed which take adequate cognizance of the new research directions, with questionnaires of everyday memory functioning being the important exception (e.g. see Sunderland et al., 1983; McMillan, 1984).

The Wechsler Memory Scale is still the most widely used instrument for assessing the memory processes of clients with suspected neurological dysfunction (e.g. Lezak, 1983; Gilandas et al, 1984; Mayes, 1986). This is despite serious concerns about the paucity of adequate normative data and the lack of standardised scores for individual subtests in the Wechsler Memory Scale (e.g. see Prigatano, 1978). Weaknesses such as these have been addressed more recently in the latest version of the scale (Wechsler, 1987). Australian norms have also available (e.g. Ivison, 1977, 1984, 1986, 1988). However, the test items themselves have changed little since 1945 and thus reflect the traditional view of memory ie. simplified, meaning-restricted items that have little relation to real-world tasks and do not allow testees to display more integrated schematic strategies.
The Wechsler Memory Scale has seven subtests, which include simple personal and general knowledge items (Information and Orientation); immediate memory for digits (Digit Span); two short paragraph-length passages which are, in effect, a list of facts pertaining to an incident (Logical Memory); geometric patterns (Visual Reproduction); and associated words which include familiar and novel word pairs (Associate Learning). A modified version of the Wechsler Memory Scale has more been recently developed by Russell (1975) which includes a delayed trial (a delay of 30 minutes after presentation) for the last three subtests together with a set of suggested prompt questions for subjects who fail to recall the required information.

A recent memory test, which has been developed to supersede the Wechsler Memory Scale in the clinical context is the Denham Neuropsychology Memory Scale (Denham, 1984) which at this stage only has norms for American populations. Several new items have been included in this scale eg. memory for human faces and for musical tones/melodies. However, many of the items are closely modelled on those used by Wechsler, such as memory for digits, paired words and a paragraph-length text. It is noteworthy that the text from the Denham Scale is very similar in length, structure and content to the one of the passages from the Logical Memory subtest Form 1 of the Wechsler Memory Scale which begins "Anna Thompson of East Sydney".

The Rey-Osterrieth Complex Figure replaces the Wechsler geometric figures (Visual Reproduction) in the Denham Scale and a set of thirty general knowledge questions is included to measure remotely stored verbal memory. There is also a test of non-verbal remote memory where subjects are asked to recall highly visual items from their own experience such as whose picture is found on the American penny. In addition, the Denham Scale has provision to measure both immediate and delayed
recall for the paragraph-length text, the Rey Figure and Paired Associates. Delayed recall on this scale is considered to be approximately 50 minutes after presentation.

The Denham Scale has only recently been available commercially and its adequacy as a valid and useful scale for clinicians and practitioners, particularly in an Australian context, has yet to be decided. The fact that this new scale is closely modelled on the Wechsler Scale is not necessarily a disadvantage as the Wechsler Scale has proved itself to be a clinically useful, although it will be argued a limited, assessment and diagnostic instrument. Certain subtests, in particular, have been found to be sensitive to organic damage, namely Digit Span, Logical Memory (memory for short passages), Associate Memory (familiar and novel word pairs) and Visual Reproduction (geometric patterns) (eg. Lezak, 1983; Walsh, 1985).

Neither the Wechsler Memory or Denham Scales, however, adequately address the more recent research, which views memory as a functional part of the cognitive system and emphasises highly meaningful, schematically appropriate and ecologically valid material. That is, the memory functioning that allows the individual to cope effectively with daily living, to benefit from an education and/or to hold down a job. To achieve this, the individual will need to retain practical information, such as what s/he plans to do on a daily/weekly basis, where s/he has put things or remembering people's names or how to find his or her way around the hospital. The Rivermead Behavioural Memory Test (see Wilson & Moffat, 1984; Parkin, 1987) goes some way to redress this deficit in its attempt to provide a more realistic assessment of practical memory problems such as these.

However, in a literate society, there will also be a heavy demand on an individual's ability to comprehend and recall 'texts' (in the broader sense
of the verbal record of purposive communication activities) from of a wide range of genres (Halliday & Hasan, 1985; Martin, 1986; Brown & Yule, 1987). This ability will include reading and absorbing newspaper and magazine articles, books, manuals etc. and gaining information from radio, television and scripted films, activities which have important implications for the individual both in his or her work and pleasure. It is the assessment of these types of activities that are poorly represented among commercially available neuropsychological tests.

It is useful to look at some of the subtests of the Wechsler Scale that are considered to be clinically relevant in order to develop this point. Associate Learning and Logical Memory are subtests that purportedly measure the ability to learn new material and to remember short passages, respectively. These subtests are generally performed poorly by individuals suffering from amnesia, particularly if delayed recall is required (eg. see Walsh, 1978, 1985; Gilandas et al., 1984; Khan, 1986) and have some limited usefulness in predicting whether or not everyday memory problems are likely to occur (Sunderland et al., 1983), but only at a gross level according to practitioners in the field of rehabilitation (eg. Brooks & Lincoln, 1984).

Besides being unnatural in content, these memory tasks severely restrict the use of schematic strategies. Successful performance on the Associate Learning subtest is related to simple associational strategies and/or rehearsal. The Logical Memory subtest requires a more sophisticated schematic approach because the materials to be recalled are small texts but the task itself restricts the use of schematic strategies by demanding verbatim recall which means that subjects are penalised for recalling the gist ie. recalling the key content but not necessarily in the actual words presented. Also, a closer analysis of the texts themselves indicates problems with structure and generic expectations
which would also disrupt the use of successful schematic strategies. To illustrate, the two passages in Form I are poor examples of news reports which would typically begin with a lead or summary statement and then expand on the events and details, generally concluding with a recapitulation of the main points (eg. see Brown & Yule, 1987). The Logical Memory passages are very different to this in structure. The text of the passages has no lead statement and is lexically dense such that the information is not spaced out sufficiently nor is it systematically developed. Such textual features would not support a reader's recall. As indicated by the usual structure of a news report given above, oral texts are normally less information laden and more redundant in order to give the listener time to absorb the content of the text (Martin, 1984; 1987). Thus, in contrast to what Halliday and Hasan (1985) and Martin (1986) call functional texts, these paragraphs are not structured appropriately with the purpose of social communication of meaning in mind as everyday texts would be. Furthermore, Mandler (1984) provides evidence that texts that are not structured appropriately to meet the reader's expectations of the genre are more difficult to recall.

1.5.2 Overview

In conclusion, neuropsychological tests in current use are limited and restrict the use of expectation-confirming schemata, mental structures which have been found to be powerful organisers in normal memory functioning. Instead, these tests rely on tasks such as presenting the testee with a meaningless paired word list or which require the literal recall of contrived paragraphs that lack the redundancy, cohesion and generic structure readers normally expect and rely on in their search for meaning. These kinds of tests restrict the testee to an extremely limited range of low-level memory strategies.
The question that needs to be asked, therefore, is: How does a failure to recall these kinds of tasks relate to the individual's ability to perform when information is presented in a more cohesive and schematically rich format such as a narrative or a film (e.g., a television programme) or in other more 'natural settings'? Such a question has implications for both clinical assessment and the kinds of rehabilitation programmes that can be devised from the results of assessment.

1.5.3 The amnesic syndrome

The major memory problem discussed in the clinical literature and one which has the most devastating effect on an individual's life is the amnesic syndrome (amnesia). The nature of the issues involved in this syndrome are complex but indicate that investigation of schema-based tasks and the use of schema-based strategies is necessary, with particular reference to the processing of texts. The notion of text here is that defined by Halliday and Hasan (1985) and includes those presented aurally as well as those in the printed and film modalities. As previously mentioned, the ability to process and recall texts is of crucial importance in a literate society for leisure, career and educational pursuits such that an individual's life-style would be severely compromised if s/he could not comprehend and recall such information.

The organic amnesia syndrome is a permanent, global disorder of memory functioning which is an all too common and particularly debilitating affect of brain trauma or disease. Amnesia is associated with a range of neurological conditions including head injury, cerebral tumour (particularly of the third ventricle), herpes simplex encephalitis, Korsakoff's syndrome, cerebrovascular accidents, anoxia, surgery to the medial temporal lobes and dementia (see Butters & Miliotis, 1979; Hirst, 1982; Parkin, 1984, 1987; Kopelman, 1986; Squire, 1987). Sites of pathology
most commonly implicated in amnesia are the diencephalon (in particular the mamillary bodies and the dorso-medial thalamic nucleus) and the medial temporal lobes (including the hippocampus, amygdala and uncus) (eg. Parkin, 1984). Although it is also established that other areas of the cortex can be involved in amnesia such as damage to the frontal lobes which is characterised by disturbances in the ability to plan encoding and retrieval strategies (eg. Stuss & Benson, 1984; Mayes, 1986; Baddeley & Wilson, 1988).

Memory impairment in amnesia can vary with the site of the pathology, the aetiology of the disease and across individuals (eg. Brooks, 1984; Parkin, 1984; Mayes, 1986), but a number of symptoms are considered to be characteristic of the condition. Typically patients suffering from amnesia maintain language ability and their premorbid level of intellectual functioning and display a normal short-term memory span. Retrograde amnesia (memory loss for knowledge acquired and events occurring before the onset of the trauma or illness) is present to varying degrees with more remote memories and learning being relatively spared. But, antegrade amnesia or an impairment in learning new material is severe such that performance on conventional tests of long-term memory (ie. as measured by delayed learning) is invariably poor. Parkin (1984) estimates at least two standard deviations below the norm. Some residual abilities remain for learning new skills (procedural memory) but amnesics are generally unable to remember the circumstances under which they learned the new skill (eg. Parkin, 1984, 1987).

It is commonly considered that learning and retention need to be differentiated in investigating antegrade amnesia (eg. Erikson & Scott, 1977; Lezak, 1983). This is because information, including complex information, may be learned by some amnesics and recalled on
completion of the learning tasks but is rapidly forgotten (eg. Cermak & O'Connor, 1983 with a post-encephalitic subject) whereas others may simply fail to learn or encode aspects of the new information (eg. Butters & Cermak, 1980) or may encode the information but suffer severe accessing problems and benefit from appropriate retrieval cues (eg. Wincor, 1982).

In line with findings such as these, a number of theories have been proposed in the literature to explain the nature of the learning and retention problems in organic amnesia (eg. see authors in Cermak, 1982; Baddeley, 1982 c; Kopelman, 1986; Parkin, 1987). None of these theories in themselves adequately explain the amnesic syndrome, but the issues they raise are highly relevant in addressing research questions involving amnesic subjects.

(i) Faulty encoding: It has been suggested that although amnesics, in particular amnesics suffering from Korsakoff's syndrome, are able to encode perceptual information adequately, they do not spontaneously engage in processing or organising information in terms of its more meaningful semantic properties. That is, they make less use of semantic information when trying to remember. Experimental evidence in support of this hypothesis is at best patchy and it is difficult to establish from the literature whether such amnesics have difficulty encoding information semantically because they are unable to integrate new information into existing schemas of well-consolidated, premorbid knowledge or whether other factors are involved, for example, motivational (eg. Davidoff et al., 1984) and task-related factors (eg. Baddeley, 1982 a; Parkin, 1987). Some evidence suggests that amnesic subjects can be taught to use semantically appropriate strategies to improve their performance on certain tasks whereas other studies using
different sets of tasks have found no such improvement (eg. see Parkin, 1987).

Furthermore, patients with differing pathologies and/or educational backgrounds may differ in their ability to encode or organise information in a semantically appropriate fashion. For example, Cermak and O'Connor (1983) found that their post-encephalitic subject S.S. who had postgraduate qualifications in physics could retain (ie. encode) and demonstrate his recall (ie. retrieval) of information from an academic article, the technical content of which he was familiar, but which also contained new information he could not have been exposed to before his illness. This new learning, however, deteriorated very rapidly. Korsakoff patients, on the other hand, are consistently found to perform poorly on a similar task requiring the recall of text, namely the short prose passage from the Wechsler Memory Scale (Logical Memory) which is easily understood regardless of educational background (Parkin, 1984; Walsh, 1985). Such studies suggest that Korsakoff patients are unable to analyse text in the same way as S.S. However, as mentioned previously, there are problems with the schematic organisation of the passages from the Wechsler Logical Memory subtest and, furthermore, on this task subjects have the text read to them whereas S.S. read the text to himself, apparently at his leisure.

In the case of head injury victims many of whom suffer diffuse cerebral injury, conflicting results for the same Wechsler Logical Memory subtest are reported. For example, Stuss and Benson (1984) describe head injured subjects who could retain the story in a normal manner although were highly susceptible to interference (ie. indicating they did not have an encoding problem), whereas Brooks (1984) consistently reports studies where such patients had profound difficulty recalling the same story such that an encoding problem may have been a reasonable hypothesis.
These conflicting results are probably related to a number of factors including differences in the severity and pathology of the brain damage and to the length of time since injury indicating that results from head injury are particularly difficult to generalise.

Finally, an interesting article by Ostergaard (1987) describes a child-amnesic who when tested a number of years after developing an amnesic syndrome from anoxia was found to have striking deficits on a range of semantic memory tasks including reading comprehension. This indicates that adult amnesics in comprehending and retaining material from their reading are relying heavily on their premorbid learning in performing memory tasks of this type. Ostergaard's child-amnesic, on the other hand, had great difficulty learning and retaining such material at all, possibly because he had not acquired these reading/comprehension skills (ie. the appropriate adult text-processing schemata) prior to his illness. Thus, this child could be described as having an encoding problem because he had not developed adequate schema to deal with more complicated textual material.

Certainly, Cermak and O'Connor's (1983) post-encephalitic patient did not have an encoding difficulty but this is not as well established in the case of Korsakoff patients. For head injury victims, some may well have problems with encoding whereas others obviously do not.

(ii) **Insufficient Learning Time:** Related to the encoding hypothesis and the above discussion, there is some evidence that Korsakoff amnesics are helped in their learning by being allowed increased study time (eg. Huppert & Piercy, 1978). Furthermore, Glasgow et al. (1977) & Haffey (1983 - see Wilson & Moffat, 1984) found that severely head injured adults could be taught to retain text information using the Preview - Question - Read - State - Test (PQRST) study method. This method proved superior to rehearsal and other study techniques used by the subjects prior to
training. However, Cermak & O'Connor (1983) report that S.S.'s long-term retention of the material from the article he read did not benefit from further rehearsal or from strategies which highlighted the key elements in the text.

Thus, the typical time pressure placed on memory impaired subjects by most neuropsychological tests in assessing their recall may put them at a disadvantage and give an inaccurate picture of their capabilities.

(iii) **Faulty Retrieval:** This hypothesis postulates that although amnesics can retain or encode information their poor performance on tests of memory relates to a retrieval problem or a difficulty accessing acquired information. Evidence that is usually presented in support of this thesis is that the performance of amnesics on recall tasks can be improved in some circumstances given appropriate cues or reminders (eg. see Hirst, 1982). It has also been observed that amnesics can sometimes provide correct answers to previously presented tests at an inappropriate or later stage (Warrington & Weiskrantz, 1978). Thus, if an amnesic subject fails to recall the information required on a memory task, it may be accessible if his remembering is probed or his encoded schema is activated using appropriate retrieval cues such as prompts and target questions.

Moreover, amnesics have been found to be superior at recognising the 'familiarity' or 'unfamiliarity' of information rather than being able to recall the information freely which further suggests that some aspects of the information at least must have been retained, although this could also be seen as a problem of inadequate initial encoding (eg. Crowder, 1982).

(iv) **Faulty Consolidation:** Finally, this hypothesis proposes that although information is registered and can be demonstrably held in an organised form in a temporary store, the information is not consolidated
or established in some relatively permanent form ie. in a long-term memory store. This hypothesis was suggested by the clinical findings that memory may be relatively intact in the presence of profound amnesia (eg. Milner et al., 1968; Brooks, 1984) and was put forward by Cermak and O'Connor (1983) to explain S.S.'s performance.

However, related to the insufficient time learning time hypothesis, the question that needs to be asked before assuming a consolidation problem is can the subjects retain the material presented if he or she is permitted to take notes or to rehearse or otherwise consolidate the information?

1.5.4 Overview

In conclusion, the evidence on how and under what conditions individuals suffering from amnesia organise and recall textual material (ie. use schema-based strategies) is far from clear and needs further investigation. Moreover, given the problems discussed earlier with the Wechsler Logical Memory subtest, the texts used in this investigation will need to be familiar in an everyday context and also have an appropriate schematic organisation.

The text used in the case study of S.S. (Cermak & O'Connor, 1983) is of particular interest in this regard because it was an article on laser technology, a topic that this subject was very familiar with and to which he could bring his prior knowledge of the field and of the genre of scientific reports. Therefore, to use Piagetian terminology he could assimilate the incoming information into his existing schema network. At the same time, he needed to accommodate to the new material present in the article or to update his existing schemata to retain the new information over time. Consolidating this new information was where this particular subject's memory appeared to fail.
Texts which could meet the above criteria and which were schematically functional and had ecological validity would be the most appropriate to use to explore the issue of processing capabilities and dysfunctions in amnesic subjects. It would also be important to use texts across a number of modes of presentation, for example listening, reading and a film format.

One of the weaknesses inherent in the Logical Memory texts of the Wechsler Memory Scale is that they are restricted to an aural mode of presentation. Brain trauma may differentially compromise the processing and recall of texts depending on the mode of presentation. For example, there is evidence in the literature as was discussed earlier that the ease of recall of verbally and visually presented material may be differentially compromised depending on the site of pathology. It is also well documented in the literature on brain trauma that there may be differences depending on pathology in the ability of subjects to comprehend and to recall written and spoken texts (eg. Walsh, 1978; Lezak, 1983). Furthermore, the literature on normal memory functioning (eg. Hildyard & Olsen, 1982) indicates that there are important processing differences in the recall of texts dependent on whether they are listened to or read by subjects.

The research into the memory functioning as outlined above also emphasises that in designing memory tasks proportioning to measure an individual's ability to recall textual material, it is necessary to have built into the assessment the possibility of not just measuring how much content is recalled but also the nature of that recall. This means to explore for a given text what is consistently recalled across subjects in relation to what is missed; how the recall is typically organised; what strategies are most often used; do subjects, as would be predicted from the
schema literature, recall more items of gist than of details; what information from the text is sensitive to decay and what is not? etc.

For subjects suffering from brain trauma, it may be necessary to give cues during test and there needs to be the potential in the assessment text for post-assessment follow up. It may need to be established whether an individual who performed poorly when recalling the text can improve his or her recall if given more time to study the text and to rehearse the main points or to take notes during presentation. Particular diagnostic questions may also be important. For example, is the problem encoding, such that the individual can analyse the content of the text in an organised fashion or is it more a problem of retrieval needing cues and prompts or a consolidation issue whereby information can be analysed but cannot be retained over time? Can a subject who finds a free recall task difficult recall the content of a text better if given to specific questions to answer?

Questions like these are most important in investigating memory dysfunction and ones which memory assessment devices fail to address adequately. Clinicians would gain valuable diagnostic information if they could explore such questions more effectively in relation to a client. They would also be able to decide with greater confidence and accuracy in what areas a given client was likely to be deficient and what he or she could realistically achieve in relation to practical, educational and career goals. Moreover, data on the strategies a client typically adopts would be easier to communicate to other professionals involved in the client's rehabilitation, because they would reflect real-life situations and would be invaluable in designing treatment programmes.
1.6 Conclusions and Research Design

Deficiencies in memory functioning are a frequent complaint of individuals suffering from organic brain damage (e.g., Sunderland et al., 1983; Mayes, 1986) and these deficiencies can range from minor forgetfulness to a devastating and permanent inability to retain nearly all new information as characterised by the amnesic syndrome. In a literate society difficulty recalling information from texts can have particularly serious consequences for individuals in pleasure activities, such as reading or watching television, and in pursuing educational and career ambitions.

Memory tests in current use such as the Logical Memory subtest from the Wechsler Memory Scale which assess the recall of texts are limited in their diagnostic usefulness. This is because such tests require subjects to recall verbatim information-laden paragraphs of text, a task which discourages the use of appropriate text-processing schemata. In recalling texts, individuals characteristically use their prior knowledge of the content of the text and of how texts in that genre are typically organised. They also concentrate on the gist or the key elements that are essential to the overall meaning of the text and to gist relevant details (Mandler, 1984). Gist is generally not recalled verbatim but is a summary of the content of the text, often in the person's own words. The Logical Memory texts are not expectation-confirming because they are poor examples of news reports delivered aurally and overloaded with incidental details which the instructions of the test require subjects to recall.

The capacity to use existing well-structured knowledge and to focus on the important information in a text is particularly crucial for memory
impaired individuals with limited information processing resources. Furthermore, the fact that neuropsychological tests such as Logical Memory typically ignore text-processing strategies is a glaring weakness in their diagnostic capabilities. There is substantial evidence (e.g., Butters & Miliotis, 1979; Parkin, 1987; Squire, 1987) that amnesic individuals typically retain knowledge and strategies learned prior to the onset of their amnesia but have difficulty with unfamiliar tasks such as that expected by verbatim recall of a text given one reading.

Lincoln (1984) asserts that most memory tests have poor predictive validity because she claims that "discrepancies between test results and everyday performance are common in clinical observations". She goes on to suggest that memory tests may be "measuring something very different from daily life memory" (p. 202) which creates problems in devising appropriate rehabilitation programmes for clients or in advising them with any accuracy of their prospects for the future.

1.6.1 Research design

It is proposed that the Logical Memory subtest (Form 1) of the Wechsler Memory Scale (WMS) which is widely used in clinical practice does not adequately predict the ability of subjects suffering from memory dysfunction to recall everyday texts. This is largely because the passages from Logical Memory are not representative of everyday texts or of the task demands of everyday life and do not adequately account for the nature of everyday text recall by normal memory subjects.

In order to test these assertions, the recall of normal memory and memory impaired subjects was assessed on three everyday texts and the two passages from Form 1 of the Logical Memory subtest of the Wechsler (WMS) for up to one week. The Logical Memory subtest even in its alternative versions (e.g., Russell, 1975; Denham, 1984) focuses on delayed
recall for up to 50 minutes. But, it is well known that normal memory subjects can recall information from texts for much longer than this (eg. see Neisser, 1982 b; Mandler, 1984).

The three texts were selected from a real-life setting and were representative of different text genre (narrative, historical and persuasive argument) and of different modes of presentation (aural, written and film). These everyday texts were also representative of those found in an educational setting and those likely to be encountered by a relatively well-educated population. Educational relevance was considered to be important because many young people who suffer memory impairment from brain trauma, on recovery, wish to know whether or not they can feasibly return to an educational or work setting where there is a demand for them to comprehend and to recall textual material (eg. Wilson & Moffat, 1984).

It is hypothesised that text recall will best be predicted by schema theory such that subjects are expected to recall the most salient information or gist more often than the supporting details and in recalling the texts to bring their knowledge of texts to bear on the task (eg. Mandler, 1984; Brown & Yule, 1987). It is also expected that the recall of gist will be more robust over time than the recall of details (eg. Mandler, 1984).

A free-recall, retelling paradigm was adopted. Retelling has been found to be a particularly useful means of assessing the recall of texts such as narratives (eg. Bartlett, 1932) and films (Chafe, 1980) because it allows subjects some freedom in structuring their knowledge in the way that comes most naturally to them.

Finally, the literature on memory impairment indicates that some amnesic subjects may require cues in a free-recall situation so relevant cues have been built into the experimental tasks.
1.6.2 Experimental hypotheses
1.6.2.1 Memory impaired subjects will recall less

It is expected that subject who have suffered from a brain trauma that has resulted in memory dysfunction will recall less of both the gist and details from the texts presented under both immediate recall and delayed recall conditions than will normal memory functioning subjects. This is because memory impaired individuals are likely to encode information; to access information they have recalled; and to retain that information over time less well than normal memory individuals (eg. Butters & Miliotis, 1979; Parkin, 1987; Squire, 1987).

Hypothesis 1: Memory impaired subjects will recall significantly less gist and less details over time than a matched sample of normal memory subjects

Subjects who have suffered brain damage and have consequent memory problems will recall less gist and less details from a set of everyday texts and from the Wechsler (WMS) texts than a matched sample of normal memory subjects.

1.6.2.2 Some text content will be more memorable

A particular weakness in the Logical Memory subtest from the WMS is that the scoring of the passages treats each 'idea unit' as if it was of equivalent importance. Whereas, it is well known from the literature (eg. Mandler & Johnson, 1977; Mandler, 1984; Trabasso & Van Den Broek, 1985) that some items in any text can be expected to be consistently more salient and, therefore, easier to recall than others. This will be related to a number of variables including individual differences in background experience, however, some items of content will be consistently more
memorable across subjects. In particular, research would indicate that gist items will be more memorable than details items for both normal memory (eg. Bartlett, 1932; Thorndyke, 1977; and Mandler, 1984) and clinical populations of subjects (eg. Rubin et al., 1981; Prevey et al., 1988). It can also be anticipated that some items of both gist and details will be more memorable than others, again reflecting their relative importance to the central structure of the text.

**Hypothesis 2: Some items of both gist and details from each text will be more memorable than others.**

(a) Some items of gist and some items of details from each of the five texts presented (3 everyday and 2 WMS texts) will be particularly memorable for normal memory subjects as indicated by significantly higher item facility scores.

The most memorable or the most frequently recalled items of gist (high gist) and details (high details) will be distinguishable across the normal memory subjects from the least memorable or least frequently recalled items of gist (low gist) and details (low details).

(b) Subjects who have suffered brain damage and have consequent memory problems will recall significantly more high gist and high detail items from each of the everyday and from the combined Wechsler Memory Scale (WMS) texts than low gist and low details items. High gist and low gist items will be defined by the item facility scores (gist and details) for each text achieved by the normal memory subjects.

**Hypothesis 3: Gist items will be more memorable than details items for both normal and memory impaired subjects.**

For both the everyday texts and the combined texts from the Wechsler Memory Scale (WMS), subjects with normal memory functioning and
subjects who have suffered brain damage and have consequent memory problems will recall more of the text defined as gist over time than a comparable sample of the text defined as details.

1.6.2.3 Gist will be more salient over time

Gist recall, particularly from well-structured everyday texts, has been found to be more robust over time than details recall (eg. Bartlett, 1932; Mandler, 1984). Details are more likely to decay over time for a memory impaired population (Prevey et al., 1988).

Hypothesis 4: Gist recall will be stable over time. Details recall will be stable over a short period and then decay for normal memory subjects and decay significantly over time for memory impaired subjects.

(a) For subjects with normal memory functioning, the number of items of gist recalled from each of the everyday and WMS texts will be stable over time. Recall of details items will be stable for up to 30 minutes but will decay significantly after one week.

(b) For subjects who have suffered from brain damage and have consequent memory problems, the number of items of gist recalled from each of the everyday and WMS texts will be relatively stable over time but the number of items of details recalled will decay significantly.

1.6.2.4 Recall of WMS texts is not indicative of the recall of everyday texts

It is expected that in recalling the everyday texts subjects will choose text-processing strategies which will emphasise the recall of gist and gist-relevant details. This is because the everyday texts are well-structured examples of their respective genres and because the recall instructions require a retelling of the content. Gist can also be expected to
be more salient for the Wechsler Memory Scale (WMS) texts but because of the details-laden content of these texts and the verbatim recall instructions, subjects will be encouraged to focus on the details. Thus, in the short-term the details of the WMS texts rather than the details of the everyday texts can be expected to be more salient. However, in the longer term, verbatim recall is likely to decay whereas the recall of gist relevant details from the everyday texts will be more robust. The details in the WMS texts tend to be less gist relevant (ie. details for the sake of details) than those from the everyday texts.

**Hypothesis 5: More gist will be recalled over time from each of the everyday texts than from the WMS texts. More details will be recalled in the short term from the WMS texts but details from the everyday texts will be more memorable over time.**

(a) Both normal memory and brain damage subjects will recall significantly more gist items (as 'percentage of the text recalled' scores) over time from the more meaningful, well-structured and relevant everyday texts than from a combined WMS text despite the fact that all of the everyday texts are longer and contain considerably more information.

(b) Both normal memory and memory impaired subjects will recall significantly more details items (as 'percentage of the text recalled' scores) from a combined WMS text for up to 30 minutes but after one week will recall a higher percentage of details items from the everyday texts.

The verbatim recall of the WMS passages which are information-laden and poorly structured is likely to be seen as a more difficult task than the free recall of appropriately structured everyday texts.
Hypothesis 6: The WMS texts will be judged more difficult to recall than the everyday texts.

Normal subjects will judge the two WMS passages as more difficult to recall than the everyday texts presented despite their relatively short length and the small number of information units they contain.

Only normal memory subjects were used to test this hypothesis as the literature suggests (Sunderland et al., 1983) that some brain trauma subjects may not be able to comment on their remembering or may have forgotten enough of the texts over time that they cannot realistically be expected to make comparisons among them.

1.6.2.5 Strategies used to recall everyday texts will be different

Hypothesis 7: Strategies used by normal memory subjects to recall the everyday texts will be qualitatively different from those used to recall the WMS texts.

It is expected that normal memory subjects will adopt strategies that seek the key thematic information or the gist in recalling the everyday texts. In recalling the short, WMS passages on the other hand, subjects are expected to adopt strategies that focus on details rather than gist. This approach to recall is encouraged by the test instructions and the details emphasis in these texts.

Some variation in the strategies used can also be expected across texts on account of the different genres and modes of presentation and across individuals who will have different background experiences and preferred approaches to text recall.

This hypothesis will be tested using qualitative evidence provided by the normal memory subjects.
1.6.2.6 Logical Memory scores will not predict everyday text recall

The ability of the Logical Memory subtest of the Wechsler Memory Scale (WMS) to predict the recall of everyday texts representative of different genre and modes of presentation is likely to be poor. This is because the WMS texts are not representative of the texts or of the task demands encountered in real-life.

**Hypothesis 8: Logical Memory scores will not predict the recall of everyday texts.**

Logical Memory scores from the WMS are not expected to correlate significantly with either the gist or the details scores of the everyday texts for either normal or memory impaired subjects.

**Hypothesis 9: Logical Memory scores will not adequately predict the recall of individual memory impaired subjects on the everyday texts.**

Individual case studies for the memory impaired subjects will be discussed in relation to each subject's pattern of gist and details scores across time on the texts presented and in relation to qualitative and other clinical data collected during assessment. It is expected that for individual memory impaired subjects Logical Memory scores from the WMS will not adequately predict the recall of everyday texts.
CHAPTER 2: METHOD

2.1 Subjects

Three groups of subjects were identified.

2.1.1 Group 1: Memory impaired subjects

Six subjects who had suffered a brain trauma of some kind which left them with significant and persistent memory problems were selected. Of the subjects selected, five were referrals from within the health and rehabilitation agencies in the ACT and one was self referred.

Subjects were selected under the following criteria:

1. They suffered from significant memory problems which could be dated from their brain trauma and there were no indications of significant memory problems prior to the trauma. This was confirmed in each case by a family member and/or from hospital records.
2. The trauma which caused the memory problems occurred at least one year prior to testing to ensure full post-trauma recovery.
3. Significant memory problems including difficulty recalling texts were indicated on the Subjective Memory Questionnaire (SMQ) (Bennett-Levy & Powell, 1980). This questionnaire was filled in by the subject and by an independent observer, in all cases a family member or a carer. An independent observer was used because it is well established (eg. Sunderland et al., 1983) that some people suffering brain damage have difficulty assessing the extent and nature of their memory problems.
4. Subjects had to be well educated; a Year 12 level of education or better. This criterion was imposed so it could be assumed that these subjects had
experience with how information is organised in more academic everyday texts and skill in gaining information from such texts.

Subjects selected

The six subjects in this group were three females (aged 18, 19 & 52 years) and three males (aged 23, 27 & 50 years).

Of the females, one had suffered a closed head injury as a result of a significant fall; one had suffered anoxia; and the other a severe brain haemorrhage. All the male subjects had suffered closed head injuries as the result of traffic or sporting accidents.

One male had completed a degree in Science at university prior to his accident: one male and one female subject were studying Humanities courses in an advanced education institution: one female was in her final year at school prior to her accident and was an A level student: one male had university entry and ambitions of further study prior to his accident: one female had a matriculation and a white collar career before her illness.

All subjects identified themselves as middle class and this was confirmed by their family or carers.

It was difficult to select a group of subjects who fitted the selection criteria and were able or willing to do the lengthy testing sessions required or who were of the opinion that the testing would benefit them personally. A neuropsychological report was written for each subject suffering from brain injury who was approached and given any testing. Eight subjects were eventually tested but two subjects had to be dropped from the sample. One subject was excluded because, after completing only half of the assessment, he was admitted to hospital for brain surgery. This meant a long, post-surgery recovery period but also his
cognitive functioning may well have changed significantly after surgery. The other subject was excluded because although he complained of memory problems assessment results, including a complete Wechsler Memory Scale, showed that he had a better than average memory.

2.1.2 Group 2: Matched group with normal memory

A matched group of six subjects with normal memory functioning and no history of brain trauma was then selected. These normal memory subjects matched the brain trauma group in age, education and economic status.

Four of these subjects were students at the Australian National University or the Canberra College of Advanced Education (three studying in Humanities subjects and one in Science). One subject was in Yr. 12 at school and one was a mature-aged subject with a matriculation who up until recently had a white collar career.

2.1.3 Group 3: Control group with normal memory

A sample of twelve subjects with normal memory functioning and no history of brain trauma was used to assess the recall of the experimental texts by a control population of well-educated subjects with normal memory functioning.

This group consisted of six first year psychology students from the Australian National University and the matched sample described above. The age of this group ranged from 18 to 52 years with ten subjects aged between 18 - 27 years and two subjects aged 50 and 52 years.

The mature-aged subjects were selected because they matched two of the experimental subjects in age, socio-economic status and education. They were included in the control group of subjects with normal memory functioning because their performance on the memory tasks was well
within the performance scores for the younger subjects. There is evidence that verbal memory does not decline significantly with age and experience until well into the 60's (Hochanadel & Kaplan, 1984) so it is appropriate to include these subjects in a normal memory functioning sample.

2.2 Experimental Texts

The everyday texts chosen were a short story (a narrative text); a newspaper article which reported an aspect of Australian history (a report on a historical theme); and a documentary film which presented an argument between conservationists and a mining company from the point of view of the conservationists (a text presenting a persuasive argument).

The criteria for selecting the texts were that they came from an everyday setting, were not too demanding in content and were compatible with those encountered in an educational setting.

Once selected, these everyday texts were then shown to a panel of three expert judges all with a linguistic background who judged them to be well-structured representatives of their respective genres.

The following were the five experimental texts used in this research: two passages from the Wechsler Memory Scale (WMS) and three everyday texts.

**Wechsler Memory Scale Texts** (see Appendix A)
The Logical Memory subtest from the Wechsler Memory Scale (Wechsler, 1945): Form 1 the Australian version (see Ivison, 1977).
This test consists of two passages which begin *Anna Thompson* (65 words) and *The American liner New York* (53 words).
**Everyday Texts** (see Appendix A)

1. Short Story
The short story *Our Dog Montie* by Michael Dugan (1971) is 1326 words long and comes from a book of readings recommended for use in high schools.

2. Newspaper Article
The article *Camel Drivers' Historic Role* is 310 words long and was adapted from an article by A. Q. Qureshi (Canberra Times, 1988). The article also contains a picture of an Afghan with his camels.

3. Documentary Film
The film is entitled *The Battle for Mt. Etna* and comes from the Australian Broadcasting Commission educational television series *Behind the News* (1988). It runs for approximately 4 minutes and the film script contains 540 words.

2.3 Procedure

All subjects were assessed individually by the same experimenter over three sessions one week apart.

Subjects in the memory impaired group were given an additional interview session prior to testing during which information was informally collected on the subject's history of injury and the nature of the memory problems he or she was experiencing. The Subjective Memory Questionnaire (SMQ) (see Bennett-Levy & Powell, 1980) was also completed in the session. An additional copy of the SMQ was given to the subject to take home for a family member or a carer to complete.

The main experimental task was for each subject to recall the three everyday texts (the short story, the newspaper article & the documentary film) and the two passages (Anna Thompson & the American liner New
York) from the Logical Memory subtest of the Wechsler Memory Scale (WMS) using a free-recall paradigm. Over the three sessions, subjects were required to recall each text immediately, 30 minutes and one week after presentation.

The two passages from the Wechsler Memory Scale were always presented together and in the order required by the test instructions (see Appendix B).

The four experimental texts were presented to each subject two per session over the first two sessions in the following manner:-

1. The short story was read to the subject by the experimenter.
2. The newspaper article was read by the subject within a 4 minute time period.
3. The documentary film was on video and was shown to the subject using a video recorder.
4. The Logical Memory passages (Anna Thompson and the American liner New York) were read to the subject by the experimenter as per the WMS instructions.

Texts were randomly assigned to the first two sessions to control for 'order effect' for the memory impaired and normal memory groups.

Matched control subjects were presented with the texts in the same sequence as they were presented to their memory impaired counterparts.

The third session was required for subjects to recall the texts presented the previous week.

The recall instructions for the everyday texts were standardised and asked the subject to recall each text as if retelling it in as much detail as possible to a friend who was interested in the content (see full standard recall instructions Appendix B).
Subjects were also informed that they would be asked some questions on the content of the text (see Appendix B for questions). Questions were related to both gist and selected details of the text and were given:

(a) to help legitimise the wait for the subject before the next recall;
(b) and to see how memory impaired subjects performed on specific questions in comparison to their free recall of the text.

Subjects were not informed that they would be required to recall the information from the texts presented over time, that is, after 30 minutes and after one week.

The recall instructions for the Logical Memory subtest were the standardized instructions from the WMS with the addition of a sentence which informed subjects about the set of questions they would be asked on the content of the passages (see Appendix B).

Immediately, 30 minutes and one week after presentation, subjects were instructed to recall what they could of each text in as much detail as possible. The only prompt allowed was: “Do you recall any more?”

If a subject could not recall any of a given text after a reasonable period of time had elapsed, a cue was permitted (see Appendix B for the permitted cue for each text). Cues were given to assist the recall of memory impaired subjects with a retrieval or access problem. Items contained in the cue were not later scored as an item correctly recalled.

Some subjects guessed after the second session that they would be asked to recall the material again after one week. These subjects were asked to endeavour not to think about the text or to record their recall in any way over the week.

Immediately after each text was presented, the subject was asked to record his or her recall on an audio tape using a portable tape recorder. Recall of each of the four experimental texts immediately, after 30 minutes and after one week were recorded on audio tape.
Testing sessions for each subject were arranged as follows:

**Session 1:** The subject was given the instructions for the text to be presented. The first text was then introduced and the subject was required to recall it immediately. The subject was then asked the set of questions on the text which were given orally by the experimenter. Answers to the set of questions were written down by the subject. In the case of two of the brain trauma subjects who had poor fine motor coordination, the answers to these questions were dictated and recorded by the experimenter.

Subjects were then asked to comment on the strategies they used in recalling the text.

After 30 minutes, the subject was asked to recall the text again.

A second text was then introduced to the subject following the same procedure.

For the Logical Memory subtest, each passage was presented and recalled individually as per the test instructions in the Wechsler Memory Scale manual (Wechsler, 1945).

**Session 2:** Each subject was reminded of the texts presented the previous week (see Appendix B) and then was asked to record his or her recall of the two texts onto a tape using a portable recorder. If a subject could not recall a text after a reasonable period a cue was given (see Appendix B for permitted cues).

The next two texts were then presented as above.

**Session 3:** The subject was asked to recall the texts presented the previous week as before.

The subject was then asked to rank the texts (the two passages from the WMS were ranked independently) in order of difficulty from 1 - 5.
Subjects were instructed that they could give more than one text the same rank if they so desired.

2.4 Text Analyses

2.4.1 Analysis of text into gist and details items

The experimenter analysed each of the three everyday texts and the two passages from the Logical Memory subtest of the Wechsler Memory Scale (WMS) into gist items and details items. The gist and details items generated for each text were then given to three independent, expert judges (all with a linguistics or language education background) for critical comment and revision. The analyses were revised based on the consensus of opinion from the expert judges (see Appendix C for gist and details analyses for each text).

Gist was defined as the key thematic information presented in a text, information deemed crucial to the central meaningful structure or the main message of the text. For example, in an expository text, the gist would be the main argument or point of view presented; in a narrative, the setting, important information about prominent characters and important events relevant to the plot. The gist can be seen as a summary or precis of the central meaning and is often recalled in a person's own words.

Details were defined as supporting material which elaborated on or embellished the main argument or plot but if left out would not detract from the main message or the overall meaning of the text.

The above notions of gist and details are based on those described by Bartlett (1932) and authors such as Mandler (1984) but also are indebted to the understandings from systemic linguistics of the structure of different text genres as discussed below.
2.4.2 Rationale for text analyses

The purpose of the text analysis in this study was to identify separate elements of the text in such a way as to allow comparison between subjects in terms of the nature as well as the amount of content recalled. The breakdown of texts into gist and details items represents a significant advance over the text analysis in the Wechsler Memory Scale which provides no assessment of global as opposed to specific content recall.

An understanding of the constituent structure of different kinds of texts was required in order to specify the gist and details for each text. A suitable basis for determining such structure was found in the systemic functional approach to text analysis developed by Halliday & Hasan (1985). These authors define text first and foremost as a semantic and not simply a linguistic unit. For Halliday & Hasan,

"A text, then, is both an object in its own right (it may be a highly valued object, for example something that is recognised as a great poem) and an instance - an instance of social meaning in a particular context of situation. It is a product of its environment, a product of a continuous process of choices in meaning that we can represent as multiple paths or passes through the networks that constitute the linguistic system."

(Halliday & Hasan, 1985 p.11).

Martin (1984; 1986; 1989) and others (eg. Christie, 1989; Callaghan & Rothery, 1989) have extended Halliday and Hasan's work on texts to include the concept of 'genre'. A genre is a generalised representation of culturally appropriate texts. Texts which constitute examples of a particular genre have significant commonality in terms of the way meaning choices are organised within them.
The recount genre, for example, exists to retell events for the purpose of informing or entertaining and events are usually arranged in a temporal sequence. The generic structure of recounts can be represented as an orientation followed by a sequence of events and often a re-orientation at the end of the text. Other genres have different generic structures, for example, a report is a factual text which describes the way things are, with reference to a whole range of phenomena, natural, synthetic and social in our environment. Reports exist to taxonomize or classify fields of knowledge and are common in scientific writing. Reports have no temporal sequence and their generic structure can be represented as a general classification followed by a description.

The concept of genre presented by systemic functional linguists such as Martin (1984, 1986, 1989), Callaghan & Rothery (1989) and Christie (1989) is similar in many respects to other representations of text structure that already exist within the psychological literature. Most notably the concepts of story schema and story grammar (Mandler, 1984). For example, the representation of generic structure for narratives by the systemic linguists closely accords with that proposed for 'story schema' ie. Orientation (setting, characters etc.), events (complication/ resolution pattern), coda (moral observation). However, for the purposes of this study, the text analysis of the systemic linguists has a major advantage over story grammar/schema because it is applicable to representing the structure of a range of text genres and text lengths. Story grammar/schema, on the other hand, is really only suited to short, simple, specially constructed stories (Garnham, 1983; Brown & Yule, 1987).

2.4.2 Genre of texts and the construction of gist

The genre and main gist structure of each text type used in this study are discussed below:-
The WMS passages were considered to be poor examples of orally presented newspaper reports where a series of logically connected events are described. The gist for the WMS texts was constructed as a summary of the main events which in a newspaper report usually have the structure (see Macken, 1989):

- Headline
- Lead (Newsworthy event)
- Background Events (1-n)
- Sources

The short story fits the classification of a narrative text with the basic generic structure consisting of an Orientation where the scene is set and the main characters introduced followed by a series of Complication/Resolution sequences and concluding with a moral (Christie, 1989). That is:

- Orientation
- Complication
- Reaction (optional)
- Resolution
- Coda

The newspaper article was considered to be a historical report (Martin 1989). The generic structure of a report can be represented as:

- General Classification
- Description (1-n)

The documentary film was considered to be a combination of two factual text types, an exposition and a discussion (Martin, 1985; Callaghan & Rothery, 1988). While the film is principally an exposition text which puts forward a point of view (ie. the conservation case against mining), the text also makes some pretext of presenting the mining company's viewpoint and thereby introduces some features of a discussion text.
The two relevant generic structures are:-

**Exposition**

- Thesis
- Position
- Preview
- Arguments (1-n)
- Point
- Elaboration

Reiteration (restatement of the thesis).

**Discussion:**

- Issue
- Arguments for and against (1-n)
- Or
- Statements of differing points of view (n-1)
- Recommendations.

The generic structures outlined above formed the base information from which the estimates of gist or the meaningful structure of the text were compiled. Details were then determined as the elements within the text which contributed to each aspect of the gist.

The completed analysis into gist and details for each text is presented in Appendix C.

2.5 Scoring Recall of Texts

2.5.1 Gist and details items

The full free recall of each of the five texts (short story, newspaper article, documentary film and two WMS passages) for each of the three time periods (ie. immediately, 30 minutes and one week after
presentation) for each subject was transcribed from the audio tapes. For each subject, there were a total of 15 transcripts (3 transcripts per text).

Each text transcript was then analysed into an overall score for gist and for details. A score of one was given for each item of gist and each item of details successfully recalled. The number of successful recalls for gist items and details items were then summed for each text transcript. Maximum raw scores for each text for gist and for details are as follows:

**Everyday texts**
1. Short story - gist 54 details 94
2. Newspaper article gist 12 details 43
3. Documentary film gist 17 details 50

**WMS texts**
4. Anna Thompson gist 9 details 16
5. American liner gist 7 details 19

A gist item was scored as successful if it contained the main meaning intended. For example, in the Anna Thompson text a subject was given a score for "bills to pay" when the actual item in the text was "the rent was due"; in the film "an argument between the Greenie's movement and a mining company" when the actual item was "the battle is between conservationists and a cement company". If an item was difficult to score, the expert judges used in the text analyses were consulted and a consensus opinion was taken.

Details items tended to be less difficult to score as the information they contained was more specific. However, as with gist items, if an equivalent meaning was given the item was scored as correct. For example, in the short story one subject substituted "lived on a pension
from his 11 children and drank kerosene"; for "lived on the child endowment from his 11 children and drank methylated spirits".

2.5.2 The Logical Memory subtest (WMS)

The two passages from the Logical Memory subtest of the Wechsler Memory Scale were also scored as per the instructions in the test manual. The passages in the Logical Memory subtest are divided into idea units (see Appendix A for the breakup of each text into idea units) and each idea unit correctly recalled scores one point. The Anna Thompson passage contains 24 idea units and the American Liner 22 idea units. The overall score for the subtest is computed by averaging the scores obtained for each passage. The maximum score for the Logical Memory subtest is, therefore, 23.

2.5.3 Frequency of recall for each item of gist and details

A score for frequency of recall for each of the gist and details items for each of the five texts (3 everyday and 2 WMS texts) was obtained for the normal memory subjects.

For each text, the number of times each gist and details item was recalled over the three time periods was given a score. A maximum score of 3 was given per item for a given subject on a given text (i.e. a score of 3 was achieved if a subject successfully recalled a given item over the three time periods). Frequency scores for each gist and details item were then summed for the 12 normal subjects. The maximum score for any one item of either gist or details across subjects was 36.
2.5.4 Scoring of text related questions

A score of one was given for each of the five questions on each of the texts correctly answered (see Appendix B for questions and acceptable answers).

Subjects were scored successfully on the questions related to the theme or precis of the text if they gave any reasonable generalisation of the overall message or content. Typical answers to these gist type questions included:-

1. The short story: "That dogs can be allowed to get away with too much and a little bit of discipline is all that is needed to bring them into line".
2. The newspaper article: "The article described the Afghan camel drivers and their contribution to the opening up of outback Australia."
3. The documentary film: "The film was about the battle between the conservationists and a cement company over the mining of Mt. Etna in Queensland."
4. Anna Thompson: "It was about a woman who was robbed of some money and she was poor and had young children to feed. The police felt sorry for her and took up a collection for her".
5. The American liner: "A ship hit something and sank but all the passengers were rescued".
3.1 Mean, Standard Deviations and Scores

The mean and standard deviation for each set of scores for gist and details for each of the five texts presented (everyday and WMS texts) across the three periods of time after presentation (i.e., immediately, 30 minutes and 1 week) for both normal memory functioning and memory impaired subjects are given in Tables 1 and 2.

The mean and standard deviation are also given for the scores of both normal and memory impaired subjects across time on the Logical Memory subtest. The mean of 12.60 (sd=3.12) achieved by the normal memory group for Logical Memory immediately after presentation is slightly higher than that reported by Ivison (1988) for a similar group of university students (M=11.79; sd=3.26).

Table 1 presents raw scores (note that the maximum possible raw score for gist and for details varies within the one text and from text to text). Table 2 presents scores as converted 'percentage recalled' scores for ease of inter text comparisons. However, it needs to be remembered that the number of items of gist and details and the length of each text varies, in some cases markedly, so inter text comparisons need to be considered with these differences in mind.
Table 1

Means and standard deviations for the raw scores (gist and details) for normal memory (n=12) and memory impaired (n=6) subjects on each of the everyday and WMS texts and for the Logical Memory subtest.

<table>
<thead>
<tr>
<th>TEXTS</th>
<th>NORMAL</th>
<th>MEMEORY IMPAIRED</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Time after Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immed  30mins 1 week</td>
<td>Immed  30mins 1 week</td>
</tr>
<tr>
<td>Short Story</td>
<td>No. Words 1326</td>
<td></td>
</tr>
<tr>
<td>GIST (max.54)</td>
<td>Mean</td>
<td>39.25</td>
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<tr>
<td></td>
<td>SD</td>
<td>7.14</td>
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<tr>
<td>DETAILS (max.94)</td>
<td>Mean</td>
<td>33.92</td>
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<tr>
<td></td>
<td>SD</td>
<td>8.58</td>
</tr>
<tr>
<td>Newspaper article</td>
<td>No. Words 310</td>
<td></td>
</tr>
<tr>
<td>GIST (max.12)</td>
<td>Mean</td>
<td>11.08</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.08</td>
</tr>
<tr>
<td>DETAILS (max.43)</td>
<td>Mean</td>
<td>14.17</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.19</td>
</tr>
<tr>
<td>Documentary film</td>
<td>No. Words 540</td>
<td></td>
</tr>
<tr>
<td>GIST (max.17)</td>
<td>Mean</td>
<td>14.67</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.61</td>
</tr>
<tr>
<td>DETAILS (max.54)</td>
<td>Mean</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>5.62</td>
</tr>
<tr>
<td>Anna Thompson</td>
<td>No. Words 65</td>
<td></td>
</tr>
<tr>
<td>GIST (max.9)</td>
<td>Mean</td>
<td>6.50</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.52</td>
</tr>
<tr>
<td>DETAILS (max.16)</td>
<td>Mean</td>
<td>9.25</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.55</td>
</tr>
<tr>
<td>American liner</td>
<td>No. Words 53</td>
<td></td>
</tr>
<tr>
<td>GIST (max.7)</td>
<td>Mean</td>
<td>4.67</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.16</td>
</tr>
<tr>
<td>DETAILS (max.19)</td>
<td>Mean</td>
<td>8.17</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.86</td>
</tr>
<tr>
<td>Logical Memory</td>
<td></td>
<td>max score 23</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>12.60</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.12</td>
</tr>
</tbody>
</table>
Table 2
Means and standard deviations for the converted percentage scores (gist and details) for normal memory (n=12) and memory impaired (n=6) subjects for each of the everyday and WMS texts.

<table>
<thead>
<tr>
<th>TEXTS</th>
<th>NORMAL</th>
<th>MEMORY IMPAIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immed</td>
<td>30min</td>
</tr>
<tr>
<td><strong>Short Story</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>70.69</td>
<td>70.37</td>
</tr>
<tr>
<td>SD</td>
<td>13.19</td>
<td>12.00</td>
</tr>
<tr>
<td>DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>36.08</td>
<td>31.29</td>
</tr>
<tr>
<td>SD</td>
<td>9.12</td>
<td>9.85</td>
</tr>
<tr>
<td><strong>Newspaper article</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>92.36</td>
<td>87.85</td>
</tr>
<tr>
<td>SD</td>
<td>9.03</td>
<td>10.28</td>
</tr>
<tr>
<td>DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.95</td>
<td>31.59</td>
</tr>
<tr>
<td>SD</td>
<td>7.41</td>
<td>9.48</td>
</tr>
<tr>
<td><strong>Documentary film</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>86.28</td>
<td>86.28</td>
</tr>
<tr>
<td>SD</td>
<td>9.50</td>
<td>9.50</td>
</tr>
<tr>
<td>DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>30.25</td>
<td>27.33</td>
</tr>
<tr>
<td>SD</td>
<td>11.43</td>
<td>10.49</td>
</tr>
<tr>
<td><strong>Anna Thompson</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>71.76</td>
<td>71.76</td>
</tr>
<tr>
<td>SD</td>
<td>17.32</td>
<td>19.17</td>
</tr>
<tr>
<td>DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>57.81</td>
<td>41.93</td>
</tr>
<tr>
<td>SD</td>
<td>15.96</td>
<td>19.29</td>
</tr>
<tr>
<td><strong>American liner</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>66.67</td>
<td>66.67</td>
</tr>
<tr>
<td>SD</td>
<td>16.5</td>
<td>19.82</td>
</tr>
<tr>
<td>DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>42.03</td>
<td>39.91</td>
</tr>
<tr>
<td>SD</td>
<td>18.36</td>
<td>18.70</td>
</tr>
</tbody>
</table>
Tables 1 & 2 illustrate that overall the memory impaired sample of 6 subjects achieved lower average scores than the normal memory sample of 12 subjects. Individual differences in scores as indicated by the standard deviations are also evident with some being more disparate than others across texts and within both the normal and the memory impaired groups.

Standard deviations for the normal memory group (gist and details recall) are relatively stable across time indicating that the individual differences in scores between subjects are also relatively stable. For the memory impaired group, the time period 30 minutes after presentation has the largest standard deviations for each text for gist recall and for details recall (apart from the Anna Thompson text) indicating a particularly wide range of individual differences for this time period. This indicates that some memory impaired subjects could retain information for up to 30 minutes or maybe even improved their recall scores in the short term (this was not uncommon) whereas the recall of others decayed rapidly making the variation in individual differences wider.

Tables 1 & 2 also indicate that, in general, scores for the normal memory subjects cluster more around the mean than scores for memory impaired subjects even though there were fewer subjects in the memory impaired sample ($n=6$ in relation to $n=12$ for the normal memory group).

It is useful to make tentative comparisons from the data in Table 2 between the normal memory and memory impaired subjects for the immediate recall of gist and details across texts. The significance of these results is tested more fully by data presented later in this chapter. The recall of memory impaired subjects is likely to be closer to that for normal memory subjects immediately after presentation of the texts.
Immediately after presentation, normal memory subjects recalled their highest percentage score (92.36%) for the gist of the newspaper article than for any other text. It is to be expected that normal memory subjects would recall a higher percentage from this text than from the other everyday texts which contain more items of gist. However, the normal memory subjects also recalled considerably more gist from the newspaper article, and also from the documentary film, than from the shorter Wechsler Memory Scale texts which contain fewer items of gist. The percentage of gist recalled from the short story and the Wechsler Memory Scale texts for these subjects was very similar which is particularly noteworthy given that the short story is the longest text with the most items of gist.

The memory impaired subjects, in contrast, recalled a higher percentage of gist from the Wechsler Memory Scale texts than from any of the everyday texts immediately after presentation. Furthermore, the lowest percentage of gist recalled by these subjects was for the newspaper article (31.95%) indicating that, in comparison to the normal memory subjects, they found gist recall for this text the most difficult.

Both normal memory and memory impaired subjects recalled a higher percentage of details from the Wechsler texts than from the everyday texts immediately after presentation. For this time period, the gap between normal memory and memory impaired subjects in terms of percentage recalled was also smaller for the Wechsler Memory Scale texts than for the everyday texts. It is noteworthy, however, that a much higher percentage of details was recalled from the short story by the memory impaired subjects than from the other two everyday texts despite the fact that the short story is the longest of the everyday texts and has a great deal more identified details items.
After one week, the normal memory subjects recalled a higher percentage of gist from the newspaper article and the documentary film than from the other texts. Normal memory subjects recalled the highest percentage of details from the Wechsler Memory text Anna Thompson, although the percentage of details recalled was fairly similar across texts for these subjects.

After one week, the memory impaired subjects recalled a higher percentage of the gist from the documentary film than from the other texts and a higher percentage of details from the everyday than the Wechsler Memory Scale texts.

3.2 Hypothesis 1: Memory Impaired Subjects will Recall Less

The hypothesis that subjects who have suffered brain damage will recall less gist and details than a matched sample of normal memory subjects was tested using a series of one-tailed t tests for related samples for each everyday and each WMS text across the three presentation times (see Table 3). Note that results displayed in Tables 1 & 2 are for the entire sample of 12 normal memory subjects whereas the results reported below apply only to the matched sample of 6 normal memory subjects.

Memory impaired subjects were found to recall significantly less gist and less details than normal memory subjects from each of the everyday texts (short story, newspaper article and documentary film) and from the Anna Thompson passage (WMS text) across presentation times.

Memory impaired subjects also recalled significantly less gist and less details from the American liner passage (WMS text) one week after presentation and significantly less details 30 minutes after presentation. However, no difference was found between memory impaired and normal memory subjects for the gist and details recall of the American liner
passage immediately after presentation or for gist recall 30 minutes after presentation (see Table 3).

Thus, for all texts except the American liner from the Wechsler Memory Scale memory impaired subjects recalled significantly less than normal subjects.

Table 3

One-tailed t test scores for the difference between memory impaired subjects and a matched sample of normal memory subjects on recall of gist and of details across time for each of the everyday and WMS texts.

<table>
<thead>
<tr>
<th>Text</th>
<th>Time after Presentation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Immediate</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Short story</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>4.969**</td>
<td>4.056**</td>
<td>6.135**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>4.034**</td>
<td>3.264*</td>
<td>5.044**</td>
</tr>
<tr>
<td>Newspaper article</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>15.526**</td>
<td>6.278**</td>
<td>7.519**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>6.888**</td>
<td>4.329**</td>
<td>5.853**</td>
</tr>
<tr>
<td>Documentary film</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>6.776**</td>
<td>4.722**</td>
<td>4.856**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>4.827**</td>
<td>8.535**</td>
<td>3.236*</td>
</tr>
<tr>
<td>Anna Thompson</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>3.877**</td>
<td>3.521**</td>
<td>7.486**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>2.035*</td>
<td>8.451**</td>
<td>2.975*</td>
</tr>
<tr>
<td>American liner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>1.501</td>
<td>1.782</td>
<td>4.858**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>1.196</td>
<td>2.605*</td>
<td>5.215**</td>
</tr>
</tbody>
</table>

* p<0.05
** p<0.01
3.3 Hypothesis 2: Some Items will be More Memorable

3.3.1 The most memorable items

An item facility (IF) score was computed for each item of gist and each item of details for each of the five texts (3 everyday and 2 WMS) for normal memory subjects. Item facility was calculated by taking the frequency an item was recalled summed across time for the twelve normal memory subjects and dividing this score by 36 or the maximum recall score achievable per item. Item facility scores for each item on each text are given in Appendix D. An IF score close to 1 indicates that an item is highly memorable or most likely to be recalled for up to one week after presentation; an IF score close to 0 indicates an item is highly unmemorable or most unlikely to be recalled for up to one week.

The most memorable items of gist and details for each text are listed in order of presentation in Appendix E. The most highly memorable items of gist were defined as those scoring IF ≥ 0.85. Details items were recalled less well so the most highly memorable details were considered to be those with an IF score of ≥ 0.75.

Considerably more gist items than details items were found to be highly memorable across time periods. It is noteworthy that the details items most frequently recalled relate closely to the most memorable gist as would be anticipated from the literature (eg. Bartlett, 1932; Mandler & Johnson, 1977; Mandler, 1984).

For example, in the short story the most memorable gist was the key information related to the main protagonist, the dog and his behaviour together with the way the mother dealt with this behaviour; the fact of the elderly school teacher moving in next door; and the key incident where the dog bit her and the implications of that action.
The most memorable details (ie. those with IF scores of 0.80 or more) were the name of the dog or the main protagonist (Montie) and the details surrounding the most significant action in the story. Namely, the school mistress was invited over for afternoon tea; the dog was placed in the shed with a good supply of meat and water. The father held the dog on as short a lead as he dared. The dog bit the teacher on the ankle and she boxed him on the ear.

With the other four texts, only one item of detail per text had an IF score of \( \geq 0.75 \) but in each case this detail was significant to the the most memorable gist items.

### 3.3.2 High and low gist/details items for normal memory subjects

Gist and details items for each text were arranged from the most frequently to the least frequently recalled from the frequency scores previously compiled (see Appendix D for IF scores which can be converted back into frequency scores). The top 25% of items (to the nearest whole number) or those most frequently recalled were labelled high gist and high details respectively. If a frequency score was the same for more than one item at the 25% cut off point, these were also included in the high gist or high details category.

Low gist and low details items were similarly selected as the bottom 25% of items or those least frequently recalled.

The same number of items were designated as low gist or low details as had been designated high gist and high details for each text. Where the number of items for low and high gist or details was not the same on a given text because the cut off point came within a range of items with the same score, adjustments were made so that the required number of items was selected randomly from within the range.
3.3.3 Memory impaired subjects will recall more high than low gist/details

A series of one-tailed t tests for related samples was carried out for each of the three everyday texts and for the combined WMS texts to compare differences in the frequency scores (summed across time) between high and low gist items and between high and low details items for the memory impaired subjects. The WMS texts were combined for this analysis because the number of items of high gist and reciprocally low gist was too small for each text on its own (i.e., only two in each category).

The null hypothesis was rejected in favour of the alternative hypothesis for gist and details recall for the three everyday texts and for the combined WMS text. Across texts, memory impaired subject recalled significantly more high than low gist items [short story \( t=5.585, p<0.01 \); newspaper article \( t=7.993, p<0.01 \); film \( t=5.445, p<0.01 \); & combined WMS \( t=2.863, p<0.05 \)] and significantly more high details than low details items [short story \( t=2.434, p<0.05 \); newspaper article \( t=2.074, p<0.05 \); film \( t=4.481, p<0.01 \); & combined WMS \( t=3.077, p<0.05 \)].

3.4 Hypothesis 3: Gist will be More Memorable

The hypothesis that for each of the texts more gist than details items will be recalled by both normal and memory impaired subjects over time could not be tested by directly comparing the percentage of gist with the percentage of details recalled for each text as set out in Table 2. It is tempting to compare these percentage scores directly as, on face value, scores for gist are consistently and substantially higher than those for...
details. However, although the gist items themselves tend to be longer and, in many cases, to contain more information than the details items, it needs to be remembered that in all texts there are considerably more details than gist items.

One solution would be to weight gist items in relation to details items. Another would be to compare gist items with a comparable number of details items selected randomly or selected in order of presentation from the text.

The above solutions are not entirely satisfactory because the gist items were deliberately selected because they were important to the argument or plot of the text whereas details items are a mixture of trivial details through to highly relevant and memorable details. More memorable details are dispersed throughout the text and tend to cluster in relation to the more memorable gist items (see results Hypothesis 2). In light of these discrepancies between gist and details, it was decided to test the gist-details hypothesis in a way most favourable to the details items by comparing the gist items with the same number of the most frequently recalled or high details items for each text. High details items were those defined above as high details or those most frequently recalled by the normal memory subjects. High details items were selected from the most to the least frequently recalled until the number required to match the number of gist items for that text was reached. If in selecting the required number of high details items, the cut off point came within a frequency score, first items in order of presentation were selected until the required number was achieved.

A series of one-tailed t test comparisons for related samples between gist and high details recall was conducted for each of the everyday texts separately and for the combined WMS texts (ie. total gist items from Anna Thompson & the American liner were combined with the same number
of high details from each text being included). T tests were also conducted for each of the time periods after presentation (see Table 4).

**Table 4**

One-tailed t test comparisons for related samples between the recall of gist and memorable details for the three everyday texts and the combined WMS text across time periods for normal memory and memory impaired subjects

<table>
<thead>
<tr>
<th>Text</th>
<th>NORMAL MEMORY (n=12)</th>
<th>MEMORY IMPAIRED (n=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immed  30min 1 week</td>
<td>Immed  30min 1 week</td>
</tr>
<tr>
<td>Short story</td>
<td>10.307** 12.421** 15.409**</td>
<td>7.327** 4.039** 3.684**</td>
</tr>
<tr>
<td>Newspaper article</td>
<td>6.317** 5.832** 8.393**</td>
<td>3.731** 2.993* 2.163*</td>
</tr>
<tr>
<td>Documentary film</td>
<td>8.409** 8.013** 8.158**</td>
<td>9.589** 3.927** 3.701**</td>
</tr>
<tr>
<td>WMS combined text</td>
<td>0.306  1.617  3.831**</td>
<td>3.245*  2.395* 1.646</td>
</tr>
</tbody>
</table>

* p<0.05  
** p<0.01

The null hypothesis was rejected in favour of the alternative hypothesis for both the normal memory and memory impaired groups for each of the everyday texts for each presentation time period (see Table 4). Thus, gist items were more memorable than even high details items across time and subjects for the everyday texts.

For the combined WMS text, the null hypothesis was accepted for the normal memory group for the immediate and the 30 minutes after presentation indicating that there was no difference in the recall of gist
and details items over 30 minutes. But one week after presentation, a significant difference between gist and details recall emerged. For the normal memory subjects, gist was more memorable than details on the WMS text but only after a time lapse of one week.

The opposite was true for the memory impaired group where gist on the WMS text was significantly more memorable than details immediately and 30 minutes after presentation but there was no significant difference between gist and details recall one week after presentation (see Table 4).

3.5 Hypothesis 4: Gist Recall is Stable Details Decay

Hypothesis 4 which predicted that gist recall would be stable whereas details recall would be prone to decay was tested for normal memory and memory impaired subjects using a series of t tests for related samples. For each of the five texts (everyday and WMS texts), the significance of differences between raw scores for gist and details recall was investigated over each of the three presentation time periods (ie. between immediate recall & recall after 30mins; between immediate recall & recall after 1 week; between recall after 30 mins & after 1 week). A one-tailed test was used because the alternative hypothesis postulated was that recall would decay over time (see Table 5). It is well documented that memory declines with time and the mean scores on Tables 1 and 2 tend to confirm this.
Table 5

One-tailed t test comparisons for related samples between time periods for the three everyday texts and for the two WMS passages (gist and details) for normal memory and for memory impaired subjects

<table>
<thead>
<tr>
<th>Texts</th>
<th>NORMAL MEMORY</th>
<th></th>
<th>MEMORY IMPAIRED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immed/</td>
<td>Immed/ Immed/</td>
<td>Immed/</td>
<td>Immed/ Immed/</td>
</tr>
<tr>
<td></td>
<td>30mins 1week</td>
<td>30mins 1week</td>
<td>30mins 1week</td>
<td>30mins 1week</td>
</tr>
<tr>
<td>Short story</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>1.547</td>
<td>3.068**</td>
<td>2.865**</td>
<td>2.818*</td>
</tr>
<tr>
<td>DETAILS</td>
<td>2.800**</td>
<td>5.700**</td>
<td>4.818**</td>
<td>0.450</td>
</tr>
<tr>
<td>Newspaper article</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>2.000*</td>
<td>3.739**</td>
<td>1.898*</td>
<td>0.438</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.904</td>
<td>3.424**</td>
<td>2.839**</td>
<td>-0.344</td>
</tr>
<tr>
<td>Documentary film</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.000</td>
<td>2.588*</td>
<td>2.806**</td>
<td>0.917</td>
</tr>
<tr>
<td>DETAILS</td>
<td>1.808</td>
<td>3.497**</td>
<td>2.600*</td>
<td>0.143</td>
</tr>
<tr>
<td>Anna Thompson</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.194</td>
<td>1.484</td>
<td>1.607</td>
<td>2.484*</td>
</tr>
<tr>
<td>DETAILS</td>
<td>2.602*</td>
<td>5.947**</td>
<td>3.367**</td>
<td>2.346*</td>
</tr>
<tr>
<td>American liner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.000</td>
<td>1.459</td>
<td>1.509</td>
<td>4.572**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>1.268</td>
<td>4.772**</td>
<td>5.516**</td>
<td>2.458*</td>
</tr>
</tbody>
</table>

*  p<0.05
** p<0.01
3.5.1 Normal memory subjects

For normal memory subjects, Hypothesis 4 predicted that the number of gist items recalled for each text presented would be stable across time periods whereas the number of details items would be stable over 30 minutes but would decay significantly one week after presentation.

The hypothesis of stability of recall over time for gist was accepted for both of the WMS texts (Anna Thompson and the American liner) where recall was stable for up to one week but had to be rejected for the everyday texts (short story, newspaper article & documentary film) (see Table 5). Recall of gist items for the short story and the documentary film was stable for the time period immediate to 30 minutes but declined significantly over one week (i.e. between the time periods immediate to one week and 30 minutes to one week). Recall of gist for the newspaper article declined significantly over time.

The hypothesis that details items would be stable in the short term but decay over one week was accepted for two of the everyday texts (the newspaper article and the documentary film) and for the WMS text the American liner New York. This hypothesis was rejected, however, for the everyday text the short story and for the WMS text Anna Thompson where recall of details declined significantly over time.

It needs to be noted that the item facility (IF) scores for each item of gist and details for each text (see Appendix E) indicate that highly memorable gist and highly memorable details items were in fact stable for up to one week. A significant number of items of gist had IF scores of 0.85 or higher with some items scoring the maximum IF score of 1 demonstrating that these items were particularly memorable for normal memory subjects over time. Similarly, a small number of particularly relevant details items, such as the name of the dog Montic in the short
story, had high IF scores so recall of a small number of details items was also stable over time.

3.5.2 Memory impaired subjects

For memory impaired subjects, Hypothesis 4 predicted that the number of gist items recalled would be stable over time while the number of details recalled would decay significantly.

The null hypothesis that gist recall would be stable over time was accepted for the newspaper article and for the documentary film; and rejected for the Anna Thompson text (WMS) where recall of gist decayed significantly over time (see Table 5). The stability hypothesis was partially rejected for the other two texts. The recall of gist for the short story and for the WMS text the American liner decayed significantly between the time periods immediate recall and recall after 30 minutes and after one week but was stable for the time period 30 minutes to one week after presentation. This indicates that for these texts, what was recalled of the gist items after 30 minutes had elapsed, was stable for up to one week. It also needs to be remembered that there were considerably more gist items for the short story than for any other text.

For memory impaired subjects, the decay hypothesis for details recall was rejected for the newspaper article where details recall was stable across the time periods but was partially accepted for the other texts where details recall decayed across some time periods and remained stable across others (see Table 5). The pattern of recall was consistent for the two WMS texts where recall decayed significantly between immediate recall and recall after 30 minutes and between immediate recall and recall after one week but was stable between 30 minutes and one week indicating that if items were recalled after 30 minutes they were stable for up to one week.
For the documentary film, recall of details decayed between immediate and one week after presentation but was stable for the other two time periods. Note, however, that the t score of 2.057 for the immediate to one week time period only just reached significance (see Table 5) which suggests that the recall of details on the film was, in fact, relatively stable.

Details recall for the short story decayed for the last two time periods but was stable between immediate recall and recall after 30 minutes. Thus, for the short story text details recall was relatively stable for 30 minutes but decayed significantly over one week. It needs to be remembered that 94 details items were identified in this text which is considerably more than for any other text. As mentioned earlier, these results need to be considered in relation to the number of gist and details items to be recalled in each text (see Table 1).

3.6 Hypothesis 5: Gist from the Everyday and Details from the WMS Texts will be more Salient

Gist and details scores for the WMS texts (Anna Thompson and the American liner) were combined so that the number of gist and details items on the WMS text were closer to the number of these items on the everyday texts. After combining the scores on the WMS texts, there were still more items of gist and of details on the everyday texts than on the combined WMS text, with the exception of gist items for the newspaper article text (see below). Therefore, to control any bias in favour of the newspaper article text for gist recall scores, comparisons for this text were carried out using gist recall scores on the Anna Thompson and the American liner texts separately. These comparisons were additional to those for the combined WMS text which were made with all three everyday texts including the newspaper article.
It needs to be remembered that each of the WMS passages were presented independently to subjects which is likely to give a recall advantage to the combined WMS text over any of the everyday texts.

<table>
<thead>
<tr>
<th>Text Type</th>
<th>Words</th>
<th>Gist Items</th>
<th>Details Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short story</td>
<td>1326</td>
<td>54</td>
<td>94</td>
</tr>
<tr>
<td>Newspaper article</td>
<td>310</td>
<td>12</td>
<td>43</td>
</tr>
<tr>
<td>Documentary film</td>
<td>540</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>Combined WMS text</td>
<td>118</td>
<td>16</td>
<td>35</td>
</tr>
</tbody>
</table>

It also needs to be appreciated that gist items and a high proportion of details items from the everyday texts contain more words and idea units than those from the WMS passages (see Appendix C for comparisons of texts in this regard).

Raw scores for gist and details were converted to 'percentage of the text recalled' scores. A series of t tests were then conducted for related samples for each text separately for each time period after presentation (see Table 6). Hypothesis 5 predicted differences between scores in a given direction so one-tailed t tests were used.

It is useful to refer back to Table 2 which displays the mean percentage scores for each text across time when considering the implications of Hypothesis 5.

3.6.1 Hypothesis 5a: More gist will be recalled from the everyday texts

Hypothesis 5a predicted that significantly more gist items (as 'percentage of text recalled' scores) would be recalled from the everyday texts than from the combined WMS text across time despite the fact that the everyday texts are longer and contain more information.
Comparison of the percentage of gist and details items recalled from the everyday texts and from the combined WMS texts for normal memory (n=12) and memory impaired subjects (n=6).

<table>
<thead>
<tr>
<th>Texts</th>
<th>NORMAL MEMORY</th>
<th></th>
<th>MEMORY IMPAIRED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immed</td>
<td>30min</td>
<td>1 week</td>
<td>Immed</td>
</tr>
<tr>
<td>Short story combined WMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.855</td>
<td>-0.620</td>
<td>0.884</td>
<td>-6.918**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>-4.650**</td>
<td>-3.104**</td>
<td>-0.351</td>
<td>-2.380*</td>
</tr>
<tr>
<td>Newspaper article and combined WMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>6.054**</td>
<td>3.642**</td>
<td>3.083**</td>
<td>-4.159**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>-4.429**</td>
<td>-2.710*</td>
<td>1.177</td>
<td>-3.29*</td>
</tr>
<tr>
<td>Newspaper article and Anna Thompson</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>5.215**</td>
<td>3.499**</td>
<td>2.048*</td>
<td>-3.965**</td>
</tr>
<tr>
<td>Newspaper article and American liner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>4.784**</td>
<td>3.587**</td>
<td>3.101**</td>
<td>-3.619**</td>
</tr>
<tr>
<td>Documentary film and combined WMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>4.803**</td>
<td>4.338**</td>
<td>3.370**</td>
<td>-1.424</td>
</tr>
<tr>
<td>DETAILS</td>
<td>-5.711**</td>
<td>-4.636**</td>
<td>-1.915*</td>
<td>-3.441**</td>
</tr>
</tbody>
</table>

* p<0.05
** p<0.01
3.6.1.1 Gist recall normal memory subjects

For the normal memory subjects, this hypothesis was accepted for the newspaper article (see t scores for the combined WMS text and for each of the two WMS texts separately) and for the documentary film across time but was rejected in favour of the no differences hypothesis for the short story across time (see Table 6).

The no difference result for the short story is a significant one, however, when it is considered that the normal memory subjects recalled an equivalent percentage of gist from this text (1326 words with 54 items of gist) for up to one week as they did from the combined WMS text (118 words with 16 items of gist). This means that a larger number of gist items were recalled by these subjects from the short story than from the combined WMS text to achieve this result.

3.6.1.2 Gist recall memory impaired subjects

The memory impaired subjects, in contrast, immediately after presentation recalled significantly more gist as a percentage from the combined WMS text than from two of the everyday texts, the short story and the newspaper article (under both the combined and separate WMS text conditions - see Table 6). This result is the opposite to that predicted by Hypothesis 5a for these subjects.

Immediately after presentation, the null hypothesis of no difference had to be accepted for the percentage of gist recalled by these subjects on the combined WMS text and the documentary film. It is noteworthy that the t score for the documentary film immediately after presentation, though not reaching significance, is negative indicating a slight bias in favour of the WMS text which is a similar pattern to that for the other two everyday texts.
One week after presentation, however, the memory impaired subjects recalled a significantly higher percentage of gist from the everyday texts than from the combined WMS texts as predicted by Hypothesis 5a. For the newspaper article, a significant difference in the predicted direction was also found for the Anna Thompson text but there was no significant difference in the percentage of gist recalled from the newspaper article and the American liner.

A significant pattern in the t scores emerges over time for the memory impaired subjects. Immediately after presentation these subjects recalled relatively more gist from the combined WMS text than from the everyday texts. Thirty minutes after presentation, there was no significant difference in the percentage of gist recalled from the WMS text and the everyday texts. However, one week after presentation, a higher percentage of the gist from the everyday texts was recalled.

This trend indicates that for this sample of memory impaired subjects, gist recall from the combined WMS text tended to be superior immediately after presentation but gist recall from the everyday texts held up significantly better over time.

3.6.2 Hypothesis 5b: More details will be recalled from the WMS texts in the short term

Hypothesis 5b predicted that more details would be recalled from the combined WMS text in the short term (ie. for up to 30 minutes) but that over time details from the everyday texts would be more memorable.

3.6.2.1 Details recall normal memory subjects

As predicted, normal memory subjects recalled a significantly higher percentage of details from the combined WMS text than from the everyday texts in the short term for up to 30 minutes after presentation (see Table
6). However, details from the everyday texts were not significantly more memorable over time as predicted. There was no difference in the percentage of details recalled from the combined WMS text and from the short story and the newspaper article after one week. Moreover, a significantly higher percentage of details was recalled from the combined WMS text than from the documentary film one week later. As mentioned earlier, it needs to be acknowledged in considering these results that there were more details to recall from the everyday texts than from the combined WMS text, particularly the short story where 94 details were identified in comparison to 35 for the combined WMS text.

3.6.2.2 Details recall memory impaired subjects

As predicted, immediately after presentation memory impaired subjects recalled a significantly higher percentage of details from the combined WMS text than from the everyday texts. However, 30 minutes after presentation there was no difference in the percentage of details recalled across texts. One week after presentation, as predicted a significantly higher percentage of details was recalled by these subjects from the documentary film. However, there was no significant difference between the percentage of details recalled from either the short story or the newspaper article and the WMS text although the t scores did change from negative to positive indicating that there was a slight trend over time in favour of the recall of details from the everyday texts.

Again it needs to be acknowledged that the everyday texts, but the short story in particular, contain more details items than the combined WMS text.
3.7 Hypothesis 6: WMS Texts Judged More Difficult

The ratings (1-5 in order of difficulty) with which the normal memory subjects judged each of the five texts presented (3 everyday and 2 WMS texts) were recorded and summed for each text as observed frequencies. Three categories for ease of recall were distinguished in order to carry out a series of chi square tests - ratings of 1 - 2 'relatively easy to recall', 3 'neither easy or difficult to recall' and 4 - 5 'relatively difficult to recall'.

The expected frequencies for each of the three cells was 4 for n=12. Since Howell (1982) recommends that expected frequencies need to be ≥5, the frequencies in the middle category (ie. 'neither easy or difficult to recall') were divided equally between the other two categories for each text. Chi-square tests df=1 were then carried out for each of the five texts.

The null hypothesis of no difference in judged ease of recall was accepted for the newspaper article (everyday text) ($\chi^2=1.33$) and for the Anna Thompson (WMS text) ($\chi^2=2.08$).

The null hypothesis was rejected for the everyday texts the short story ($\chi^2=5.33$, p<0.025) and for the documentary film ($\chi^2=6.75$, p<0.01) with most subjects judging these texts relatively easy to recall. The null hypothesis was also rejected for the WMS text the American liner ($\chi^2=7.88$, p<0.01). Subjects judged this text relatively more difficult to recall.

In summary, normal memory subjects found the short story of 1326 words and the documentary film of 540 words easier to recall than either of the WMS passages, Anna Thompson and the American liner of 65 and 53 words, respectively. The newspaper article of 310 words was judged to be equivalent to the WMS text Anna Thompson in ease of recall but easier to recall than the American liner.
3.8 Hypothesis 7: Strategies Normal Memory Subjects

As part of the experimental procedure, subjects were asked to comment on how they went about recalling each of the texts they were presented. The recall strategies adopted by the normal memory subjects are discussed below for each text whereas those adopted by memory impaired subjects are discussed as part of the individual case studies. The strategies used by memory impaired individuals, however, were in many cases similar to those used by normal memory subjects. Some strategies were found to be more relevant to some texts and some modes of presentation than to others.

Individual differences in strategies were also evident. For example, some subjects showed a preference for using visual strategies even to recall verbally presented texts such as the short story or the Wechsler Memory Scale passages. Individual differences in background experience were also evident. One subject, for example, had a particular interest in the history of Northern Australia and had travelled on the train called the Ghan which meant the newspaper article was relatively easy for him to recall.

A number of subjects said they found it difficult to articulate precisely how they remembered what they recalled from a text, for example, one subject in reference to the short story commented "I don't know exactly how I remembered it. I guess I enjoyed it and I am good at remembering stories. One part just seems to lead onto the next." However, all subjects were able to make pertinent comments on some of the strategies they perceived they had used. This was also true for most of the memory impaired subjects.
3.8.1 The WMS passages

A number of subjects commented that the Anna Thompson passage was "a lot easier to remember" than the American liner. Typical comments were that the Anna Thompson passage had a "clearer storyline" and that the American liner had a "poor style" or "was badly written", particularly the long, convoluted sentence that begins "In spite of a blinding snow storm........"

Subjects also said the WMS passages contained "too many details" and made a feature of details. As one subject commented: "They (the WMS passages) were crammed with details, the woman's name, where she was mugged, how much money was taken, how many children she had, how many people were on the liner, how many women etc." Because there were so many details in the WMS texts, subjects said they put extra effort into remembering details. The majority said they adopted a rehearsal strategy where they tried to repeat the details verbally to themselves in an attempt to "remember exactly what was said". Subjects commented that this strategy was not effective, however, because they did not have time to rehearse adequately before reaching overload.

One subject attempted to visualise the scene portrayed in each passage, for example, in the American liner passage, this subject said he tried "to see the 18 women in the boat being tossed around".

3.8.2 Everyday texts

*Short story:*

All the subjects made reference to recalling the main temporal, sequence of events and hung the lesser events and the details onto these, for example: "It was easy to recall the progression of events as the story unfolded. It was a logical sequence of events, a typical story where one
event naturally flowed into the next. I remembered the details as they related to the main events."

A high proportion of subjects also mentioned recalling the main characters in the story particularly Montie the dog. A number related the antics of the dog in the story to dogs they had owned themselves. The name of the dog was often related to something in the individual's background, for example, "I once had a tortoise called Montie" or "the way the family trained Montie reminded me of when I trained my dog".

Some subjects said they visualised the characters, events and setting. "I could get a picture of the characters and see what they were doing like I could imagine Montie and see an old lady sitting drinking tea and how he (ie. Montie the dog) behaved before he bit her". Similarly another subject pictured the characters and described them even though none of the characters were specifically described in the story. A number of subjects visualised the farm setting and pictured an older style Australian farm house.

Several subjects said they did not make a conscious effort to recall the short story as they had when presented with the WMS passages. They simply enjoyed the story found it interesting and amusing which made it easy to recall. "Enjoyment made it easy". One subject said the story built up to the conclusion so that "you were expecting something like what happened in the climax to happen" which refers to the prediction skills readers bring to texts (eg. Smith, 1982).

Several subjects said they could "hear" the story in their heads and that a considerable number of words and phrases stuck in their minds verbatim such as "that was his (the dog's) last taste of human blood" or the dog had the old lady's ankle "in a vice-like grip".
Newspaper article:

A typical comment made by subjects in relation to the newspaper article was: "I picked out what I thought were the main points and the relevant details from each paragraph". Study skills techniques like these were frequently mentioned such as "I looked for key points and key words and overlooked the less important details". "I summarised the main points and remembered them in the order they came". "I remembered the main points in an ordered logical sequence".

One subject said she could "picture the actual article and where the information occurred on the page. I tried to visualise the writing as I read it". Another subject also said "I saw certain words and read these in my mind". Several subjects mentioned the picture in the article and could describe it. Comments like these indicate that subjects were also picking up incidental information from the text as Kolers (1979) has documented.

Background experience was again found to be significant. Subjects related the information contained in the article to their own interests or personal experiences. For example, one subject remembered the name of the journalist who wrote the article because she had a Pakistani friend with the same surname. Another said that Pt Augusta and Kalgoolie were familiar places to him. Another said the picture in the article was similar to one he had seen recently at a slide evening.

Documentary film:

Subjects said that overall they remembered the main elements of the debate particularly the conservationist's arguments to preserve Mt. Etna. They said that the whole film was "obviously getting you to see the destruction that was caused to the environment especially to the wild life and the caves by mining".
The majority of subjects said that they remembered the commentator's dialogue and that the pictures and diagrams supported and enhanced the arguments presented.

There were individual differences in emphasis as to whether the pictures or the dialogue was the more salient. For example, one subject said that the dialogue was unnecessary and that for her "the film could have been watched and understood without the commentary". In contrast, another subject expressed that she "mainly remembered the commentary and the important points that the commentator made".

Certain scenes and certain diagrams were frequently mentioned as being easy to remember. The scenes of both the mined and the unmined sides of Mt Etna were salient as were the pictures of the bats, the photographs of the limestone caves and the diagrams of where Mt Etna is located. Pictures were also said to help subjects recall important text content a week after presentation as "pictures seemed to stick in the mind and remind you of the points of argument. For example, I can clearly see the bats flying out of the cave and their faces which reminded me of the argument about the bats".

Subjects frequently commented that they were interested in conservation issues and were familiar with similar debates between conservationists and mining companies or developers over other sites. This background knowledge greatly assisted their recall because they could predict the arguments that were to come.

A few subjects commented that they consciously tried to remember some of the specific details like the names of the caves by rehearsing them but found that when they came to recall these they could not always remember them. Most said that it "was easier to remember the film overall than specific details".
3.8.3 Overview

In summary, the qualitative evidence indicates that in recalling the everyday texts subjects tended to concentrate on the gist or the key elements of the text whereas in recalling the WMS passages they tended to concentrate on the details. This is generally confirmed by the results of Hypothesis 5.

3.9 Hypothesis 8: WMS will not Predict Everyday Text Recall.

A correlation matrix (Pearson's product-moment) was compiled to gauge the relationship between Logical Memory scores from the Wechsler Memory Scale (WMS) and the number of gist and details items recalled from the three everyday texts (short story, newspaper article and documentary film) across the three time periods for normal memory and memory impaired subjects (see Tables 7 & 8).

Logical Memory is a subtest of the WMS and a score is the average number of 'idea units' recalled from the Anna Thompson and American liner passages as outlined in the test manual (see Appendix A for the idea units identified in the Wechsler manual for each passage).

3.9.1 Normal memory subjects

A significant relationship was found between Logical Memory scores and gist and details recall for the short story immediately after presentation and details recall 30 minutes after presentation. No significant relationship was found for gist recall 30 minutes after presentation or for either gist or details recall one week after presentation.
Table 7

Normal Memory Subjects

Correlations between each of the everyday texts (gist and details) and the Logical Memory subtest scores of the Wechsler Memory Scale across time periods.

<table>
<thead>
<tr>
<th>Text</th>
<th>WMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immediate</td>
</tr>
<tr>
<td><strong>Short story</strong></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.740**</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.593*</td>
</tr>
<tr>
<td><strong>Newspaper article</strong></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.210</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.341</td>
</tr>
<tr>
<td><strong>Documentary film</strong></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.616*</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.611*</td>
</tr>
</tbody>
</table>

Two-tailed tests
* p<0.05
** p<0.01

A significant relationship was also found for normal memory subjects between Logical Memory scores and gist and details recall for the documentary film immediately and 30 minutes after presentation. No significant relationship was found for the time period one week after presentation.

No significant relationship was found between Logical Memory scores and gist recall for the newspaper article across time. A significant relationship was found for details recall 30 minutes and one week after presentation.

Thus, for normal memory subjects the ability of Logical Memory scores to predict the recall of everyday texts is patchy over time and varies from text to text. Logical Memory scores were the most predictive of recall of
the documentary film up to 30 minutes after presentation and more predictive of details recall across texts than of gist recall. Logical Memory scores were the least predictive of gist scores on the newspaper article and of gist scores on all the everyday texts one week after presentation.

Overall, for normal memory subjects there does appear to be some predictive relationship in the short term between Logical Memory scores and recall of the short story and of the documentary film. However, it is noteworthy that the relationship between the Logical Memory scores and the short story and the film diminished one week after presentation. There was a particularly poor relationship between Logical Memory scores and the recall of the newspaper article.

3.9.2 Memory impaired subjects

For the memory impaired subjects, Logical Memory scores correlated poorly with the recall of the newspaper article and the documentary film across time. There was, however, a significant relationship between Logical Memory scores and the recall of details from these texts one week after presentation. But, this relationship largely reflects the situation that a high proportion of memory impaired subjects recalled few or no details from any texts after one week.
Table 8

Memory impaired Subjects

Correlations between each of the everyday texts (gist and details) and the Logical Memory subtest scores of the Wechsler Memory Scale across time periods.

<table>
<thead>
<tr>
<th>Text</th>
<th>GIST Immediate</th>
<th>GIST WMS 30 mins</th>
<th>GIST WMS 1 week</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short story</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.705</td>
<td>0.862*</td>
<td>0.805</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.472</td>
<td>0.980*</td>
<td>0.434</td>
</tr>
<tr>
<td><strong>Newspaper article</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.277</td>
<td>0.444</td>
<td>0.758</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.011</td>
<td>0.225</td>
<td>0.921**</td>
</tr>
<tr>
<td><strong>Documentary film</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIST</td>
<td>0.568</td>
<td>0.153</td>
<td>0.652</td>
</tr>
<tr>
<td>DETAILS</td>
<td>0.568</td>
<td>0.180</td>
<td>0.952**</td>
</tr>
</tbody>
</table>

Two-tailed tests
* p<0.05
** p<0.01

The number of memory impaired subjects in this sample was small which means that a high correlation coefficient is required for a significant result to be achieved. However, the correlation coefficients displayed in Table 8 are generally small indicating that little of the variability of the scores is reflected in the relationship. The gist recall of the short story had the strongest relationship to Logical Memory scores across time than any of the everyday texts and this relationship may have been more significant given a larger sample of subjects.

Thus, for memory impaired subjects, Logical Memory scores were the most predictive of recall of the short story but had poor predictive value for the other everyday texts. Higher correlation coefficients were achieved for recall after one week probably indicating a significant decline in recall of items across texts and over time for these subjects.
3.10 Questions on the Texts: Profile of Normal Memory

The profile of answers to the set of questions on each text (see Appendix B) by the normal memory subjects as a percentage correct to the nearest whole number is given below in Table 9. Questions were given immediately after presentation only. Results of the questions for memory impaired subjects are discussed below for individual subjects. The questions were designed to see if memory impaired subjects could answer specific questions on the text content that they may have failed to access in free recall.

Table 9 below shows that the theme/precis question was answered particularly well across texts by normal memory subjects. The relatively fewer subjects who correctly answered the questions about the title of the short story and the newspaper article indicated that subjects did not pay particular attention to this type of information in this context. Two details questions from the documentary film, the names of the caves mentioned and of the mining company, were also answered less well than other questions. The name of the mining company was particularly poorly recalled. Details selected from the WMS texts were generally well recalled apart from what it was the liner hit in the American liner passage.

Overall normal memory subjects were quite capable of answering a number of specific questions on the texts immediately after presentation. Some details questions selected, however, were more salient for normal memory subjects than others.
Table 9
Percentage of normal memory subjects who correctly recalled each of the five questions given on each of the everyday and WMS texts.

<table>
<thead>
<tr>
<th>Everyday Texts</th>
<th>Newspaper Article.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Story</strong></td>
<td><strong>Newspaper Article.</strong></td>
</tr>
<tr>
<td>1. Theme</td>
<td>100%</td>
</tr>
<tr>
<td>2. Title</td>
<td>50%</td>
</tr>
<tr>
<td>3. Main characters</td>
<td>100%</td>
</tr>
<tr>
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<tr>
<td>5. Methods tried</td>
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<td>2. Name mtn &amp; why</td>
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<td>3. Name cave</td>
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<td>4. Name bats</td>
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<td>5. Name mining co.</td>
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<tr>
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<td>100%</td>
</tr>
<tr>
<td>2. Name of woman</td>
<td>92%</td>
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<tr>
<td>3. Where from</td>
<td>92%</td>
</tr>
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<td>4. No. children</td>
<td>75%</td>
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3.11 Hypothesis 9: Case Study Data

The recall scores across time for each of the memory impaired subjects on each of the everyday texts presented (gist and details) together with Logical Memory scores from the Wechsler Memory Scale are graphically displayed and discussed below (see Figures 1 to 6). Mean scores for the normal memory subjects are also given for purposes of comparison.

3.11.1 Subject 1

Figure 1: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 1 (memory impaired). Average scores for normal memory subjects are also displayed.

This subject recalled the short story particularly well for up to 30 minutes after presentation and performed close to (and, in the case of details after 30 minutes, better than) the mean scores for the normal
memory subjects. Her scores for the Logical Memory subtest would predict this result. However, her Logical Memory scores suggest that her recall of the short story would fall away dramatically after 30 minutes whereas she could still remember a considerable number of gist and details items one week after presentation.

Logical Memory scores for this subject did not adequately predict the recall of the documentary film or the newspaper article except for details recall after one week which were poor as her Logical Memory scores would expect.

Her recall of the gist of the newspaper article was stable for up to a week but poor in relation to her recall of the short story and well below the mean for the normal memory subjects. Details recall for the newspaper article was even poorer.

Gist recall for the documentary film was again relatively stable over time and better than that for the newspaper article but not as good as would be predicted by her Logical Memory scores. The relatively poor score for gist after 30 minutes was probably a lapse of concentration which was common for this subject. Details recall for the documentary film was again poor.

This subject was given no cues to prompt her recall for the everyday texts across time but was prompted when she failed to recall the content of the Logical Memory texts after one week. The cue did not help her to recall the Anna Thompson passage but, given a cue, she was able to recall some of the gist from the American liner. However, she recalled this gist in her own words and, therefore, failed to score on the Logical Memory subtest.

She was able to discuss her remembering and rated the everyday texts as easier to recall than the WMS passages even though she recalled these passages relatively well in the short term. She rated the short story as the
easiest to recall (which is to be expected given her scores for this text) followed by the documentary film, the newspaper article, the American liner and Anna Thompson passages.

Her comments on the strategies she used to recall the texts are as follows: "The short story was easy to remember because it was enjoyable and had lots of funny bits". She said she found the main argument of the documentary film easy to recall because she was familiar with conservation issues and had experience in caving. She also said the pictures in the film assisted her recall. She said of the newspaper article that she "looked through and concentrated on the bits that grabbed my attention". She also lamented the fact that she had been a particularly good reader before her accident but now found both following a written text and remembering its content difficult. She simply said of the WMS texts that "they were too hard to concentrate on".

This subject correctly answered all the questions on the short story text apart from the name of the title (which 50 % of normal memory subjects also failed to recall). She successfully answered all the gist questions but had more difficulty recalling details (apart from details from the short story). She did not successfully answer any of the details questions from the documentary film and confused details information from the film with that from her own experience. For example, she said the mountain was Mt. Druit and the Aborigines named it.

It is significant in relation to a rehabilitation plan for this subject that she could successfully answer the gist question from each text whereas details generally caused her difficulty with the exception of details from short story. The short story content and/or the listening mode of presentation were particularly salient for her.
3.11.2 Subject 2

Figure 2: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 2 (memory impaired). Average scores for normal memory subjects are also displayed.

Logical Memory scores for this subject would predict that immediately after presentation her recall of the texts would be similar to that for normal memory subjects but would decay rapidly 30 minutes after presentation and would be non-existent one week later. Logical Memory scores were not useful in predicting this subject's recall of the everyday texts apart from the expectation that details recall would be particularly poor one week after presentation.

No cues to recall were given to this subject for the everyday texts. She was prompted on the Logical Memory passages after one week but still failed to remember any of the content of these passages.

Scores for this subject on the everyday texts were lower than the mean scores for normal memory subjects even immediately after presentation suggesting that she reaches information overload easily with longer
texts. Gist recall for the everyday texts was considerably better and more stable over time than details recall which demonstrates that, despite a likely problem with overload, this subject is capable of recalling the key thematic information from longer texts. Her recall of the short story and the documentary film were better than her recall of the newspaper article which she had to read for herself.

She rated the short story as the easiest text to recall with the newspaper article as the next easiest followed by the documentary film although she in fact recalled more gist and details from the film than from the article. The WMS passages she rated more difficult than the everyday texts with the American liner being the more difficult of the two.

In relation to the strategies used to recall the texts, this subject said that for the short story, she "picked out the obvious bits and repeated them in my mind like the main incidents and the people's names". The newspaper article she said she "just read slowly and tried to think of the main bits and said over details to myself". With the film, she said she tried to "picture everything in my mind. I didn't use any techniques it just came to me". Of the WMS passages she "just tried to repeat things but it came too fast".

This subject successfully answered the gist question for each text. She was able to answer correctly more details questions from the shorter WMS texts than from the everyday texts. She said that details from texts were particularly difficult for her to recall and were easily forgotten although this had not been the case prior to her illness.

Both the free recall task and focus questions indicated that this subject recalls gist better than details.
Subject 3

Figure 3: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 3 (memory impaired). Average scores for normal memory subjects are also displayed.

Logical Memory scores successfully predicted that this subject was unlikely to retain content from texts 30 minutes after presentation. Even prompts did not assist her recall. The one item she recalled from the gist of the newspaper article 30 minutes after presentation could be put down to the prompt and her general knowledge of camels rather than to her ability to recall the material successfully.

Details recall for the everyday texts was predicted fairly accurately by her Logical Memory scores although details recall for the newspaper article was poorer than would be expected. This subject's gist recall of the
everyday texts was somewhat better than her Logical Memory scores would predict.

Her answers to the questions were not as good as her free recall and this was probably because by the time she was given the questions (i.e. after she had recorded her free recall of each text) her memory was already fading. Her answers to gist questions were no better than her answers to details questions although she was able to recall the gist of the American liner and the major characters in the short story (the dog, the mother and father) which were particularly salient details.

After the testing sessions were completed, this subject was presented with the everyday texts again but this time she was allowed to take notes on their content. The notes she took were comprehensive and she successfully picked out the main ideas and the more crucial supporting details indicating that she was quite capable of identifying key information. She was then allowed to rehearse from her notes at her leisure and her recall was then retested. Her subsequent recall of the text was only marginally better and was still extremely poor 30 minutes after presentation. After 30 minutes, she did not even recall that she had taken notes and was surprised when these were shown to her in her own handwriting. This result indicates that, although she can select key information, her memory for texts is transient and is unlikely to improve with training.

Given the transitory nature of her memory, this subject was unable to rank the texts in terms of ease of recall or comment adequately on her remembering.
3.11.4 Subject 4

Figure 4: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 4 (memory impaired). Average scores for normal memory subjects are also displayed.

Logical Memory scores for this subject would predict he would recall less than half the content of a text immediately after presentation. This recall would decay significantly after 30 minutes and he would be unable to recall any content after one week.

A different assessment of the capabilities of this subject emerged from his recall of the everyday texts. Logical Memory scores particularly underestimated his ability to recall gist content. Across the everyday texts, this subject was able to recall some gist for up to one week. Gist recall for the short story and for the documentary film were strengths with the amount of gist recalled from the documentary film increasing
over one week. Details recall was much poorer and more in line with his Logical Memory scores. It is significant, however, that on two of the everyday texts, this subject recalled details he had failed to recall 30 minutes after presentation. This together with the fact that he could recall progressively more of the gist from the documentary film over time suggest that he may have difficulty accessing what he has recalled.

A particular feature of the recall of this subject was that he had difficulty remembering the context of his recall. For example, after one week, he confused the factual texts and was not sure whether the information he recalled about the cameleers came from the newspaper article or from the documentary film.

The questions related to the texts assisted this subject's recall and his answers were well-structured and generally correct although he had difficulty remembering titles, names and places. Even names he thought he had successfully recalled were often only partially correct. For example, he recalled the bats in the film but thought they were called Wide Winged or Flat Winged Bats.

He said that in trying to remember the texts he consciously picked out the main points or the main things that were happening and then repeated these to himself. With names of things, he attempted to remember the first letter which is a particularly low level strategy for a well-educated subject indicating that recalling details are a significant problem for him. He also commented that he was much better at remembering verbal information than pictures although the pictures prompted his recall of what was said.

Since he had difficulty recalling which texts were which after one week, he was not asked to rank the texts in terms of ease of recall.

This subject was allowed to take notes on the everyday texts after the experimental sessions were completed. His notes provided adequate
summaries of the key information given in the texts and reading these over to himself greatly assisted his subsequent recall.

3.11.5 Subject 5

Figure 5: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 5 (memory impaired). Average scores for normal memory subjects are also displayed.

Logical Memory scores for this subject would predict that his recall of a text immediately after presentation would be almost as good as that of normal memory subjects but that his recall would decay rapidly after 30 minutes. What was recalled after 30 minutes his Logical Memory scores would suggest would be recalled for up to one week. This was not an accurate description of this subject's recall of the everyday texts.

His recall of the short story immediately after presentation was much poorer than that of normal memory subjects. The short story is presented
aurally, as are the WMS passages, but is a considerably longer text so the amount of information presented in the short story may have overloaded this subject. This subject volunteered during testing that lengthy texts cause him considerable difficulty: "I can't handle longer material. It's too much to organise".

The gist this subject was able to recall from the short story was relatively stable for up to one week. Details recall was weaker than gist recall but what details were recalled were stable for 30 minutes and then decayed although he did remember a small number of details from the story after one week.

For the newspaper article, this subject recalled less immediately after presentation and more over time than was predicted by his Logical Memory scores. Both gist and details recall were also stable for up to one week. It is noteworthy that he recalled proportionally less of the gist from the newspaper article than from the other everyday texts indicating that selecting key information from what he reads may be a problem for him.

The documentary film was recalled the best by this subject and his recall of both gist and details were stable over time. He was particularly interested in conservation issues which was the topic of the film but he also said that the pictures supported his recall of the text.

This subject rated the film as the easiest text followed by the newspaper article. He commented that he enjoys watching the news on television and then likes to follow this up by reading the newspaper. If he just reads a newspaper article, however, without having seen the relevant news report on television, he finds it much more difficult to follow. All the aurally presented texts (i.e. the short story and the two Logical Memory passages) he ranked equally as the most difficult to recall which suggests that he perceives an aural mode of presentation as being more difficult to
recall than the other modes. Or, it may be the length of the short story that was difficult and the content of the WMS texts.

This subject required cues over time to recall most texts suggesting that he also had problems accessing information from memory. He needed prompts to recall the newspaper article and both the Logical Memory passages 30 minutes and one week after presentation. He also needed a prompt one week after presentation to recall what he could of the documentary film. Interestingly, he needed no prompts to recall the short story despite the fact that he ranked this as a difficult text to recall.

This subject answered the gist question from each text correctly and answered fewer details questions from the short story and the American liner texts than from the other texts.

Overall this subject demonstrated that he can understand the theme of texts but has difficulty accessing the material he recalls, particularly as time passes. Furthermore, he does perceive important differences between the different modes of presentation such that he sees a film presentation is the most salient for him followed by reading.
3.11.6 Subject 6

Figure 6: Gist and details recall for each of the everyday texts in comparison to Logical Memory scores across the three time periods for Subject 6 (memory impaired). Average scores for normal memory subjects are also displayed.

Logical Memory scores were reasonably good at predicting this subject's recall of the short story, particularly details recall. His recall of the gist of the short story, however, was more robust after one week than his Logical Memory score would predict.

Logical Memory scores were less successful at predicting this subject's recall of the other two everyday texts, the newspaper article and the documentary film. His recall of these texts generally improved with time suggesting that he takes longer than usual to process and to access the material he has recalled. This subject did not require cues to aid his recall of any of the texts so cues were not the reason his scores improved.
over time for these two texts. The sets of questions which were asked between his recording of his immediate recall and his recall after 30 minutes may have reminded him of aspects of these two texts he had remembered but failed to include in his retelling immediately after presentation. These results indicate that this subject may benefit from a focus for his recall such as specific questions on the text content. Questions appear to be a particular aid to his recall of details content. His scores for details on these texts improved remarkably over time.

It is significant that this subject answered the set questions as well as the average normal memory subject. This confirms that he has an access/retrieval problem whereby he finds recalling material in a free-recall context relatively difficult and performs better when his recall is prompted by questions.

This subject said he recalled the short story because "the story logically unfolded" and he had a dog himself. Of the newspaper article, he said he had to read it "over and over" in the time and found it hard to follow. He said the only reason he remembered what he did was because of his "existing knowledge of the topic". He says he finds it hard to recall things from his reading and prefers to "get a picture of something". He said the documentary film was easy to recall because the "voice and the pictures supported each other". He said he generally finds pictures easy to recall. He watches television rather than reads because he remembers information best when it is presented in a film format. As can be anticipated from his comments, he found the documentary film the easiest to recall followed by the short story. He found the newspaper article and the WMS texts to be equally difficult. Overall, he said the everyday texts were "easier to recall and more relevant than the short passages" (ie. the Logical Memory texts).
3.11.7 Summary

Logical Memory scores were generally not useful in predicting the recall of the everyday texts for these individual subjects over time. Information from the everyday texts provided important diagnostic information not available from individual Logical Memory scores such as whether gist or details were recalled more successfully, whether prompts assisted recall, whether mode of presentation was significant and so on together with information as to strategies used. The everyday texts also gave subjects more scope to discuss and to explore their remembering.
CHAPTER 4: DISCUSSION

4.1 Introduction

The overall aim of this research was to question the usefulness of the Logical Memory subtest from the Wechsler Memory Scale (WMS), a scale widely used by clinicians, as an indicator of the everyday text-processing abilities of normal memory and memory impaired subjects. The subjects used in this study (both normal memory and memory impaired) where well-educated and could, therefore, be expected to have developed reasonably sophisticated text-processing skills as part of their education.

The number of subjects participating in this study was small, twelve normal memory and six memory impaired subjects. A larger representative sample of each group would have been methodologically preferable but this was not feasible within the time restraints of the research because of the difficulty recruiting memory impaired subjects fitting the stringent criteria; the extensive time required to assess each subject (particularly those suffering from brain trauma); and the fact that some memory impaired subjects had to be dropped from the sample post-assessment. However, for trends to be statistically significant with such small samples they need to be fairly robust and a number of important weaknesses in the Logical Memory subtest of clinical concern were found in this study even given the small number of subjects involved.

The first areas of concern to be discussed will be the problems with the American liner passage which did not adequately distinguish between normal memory and memory impaired subjects and the problems inherent in the Logical Memory texts themselves.
This will be followed by a discussion of the two most significant weaknesses in the Logical Memory subtest which were highlighted by this research:-

Firstly, that the Logical Memory subtest does not take into account a number of major characteristics of normal memory functioning, namely: the fact that some items in any text are more memorable than others; that when recalling texts subjects typically select information crucial to the meaning of the text rather than less essential information; that strategies used to recall everyday texts are significantly different from those used to recall the paragraph-length WMS passages; and that certain items of information are more resistant to time than others.

And, secondly, that the Logical Memory subtest does not adequately predict the ability of memory impaired individuals to recall information from everyday texts over time and across modes of presentation.

Finally, it will be argued that there is an urgent need to develop an assessment device for use in clinical practice that uses everyday texts to gauge the text-processing capabilities of memory impaired individuals. It is only by using everyday texts of the kind that are likely to be encountered in real-life settings that relevant diagnostic and rehabilitation decisions can be made on behalf of brain injured clients.

4.2 Problems with Logical Memory Identifying Memory Impairment

The memory impaired subjects in this study recalled less items of information (both gist and details) from the everyday texts and from the Anna Thompson text (WMS) over time than a matched sample of subjects with normal memory functioning as was predicted by Hypothesis 1 (see Table 3). This result is not surprising given that the memory impaired
subjects were deliberately selected because they were experiencing persistent, post-trauma memory problems which included difficulty recalling texts.

The WMS text the American liner New York, in contrast, failed to discriminate memory impaired from normal memory subjects immediately after presentation and for gist recall 30 minutes after presentation. This is a significant validity problem for the Logical Memory subtest given that the subtest score is based on the recall of the passages immediately after presentation and, in its revised forms (Russell, 1975; Denham, 1984), from 30 to 50 minutes after presentation. It is within this time span that the American liner passage did not adequately identify memory impaired individuals.

This result conflicts with the neuropsychological literature (e.g., Lezak, 1983; Walsh, 1985) which recommends the Logical Memory subtest as a particularly useful assessment device for identifying memory impairment. The research presented here, however, would indicate that the American liner passage may detract from the overall power of the Logical Memory subtest (Form 1 of the WMS) to distinguish between well-educated normal memory and memory impaired subjects.

4.3 Problems with Logical Memory Passages as Texts

It is significant in light of the above discussion that normal memory subjects judged the American liner passage to be more difficult to recall than the Anna Thompson passage, a result which is consistent with Ivison's (1986) conclusions. Normal memory subjects also judged the American liner as more difficult to recall than any of the everyday texts which were longer and contained significantly more information (see results Hypothesis 6).
The American liner passage has inherent linguistic problems which could explain the difficulties subjects experienced recalling the content of the text, namely it has poor thematic organisation and poor referencing both of which would affect text cohesion (Halliday & Hasan, 1976; Brown and Yule, 1987). More specifically, the first sentence of the passage thematises the liner which is appropriate but the second sentence throws the reader because it takes "in spite of a blinding snow storm and darkness" as its theme. (It is noteworthy that a number of subjects commented that this middle sentence was particularly confusing for them.) The last sentence starts "They" referring to the passengers who should have been the starting point of the second sentence if the text was well structured. Moreover, "They" has a somewhat uncertain reference and could also refer to "the boats" which again adds to the confusion of the reader and upsets text cohesion. Finally, there is a problem with the ambiguous shift from the liner to the boats (which the reader has to assume are life boats) and then to the steamer which has an incongruous co-location with a liner in modern times. In fact, the whole wartime theme presented in the American liner passage is very dated.

The Anna Thompson passage is a relatively more cohesive text. It appropriately thematises Anna and the policemen who took up a collection for her to resolve the situation. The main difficulty subjects experienced in recalling this text, a difficulty also found with the American liner, was that it was overloaded with unnecessary details. As mentioned in the Introduction, details-laden texts such as these are most inappropriate as orally presented texts because subjects are not given adequate time to absorb the content. This was certainly the complaint of a number of the subjects in this study. A well-conceived, orally presented news report would structure the information to include a certain amount
of redundancy; would not overload listeners with unnecessary details; and would repeat important information as part of the text structure.

It is also significant that normal memory subjects perceived the short story and the documentary film as easier to recall than either of the paragraph-length WMS texts. Even the newspaper article which was judged the hardest of the everyday texts to recall was judged of equivalent difficulty to the Anna Thompson passage but significantly easier to recall than the American liner.

The newspaper article may have been perceived as relatively more difficult to recall than the other everyday texts because its content may be less appealing. Moreover, the task of reading the article may have been seen as requiring more effort than listening to a story or watching a film.

Overall the everyday texts, despite their length, were perceived as easier to recall than the WMS texts. The reason for this is likely to be that everyday texts are well-structured examples of their respective genres which means the information is presented in an expectation-confirming format and details are a cohesive part of the main theme.

The fact that WMS texts are perceived as more difficult is of particular concern given that these texts are typically used in a clinical setting to assess the text recall capabilities of people who have suffered a brain injury and are, therefore, most likely to be experiencing memory and other cognitive problems. For such people, the task of recalling texts that normal memory individuals judge as more difficult than those encountered in everyday contexts makes the task unnecessarily taxing but also has the potential to be distressing for the memory impaired person. It is noteworthy that a number of memory impaired subjects who were able to discuss their remembering commented that they found the content of the WMS texts particularly hard to concentrate on (Subject 1) and difficult to recall (Subjects 1, 2, 4 & 6).
Thus, the results of this study point to a number of substantial problems with the paragraph-length texts in the Logical Memory. There are problems with the cohesion and outdated content in the American liner text. Both WMS passages are laden with unnecessary details and are not structured appropriately as aurally presented news reports (the text genre they most closely represent). And, finally the WMS passages are considered overall to be more difficult to recall than everyday texts which puts an extra burden on memory impaired individuals.

4.4 Logical Memory and the Nature of Normal Memory

A significant weakness in the Logical Memory subtest is that it fails to acknowledge the nature of normal memory functioning and of everyday memory tasks. This criticism is levelled at the subtest for the following reasons which will be further elaborated in the ensuing discussion. The subtest does not recognise the different memorability of items and neglects to acknowledge that there are important differences between gist and details recall. The recall instructions for the subtest demand verbatim recall rather than encouraging subjects to use appropriate text-processing strategies. Paragraph-length passages do not emulate the recall demands of everyday texts. And finally, the subtest fails to gauge text recall over a reasonable length of time.

4.4.1 Some items are more memorable than others

Data from Hypotheses 2 and 3 clearly demonstrated that some items in each of the everyday and the WMS texts were consistently and substantially more memorable than others over time for normal memory subjects. Item facility scores for each text given in Appendix D attest to the particularly wide range of memorability for items within each text.
Furthermore, the items found to be the most and least memorable for normal memory subjects across texts were also found to be the most and least memorable for memory impaired subjects (see results for Hypothesis 2b). This indicates that, even though memory impaired individuals typically remember less content, what they do recall is characteristic of normal memory recall.

As would be predicted by schema theory, the data also found strong evidence from the everyday texts that gist items (ie. items which make up the main theme and contain the key information relevant to the meaning of the text) were consistently more memorable than details items (ie. items containing support information). Moreover, the most memorable details were found to relate to the most memorable gist.

The scoring system of the Logical Memory subtest, however, treats each idea unit in its texts as equivalent despite the fact that researchers have been aware of the different memorability of items in texts since at least Bartlett's time (Bartlett, 1932) which predates the Wechsler Memory Scale. Even in its revised forms (Russell, 1975; Denham, 1984), the subtest makes no distinction between gist and details items although it is well established (again since Bartlett's time) that the gist of a text is generally easier to recall than the details, particularly as the time since presentation increases. In fact, the Logical Memory subtest makes no distinction of any kind between highly memorable and less memorable items such as those provided for the WMS texts in Appendices D, E & F.

By failing to acknowledge memorability, the Logical Memory subtest loses considerable validity and diagnostic power. An important example of this is that the subtest cannot distinguish between memory impaired individuals who can adaptively select and recall key information from texts from those who cannot and are, therefore, relatively more disabled.
4.4.2 Gist and details: Differences between everyday and WMS texts

As mentioned above, the Logical Memory subtest makes no distinction between gist and details recall which limits the diagnostic information that can be gained from the subtest scores. A related weakness to be discussed below is that the Logical Memory subtest ignores the nature of everyday texts and everyday text-processing tasks by placing undue emphasis on details over gist recall. It is the gist or the central meaningful structure of a text that is the important content in everyday texts. Details are of secondary importance in that they embellish and add support to the main theme.

The results of Hypothesis 3 (see Table 4) for the everyday texts were compatible with the research on schema theory and the nature of text recall (eg. see Bartlett, 1932; Mandler & Johnson, 1977; Mandler, 1984). For each of the everyday texts, both normal memory and memory impaired subjects recalled substantially more gist than details from these texts across time. These results again point out that, even though the memory impaired subjects recalled less text content and their recall decayed rapidly, they appropriately concentrated on gist or key information relevant to the overall meaning in recalling the everyday texts. The same clear pattern where gist recall is consistently superior to details recall was not, however, evident for the WMS texts. Moreover, with the WMS texts, the pattern of gist and details recall across time differed for normal memory and memory impaired subjects.

These results indicate that there were important differences between the recall tasks presented to subjects by the everyday and WMS texts. They also indicate that the recall task presented by the WMS texts differentially affected normal and memory impaired individuals which was not the case for the recall task presented by the everyday texts. To
explore reasons for these data, it is important to look more closely at the results of Hypothesis 3 for the WMS texts which compared the recall of gist and details over time for these texts (see Table 4); and at the results of Hypothesis 5 which directly compared the recall of the everyday texts with that of the WMS texts (see Table 6).

For normal memory subjects, no significant difference was found between the recall of gist and details from the WMS texts for up to 30 minutes after presentation although gist was found to be significantly more memorable one week after presentation (see Table 4).

It could be that the paragraph-length WMS texts in comparison to the considerably longer everyday texts did not overload normal memory capacity shortly after presentation so subjects were able to recall as much gist as details. This does not fully explain, however, why these subjects did not recall a much higher percentage of gist from these texts given that gist is generally easier to recall than details and given the relatively small number of gist items in these texts in comparison to the everyday texts.

The answer most likely lies in the test instructions for the Logical Memory subtest which specifically direct subjects to recall the content of the texts verbatim which would have discouraged normal memory subjects from selecting the key elements from the texts. The 'retell' instructions for the everyday texts, in contrast, give subjects greater freedom to structure their recall using appropriate text-processing strategies (ie. paying attention predominantly to gist rather than details apart from particularly important or otherwise attention-grabbing details). Moreover, the everyday texts were far too long for subjects feasibly to recall the content verbatim.

A further reason why normal memory subjects recalled similar amounts of gist and details in the short term from the WMS texts was
because these texts were crammed with details which, in addition to the subtest instructions, would have signalled to subjects that details were important. A number of subjects in this study certainly commented on the details-focus in these texts.

The details items recalled from the WMS texts by these normal memory subjects were, however, more vulnerable to decay over a week than the gist items recalled. This is likely to be because the details presented in the WMS texts were largely 'details for details sake' rather than gist-related and were, therefore, less memorable.

Unlike the normal memory subjects, subjects suffering memory impairment recalled more gist from the WMS texts in the short term but after one week they recalled as much gist as details (see Table 4). The recall capacity of memory impaired subjects was likely overloaded even by such short passages on account of the burdensome task of having to recall verbatim a details-crammed text where the details are incidental to the overall theme. The gist or the thematic structure of a text is invariably easier to recall than the details so these subjects could apparently retain the gist but the details decayed despite the subtest instructions. The reason no difference was found between gist and details recall after one week for these subjects reflects that they could recall very little of the content of the WMS passages over such a long period of time even given cues (memory impaired individuals required more cues for the WMS than the everyday texts) (see Table 1 for the average recall of gist and details by this group after one week and the case study results). The results displayed in Tables 1 & 2 and the case study data also demonstrate how particularly unmemorable the content of the WMS texts was after one week in comparison to the content of the everyday texts for these subjects.
The proposition that everyday texts present a significantly different recall task to subjects than the WMS texts is confirmed by the results for Hypothesis 5 (see Table 6) which specifically looked at differences in gist and details recall between the everyday and the combined WMS texts.

The data displayed in Table 6 shows that for normal memory subjects, gist recall for the everyday texts was superior to gist recall for the combined WMS texts across time. This is despite the fact that all of the everyday texts were considerably longer. Gist recall for the short story was also deemed to be superior because there are 54 gist items in the short story compared to 16 in the combined WMS text so a no difference result was considered to be significant. The superiority of gist recall for the everyday texts indicates that normal memory subjects were concentrating on gist or key thematic content in recalling these texts and that the gist from the everyday texts was consistently more memorable over time than gist from the WMS texts.

For normal memory subjects, on the other hand, details recall for the WMS texts was superior in the short term to details recall for the everyday texts (as predicted in Hypothesis 5). A result which, as discussed earlier, likely reflects the emphasis placed in the Logical Memory subtest on verbatim recall and details content. The superiority of details recall was, however, no longer evident after one week for the short story and the newspaper article and was considerably weaker for the documentary film. This adds support to the argument that over time gist-related details characteristic of the everyday texts are more memorable than 'details for details sake' characteristic of the WMS texts.

The pattern of gist and details recall across time for the memory impaired subjects was different to that for normal memory subjects (see Table 6). For these subjects, gist recall was found to be superior for the WMS texts immediately after presentation. However, over time gist
recall from the everyday texts became increasingly superior indicating that recall from everyday texts holds up considerably better over time. This trend was similar though statistically weaker for the WMS texts for details recall (see Table 6) again reflecting that details associated with gist tend to be remembered better over time.

The qualitative evidence on strategies used by normal memory subjects further suggests that in recalling the everyday texts subjects typically searched for the meaningful theme or gist from the text and only concentrated on the more important, gist-related details. This result was confirmed in Hypothesis 2 where considerably more gist items achieved an item facility score of greater than or equal to 0.85 indicating high memorability whereas relatively few details items proved to be as memorable and these were related to the most memorable gist (see Appendix D). The use of high-level strategies whereby subjects seek out key information is the most effective and efficient method for processing everyday texts which are lengthy and structured logically around a central theme.

In contrast, subjects typically used low-level, rehearsal strategies to recall the WMS texts probably because the standardised instructions directed them to remember as much of the content as they could. Furthermore, these texts are short and written in such a way as to signal that details are important. Interestingly, although there was an emphasis on details in these WMS texts, more items of gist than details from these texts had high IF scores indicating the power of gist recall despite instructions to the contrary and despite the fact the texts are poorly written in terms of communicating with a listener.
4.4.2.1 Overview

It could be considered that one way to improve the Logical Memory subtest would be to have norms for gist and details recall and to change the test instructions to a free-recall format. However, neither suggestion is practical. Norms for gist and details even if provided would not be valid since the data from this research indicates that the WMS passages, unlike the everyday texts, present a different recall task for normal memory and memory impaired subjects. Thus, the recall of memory impaired subjects could not be directly compared to that of normal memory subjects. Moreover, free-recall instructions for the Logical Memory subtest are not likely to change the way subjects recall the WMS texts because they are details laden which, in itself, signals that verbatim recall is actually the task.

Furthermore, as indicated in this and the previous sections, problems inherent in the texts themselves are not so easily remedied. Paragraph-length texts even if they are well written, which as was discussed earlier is not the case with the WMS texts, are too short to represent everyday text genres adequately. For an adequate assessment of everyday text recall, subjects need to be presented with longer, more meaningful texts which stretch them to adopt high-level strategies ie. strategies which concentrate on meaning and key content, predominantly gist. It is most important in assessing the memory capabilities of memory impaired individuals to gauge whether they can use these high-level, text-processing strategies which are adaptive and so crucial if effective learning is to take place.
4.4.3 Recall of texts over time

It is well known that normal memory subjects can retain information from texts for considerable lengths of time (e.g., Neisser 1982 sites examples of individuals recalling some content from texts months or even years later). The gist of a text is likely to be the most resistant to time and, from an educational point of view, individuals need to be able to recall key information over a reasonable time span if effective learning is to take place. Yet, the Logical Memory subtest only assesses recall for 30 to 50 minutes after presentation even in its revised forms (Russell, 1975; Denham, 1984). It thereby takes no account of either the fact that individuals with normal memory functioning can recall information for much longer or the possibility that memory impaired subjects may recall certain aspects of the content of a text over longer periods of time. The Logical Memory subtest also takes no account of what type of information (i.e., gist or details) is more salient over time.

The research presented here measured text recall for up to one week after presentation in order to get an indication of recall patterns over a reasonable time span and to establish what normal memory subjects and memory impaired subjects could typically remember as the time after presentation increased (see results Hypothesis 4, Table 5). Significantly different patterns of gist and details recall over time were found for the everyday and the WMS texts and between normal and memory impaired subjects.

4.4.3.1 Stability of gist and details: Normal memory subjects

The pattern of recall for normal memory subjects for the everyday texts was that gist and details were generally more stable shortly after presentation but decayed significantly after one week (see Table 5). IF
scores showed, however, that highly memorable gist items (and this included a significant number of the items identified as gist from each of the everyday texts - see Appendix D & E), were in fact stable over time as were some details. With the shorter WMS texts, on the other hand, gist recall for normal memory subjects was stable for up to one week whereas details tended to decay, results which are more consistent with findings in the literature (eg. Bartlett, 1932; Mandler, 1984).

There are a number of factors which could explain the discrepancy in the stability of gist recall between the everyday and the WMS texts.

Firstly, normal memory subjects were probably able to maintain their recall of gist items from the WMS passages over time because they were very much shorter texts and contained considerably less gist items than the everyday texts.

Secondly, these results could reflect a methodological factor whereby the experimental design of this study identified as gist both high and low gist items (ie. both highly important and the lesser important events and arguments). High gist items were in fact stable over time for the everyday texts as indicated by IF scores (see Appendix D & E).

Thirdly, in order to test the 'stability of gist' hypothesis, the psychological literature on text-processing (eg. see Brown and Yule, 1987 for comment and review) tends to use short, simple, specially constructed texts (often the same text across studies) rather than naturally occurring examples. Therefore, it may be the case that the stability of gist only holds for short, experimental texts of this kind.

And, finally recall of details by these subjects for the WMS decayed over time despite recall instructions to the contrary whereas details recall for the everyday texts was more stable (ie. for up to 30 minutes). This result is likely to be a reflection of the fact that the WMS texts introduce details for details sake, many of which did not contribute to the overall meaning
of the text and, therefore, were more prone to decay. Details items from the everyday texts, on the other hand, were more relevant and gist-related which rendered them more stable over time because they were recalled in association with highly memorable gist information.

4.4.3.2 Stability of gist and details: Memory impaired subjects.

For the memory impaired subjects, gist for two of the everyday texts, the newspaper article and the documentary film, was stable over time. Gist recall for the short story and the WMS, however, decayed (particularly in the short term) but was more stable between 30 minutes and one week. Oral presentation could be a factor in this latter result. But, the short story is also the longest text and may simply have contained too much information for memory impaired subjects to retain effectively over one week.

Details recall was relatively stable for the newspaper article and the documentary film but decayed significantly after one week for the short story. Details on the WMS texts decayed significantly but were stable after one week. This is because after one week very few details from the WMS texts were recalled by the memory impaired subjects (see Table 1). In contrast, over one week these subjects could still recall some details from each of the everyday texts.

Results for the memory impaired subjects are deceptive on face value and need to be considered in relation to Table 1 because they also reflect differences in the ease with which these subjects were able to recall the different texts.

*Newspaper article*: Memory impaired subjects recalled proportionally less gist from the newspaper article than from any other text immediately after presentation indicating that they found the key
information relatively difficult to extract from this text. Many of these subjects admitted to being slow readers and lamented the fact that their reading ability was not as good post-trauma as it had previously been. What gist memory impaired subjects did recall from the article, however, was stable over time. The normal memory subjects, in contrast, recalled more from the newspaper article than from any other text immediately after presentation. This points to the likelihood that gaining key information from reading is relatively easy for well-educated normal memory subjects but reading comprehension is more difficult for memory impaired subjects who have suffered a brain trauma.

Recall of details from the newspaper article was also stable over time for memory impaired subjects again indicating that what they were able to recall from their reading they could retain over time.

**Documentary film:** Recall of the documentary film was similarly stable over time for memory impaired subjects but with an important difference. These subjects were able to recall a higher percentage of the gist from this text than from any other text. Even one week after presentation, memory impaired subjects could still retain 41% of the gist of the film. Details were considerably less memorable but were similarly stable over time.

The film presentation and/or the topical subject on conservation of the environment appears to have been particularly salient for these subjects. The text recall of memory impaired subjects may be enhanced if information is presented in a film medium which offers both a verbal (aural) and a visual (cinematic pictures) mode of presentation and where the oral text is supported by the pictures. A number of these subjects were interested in and knowledgeable about conservation issues which is also likely to have been a factor in their relatively better recall.
Short story: Memory impaired subjects recalled a relatively high percentage of this long text although their recall generally decayed over time. After one week, they could still recall a high 24% of the 54 gist items. This suggests that even through the story was long, because it was enjoyable and well-written, the gist at least was memorable and did not overtax the capacity of these memory impaired individuals. Details were stable for up to 30 minutes and then declined significantly over time. Memory impaired subjects could, however, recall a number of details after one week from this orally presented story whereas details from the WMS texts (which were also orally presented) were poorly recalled in comparison.

WMS texts: The WMS passages are very short texts so memory impaired subjects could recall a relatively high percentage of the gist and details content immediately after presentation. Their recall, however, was very prone to decay again indicating problems with memorability over time for these sorts of texts. It is most significant that one week after presentation a smaller percentage of the content of the WMS texts was recalled than of any of the everyday texts despite the fact that the everyday texts all contain substantially more information.

4.4.3.3 Summary

The WMS passages are inherently poor examples of everyday texts, particularly of the news report text genre they supposedly represent. Furthermore, the Logical Memory subtest fails to acknowledge the characteristics of everyday text-processing in the memory task it presents to subjects (ie. paragraph-length texts to be recalled verbatim over a short period of time) and in its scoring system which ignores the significantly different memorability of items. Moreover, recall is not measured over a reasonable time period although, as the results of this study found,
important content from texts (i.e., high gist and details—see Appendix E) is stable over time.

The WMS texts were also found to present a different recall task to normal and memory impaired subjects largely because the unnatural details focus of these texts overtaxed the capacity of memory impaired subjects.

Finally, of considerable significance is the finding that although memory impaired subjects recalled less of the everyday texts than normal memory subjects and although their recall decayed rapidly, what they did recall was similar in content to that recalled by normal memory subjects. That is, memory impaired subjects selected more gist than details from the everyday texts and recalled more of the high gist and details items.

4.5 Predictive Validity of the Logical Memory Subtest

Hypotheses 8 & 9 were designed to look specifically at the ability of the Logical Memory subtest to predict the everyday text recall capabilities over time of normal and memory impaired subjects (group data) and of memory impaired subjects individually (case study data). The Logical Memory subtest provides no statistical information as to predictive validity although it is common practice for clinicians to draw conclusions about a client's ability to recall texts based on his or her Logical Memory scores.

4.5.1 Group data

Correlations between gist and details recall for each of the everyday texts and the Logical Memory scores are displayed in Tables 7 & 8 for the normal memory and memory impaired subjects, respectively. As mentioned earlier, the number of subjects involved in this research was
small, particularly the memory impaired group which was represented by only six individuals. Such a small number of subjects would certainly have influenced the likelihood of correlation coefficients reaching significance. And, this has been taken into account in the ensuing discussion by interpreting the results generously in favour of the predictive validity of Logical Memory scores. Thus, relatively high correlations which are close to significance will be considered as significant.

For normal memory subjects, significant relationships were found between Logical Memory scores and the recall of the short story and the documentary film for up to 30 minutes after presentation. After one week, however, the relationship between Logical Memory scores and these texts was non-significant. Both the short story and the film script were presented to subjects aurally as were the WMS texts so it could be that Logical Memory scores have predictive validity for aurally presented everyday texts shortly after presentation but not over a longer time span.

The relationship between Logical Memory scores and recall of the newspaper article, on the other hand, was poor especially for gist recall. Thus, Logical Memory scores are not likely to predict with any success the recall of written everyday texts.

It is further significant that for normal memory subjects the Logical Memory scores were better at predicting the details than the gist recalled from everyday texts which, as discussed earlier, probably reflects the emphasis on details recall in the WMS texts. Logical Memory scores were also the least predictive of recall one week after presentation to suggest that these scores are not good indicators of how well normal memory subjects will retain information from everyday texts over a reasonable length of time.
For memory impaired subjects, the Logical Memory scores were found to have a significant relationship with the recall of the short story, particularly the gist recall. But, a poor relationship was found between Logical Memory scores and recall of the newspaper article and the documentary film for up to 30 minutes after presentation. A stronger relationship with the article and the film was indicated one week after presentation but this simply indicates that the recall of these subjects across texts decayed significantly over one week.

Thus, for this well-educated sample of normal memory and memory impaired subjects, the Logical Memory scores were the most successful at predicting the recall of the aurally presented short story and the least successful at predicting the the recall of the newspaper article. Thus, clinicians need to be extremely cautious about assuming a client’s ability to recall written texts from his or her Logical Memory scores. Moreover, despite indications that Logical Memory scores were able to predict the recall of the film with some success for normal memory subjects, this was not the case for memory impaired subjects. Therefore, clinicians should also be cautious about making predictions about text recall from television, videos or films based on Logical Memory scores.

Finally the data indicated that Logical Memory scores were not useful in predicting the recall of normal memory subjects over a reasonable time span. It is likely, therefore, that these scores would also be poor at predicting the recall of memory impaired individuals who can in fact recall text content over time. This is a most significant weakness given that memory impaired subjects need information as to whether they can retain information successfully over time in terms of rehabilitation possibilities and work and study potential.
4.5.2 Case study data

The case study data showed that Logical Memory scores are decidedly unconvincing in predicting the everyday text recall of memory impaired individuals over time with the exception of Subject 3. Subject 3 had difficulty retaining any information after a short period of time and Logical Memory scores were relatively more successful at predicting recall in the short term. The group results, which pointed to a significant relationship between Logical Memory scores and the recall of the short story, were also less convincing on an individual basis. Logical Memory scores had a tendency to overestimate the recall of the short story immediately after presentation (see Subjects 1, 2 & 5) and to underestimate recall over time especially gist after one week (see Subjects 1, 2, 4, 5, & 6).

These data are of particular concern from the point of view of clinical interpretation where information given to a client may misrepresent his or her ability to process everyday texts, particularly across different modes of presentation. A number of subjects (Subjects 1, 2, 4 & 5), for example, found reading difficult which affected their recall of written texts but could recall relatively more given another mode of presentation ie. listening and/or viewing a film.

4.6 Development of a Text-processing Assessment Device

As the results from this research highlight, there is an urgent need for a more relevant assessment device to be developed for use in clinical and rehabilitation settings. Text-processing is a most important facility in a literate society and individuals suffering from memory loss and other cognitive dysfunctions need to be well informed about their capabilities in this area. Furthermore, an important emphasis of rehabilitation would
be to train memory impaired individuals to use strategies which would allow them access to key information within the limitations of their diminished memory capacity.

The most recent literature to come from the United States (eg. Bornstein et al., 1989; Loring, 1989; Loring et al., 1989) indicates that an updated version of the Wechsler Memory Scale (Wechsler, 1987) has been published recently although it is not as yet widely available in Australia. This version by all accounts contains fuller and more current normative data which includes norms for both verbal and visual memory. However, there is no suggestion in this literature that substantial changes of the kind highlighted in this research have been made to the Scale itself or to the Logical Memory subtest in particular. That is, in this latest revision of the WMS the texts; the test instructions; the scoring system; and the delayed time period of 30 minutes remain the same.

The reason the Wechsler Memory Scale still has clinical appeal after so many years (forty five since Wechsler originally published the scale) is probably because firstly, it is widely available and secondly, it is short and easy to administer and to score. But, as the research described here would indicate, the Logical memory subtest does not provide useful information to clinicians as to a client’s text-processing abilities and may even be unreliable in ascertaining the presence or absence of a deficit in well-educated memory impaired subjects.

The results of this study would indicate that everyday texts, although invariably longer than one-paragraph, would provide more relevant assessment tasks with which to gauge the text-processing capabilities of memory impaired individuals than the WMS texts. Everyday texts also lend themselves to relevant normative comparisons between normal memory subjects and memory impaired individuals because, even
though memory impaired recall is diminished, this study found that its content is characteristic of normal memory recall.

The study indicated, moreover, that, in assessing memory for text, it is important to use a set of everyday texts representative of a number of text genres and modes of presentation. This is because individual differences exist in experience with different text genres; in background knowledge of text content presented and in preferred strategies and mode of presentation. Furthermore, brain trauma may differently affect the ability of individuals to process texts across different modes. The sense of this line of argument was demonstrated particularly clearly by the strategies and case study data.

It would, of course, take more time to administer a test made up of everyday texts particularly if, as this study would recommend, delayed recall was measured for up to one week after presentation. However, the benefits of using everyday texts in terms of worthwhile, functional assessment would far outweigh the cost of extra administration time. Using data from everyday texts of the kind explored in this study, clinicians could predict with considerable confidence the potential of their clients to process a range of naturally occurring texts and to recall the text content over a reasonable time span.

One way to reduce the administrative time of an everyday text assessment would be to score only the most memorable gist and details items from each text for up to a week. For example, Appendices E & F give the most memorable items from the texts used in this study. How well an individual scores on these items across time would establish the nature and extent of his or her impairment. That is, an individual who cannot recall the key information which contains the overall meaning of a text is more disabled; has less rehabilitation potential; and a less positive future in a literate society than someone who can.
A further advantage of everyday texts is that they have face validity for clients and, therefore, have the potential to generate a wealth of useful qualitative information as was evident in the case study data. For example, everyday texts stimulate clients to discuss their preferred text-processing strategies; why they find some content easier or more difficult to recall; what mode of presentation they prefer; related difficulties they have noticed recalling other everyday texts in their pre- and post-trauma experience and so on. Rich qualitative data such as this can provide the clinician with highly useful information, in addition to quantitative results, from which to gauge a client's strengths and weaknesses and from which to design a useful rehabilitation programme.

Secondly, everyday texts have the potential for high predictive validity because they represent texts clients are likely to find in real-life settings. Using everyday texts, clinicians are much more likely to be able to predict with some accuracy a client’s ability to return to an educational or to a work setting where a high level of text processing ability is demanded including the ability to retain information, particularly key information, for at least a week.

Finally, everyday texts lend themselves to developing a rich range of diagnostic and rehabilitative information on a given client should this be appropriate. More specifically:-

Everyday texts make it easy to assess differences between gist and details recall which give clinicians useful information on a client's ability to select key information and/or supporting detail and the strategies the client typically adopts to do this. A client who can select gist is much less disabled than one who cannot.

With everyday texts a range of additional diagnostic information can be gathered on the text processing capabilities of a client. For example, a client can be retested and allowed to take notes to see whether or not s/he
can pick out key information or gist appropriately even if his or her memory capacity is particularly transitory. Organisation and planning, for example, can be a problem with frontal lobe damage and it can be anticipated that clients with frontal lobe damage may have difficulty recalling gist.

From the point of view of rehabilitation, it would be of particular importance to train memory impaired clients who have some capacity for gist recall in more effective ways of extracting gist which contains the overall meaning from texts without overloading the person's diminished memory capacity. The everyday texts used in the assessment could provide the initial example texts for this training.

Everyday texts lend themselves to assessing whether a client can retain information for up to one week or longer and give the clinician considerable scope to diagnose the nature of the information retained over that period of time. The contrived details-laden WMS texts, in contrast, do not lend themselves to assessing memory over an extended time frame.

Longer everyday texts allow clinicians to probe a client's recall using cues such as those adopted in this study to establish whether a client has an access or retrieval problem. Paragraph-length texts like those in the WMS are less useful in this regard because with such short texts cues can simply enable clients to guess the text content.

Everyday texts of some length and complexity also have the potential for the development of a set of comprehension/recall questions on the text content. The client could be given questions which focus on gist and details recall separately as was done in this study. Questions like cues are useful if the clinician suspects a client has a retrieval problem.
Finally, data from this study would recommend that a more appropriate test of memory for text than the Logical Memory subtest would include the following features:

1. A set of everyday texts representative of a number of text genres and modes of presentation selected from naturally occurring texts of topical interest.

2. A scoring system which distinguished between gist and details recall and provided item facility tables to indicate the memorability of individual items.

3. Additional norms for well-educated subjects so realistic diagnoses can be made for educational and career purposes.

4. A free-recall task but with allowances for prompts to add strength to the test's ability to assess the recall of people suffering a memory retrieval problem.

5. A set of focus questions which are typically answered correctly by a normal memory group. Some questions, for example, the title and the author of the text were not found to be memorable and, therefore, given the task presented in this study would not be appropriate. However, the saliency of questions like these can change with the task. In this study, for example, texts were presented individually out of their normal context of a book, a newspaper and a television program, respectively. Questions such as title and author may be appropriate given another task context where there is a functional purpose to recall such information, for example, skimming a newspaper and reading the headlines, choosing a book or a film by its title or author/producer and so on.

6. Delayed recall periods of both 30 minutes and up to one week. The results of this study clearly indicated that information about a client's ability to recall material from texts over a reasonable time span could have important implications for a client hoping to return to work or study
post-trauma. For effective learning to take place, an individual needs to be able to retain information, particularly key information for more than 30 minutes.

4.7 Conclusion and Future Directions

In conclusion, it is proposed that research in the area of schematically and ecologically appropriate tasks such as that outlined above could provide the basis for the development of a standardised test based on a schema theory of memory. Such an instrument would have the potential to broaden and update the range of memory assessment devices available to the clinician for diagnostic purposes and have greater predictive validity for everyday memory functioning than tests that are currently available.

Some pertinent data was raised in this study which needs further investigation. A question of particular interest that arises is whether the relationship found between Logical Memory scores and the recall of the short story is a substantial one across subjects other than those who are well-educated. And, whether this potentially important predictive relationship holds for other aurally presented everyday texts such as conversations; news reports and interviews on radio; debates; and lectures. Of related interest would be research which looked at the recall of texts established as equivalent in content, length and difficulty across a number of different presentation modes. A test which could isolate mode of presentation in this way would enable clinicians to diagnose with considerable accuracy the most salient medium for a memory impaired client.

Finally, in order to verify the results of this research, the hypotheses posed would need to be tested using much larger sample populations. It
would also be most useful clinically for future research to investigate the memory for texts characteristic of different amnesic groups with different aetiologies of disease or trauma and different sites of pathology.
Addendum

Since the completion of this study, the latest revision of the Wechsler Memory Scale (WMS) (Wechsler, 1987) has become more widely available and is increasingly being used by clinicians. It is appropriate, therefore, to include more detailed comment on this new revision. However, the contention made in the body of the thesis is maintained namely that, even in its revised form, the WMS does not contain the theoretical and practical changes of the kind highlighted in this research. The subtests have changed little from the original 1945 version of the scale. Abstract items such as digits, geometrical figures, word pairs and short, list-like paragraphs are still used as the recall tasks. Tasks such as these do not emulate everyday memory tasks and, therefore, do not adequately test the everyday memory strategies subjects bring to tasks in the everyday world. A more detailed discussion of the revision to the Logical Memory scale which is the focus of this thesis is given below.

The revision of the Logical Memory subtest still contains two, unrelated short, information-laden paragraphs (see attached). The first of these is almost identical to the Anna Thompson passage but, as the manual states, "has been modified to eliminate dated references" (Wechsler, 1987 p. 4). A new passage has replaced the contentious American liner passage which was consistently found to be more difficult to recall than Anna Thompson and was particularly dated with its wartime theme. Thus, in the latest version of the WMS the passages have been updated in content and
made of more equal difficulty which are certainly improvements for the better.

The theoretical issue, however, still remains that, although Wechsler calls these passages "stories", in the real world it is rare for a story to be a short paragraph in length. Also, "stories" presented in an aural mode as these paragraphs are would, in the real world, contain redundancies because listeners cannot easily pick up information, particularly details-laden information, from one hearing. Thus, the contention presented in the thesis remains that short passages like these need to be replaced by longer, more meaningful everyday texts representative of a range of presentation modes if the extensive difficulties found with the WMS passages are to be addressed in the future.

The verbatim recall task remains the same in the revised version. Subjects are instructed by the tester to tell "everything and begin at the beginning" (Wechsler, 1987; p. 19). Subjects are also penalised in the scoring if they do not give a retell that closely follows each item of content. For example, subjects are penalised if they do not recall accurately the names of the main character and other highly specific details in each paragraph. In the real world people are not expected to recall stories or other texts verbatim unless they are given ample time to do so. The usual strategy adopted by subjects in recalling texts, and the most appropriate in terms of efficiency, is to recall the gist of the text and only a few of the more gist-relevant details. This higher-level, text recall strategy is still not assessed by the latest version of the WMS.
The passages are still divided into 'idea units' for scoring but as the manual states the "rules for scoring the stories have been made more specific and exhaustive in order to increase the objectivity of scoring" (p. 4). This means that the manual has introduced a specific scoring criteria which has made it clearer what flexibility a tester can take in awarding a correct score for each idea unit.

This more specific information does make scoring easier, however, the issue this thesis has taken with the scoring of the passages has not been addressed. Again, there is no acknowledgement of the difference between gist and details which was the main recommendation for clinical settings. Also, no item facility scores are provided. In any text, some items are more memorable than other and it is important for clinical and diagnostic purposes for clinicians to be able to distinguish whether or not clients can remember the most relevant information in a text.

A delayed recall of half an hour is included in the new version of the Logical Memory subtest. This is an update which takes cognisance of the work of Russell (1975) and is an important inclusion in the new version. However, this is not a new innovation as Russell's delayed recall amendment has been available to clinicians for some time (see Lezak, 1983). Furthermore, the delay period is of the standard half hour and does not include a substantial delay of a week which the results of the thesis strongly recommended. With everyday texts,
people are able to remember the content of a text, particularly the gist content, for up to one week and this is an important facility for effective learning to take place and one which clinicians need to be able to assess.

The new version contains more extensive norms than the previous version including age-relevant norms and some norms for clinical populations. The inclusion of such extensive norms is most welcome and a long time in coming. No norms are provided, however, for well-educated populations. This is a pity because many people coming to clinicians after a brain trauma are eager to know what their possibilities are for study or for a career where the ability to process and recall texts effectively is critical.

In conclusion, the text recall assessment strongly advocated in this research has in no ways been addressed in the latest version of the Wechsler Memory Scale. The memory for text assessment devise recommended in this thesis would consist of longer, everyday texts representative of different modes of presentation. Recall would be measured across a reasonable time span. The recall task would be a retell rather than a verbatim task and there would be norms for gist and for details together with norms for item facility. Norms would also be provided for well-educated as well as for normal populations.
REFERENCES


APPENDIX A
Anna Thompson of East Sydney employed as a cleaner in an office building reported at the Police Headquarters that she had been held up on High Street the night before and robbed of fifteen dollars. She had four little children the rent was due and they had not eaten for two days. The policemen touched by the woman's story took up a collection for her.

The American liner New York struck a mine near Liverpool Monday evening. In spite of a blinding snowstorm and darkness the sixty passengers including 18 women were all rescued though the boats were tossed about like corks in the heavy sea. They were brought into port the next day by a British steamer.
Short Story
OUR DOG MONTIE
By Michael Dugan

We bought Montie when he was just a pup. 'Part Labrador,' the salesman said, 'and several parts something else'. It was the part Labrador that decided us. Mother said she had never known a Labrador that had bitten anyone - they were the most gentle dogs alive. Within five minutes Montie was ours.

We never found out what the parts something else were but they certainly made up for the part Labrador. From the first Montie bit people. We didn't take much notice in the beginning. 'Just getting used to his teeth,' Dad would say, 'and besides, a bite from that tiny thing wouldn't hurt anybody.'

Within six months Montie was as big as my sister's Shetland pony and the local chemist was making a fortune from the bandages and antiseptics we bought.

Montie would never bit more than one person per day but he always made sure of getting that one person. He might bite someone early in the morning, in which case, the rest of the family could walk in safety for the remainder of the day, or he might wait until evening, when as soon as he entered the sitting room those members of the family who thought it was their turn to be bitten would edge out of the door and go up to bed.

No one ever tried to punish Montie for his misbehaviour. 'It would only build up resentment inside him,' said Mother. Besides you couldn't get near enough to hit him and cutting down his food would have been done at great personal risk.

It was mother who thought of smearing us with some bitter tasting insect repellent to discourage Montie from biting us. All day we wandered about the house greased up like Red Indian warriors and that afternoon Montie bit the postman.

Mother was determined to love Montie whatever his sins. She had read a book on child psychology, and deciding that dogs and children had alot in common, she applied what she had read to Montie. He has an inferiority complex, she said, and he bit people to compensate for it. What we had to do was to show him that he was loved and wanted. To demonstrate this she threw her arms around his neck and gave him a big kiss to which he responded by nearly biting off her left ear.

At this time we lived in an open farming area. Apart from the house
next door, which had been empty for the past five years, the nearest house was a quarter of a mile away. Even so the neighbours, and more often the neighbours children, came in for their fair share of bites. Indeed it was only because of the kindness of these people and the cold cash that Mother paid out per bite, that Montie was never reported to the police. Quite the opposite in fact, for Sammy Griffiths, who lived on the child endowment from his eleven children and drank methylated spirits, sent one of his kids down to be bitten whenever he was a bit hard up.

In spite of the constant drain on her resources Mother made valorous efforts to make Montie feel 'wanted'. She gave him the run of the house, and found him trying to get at young Jimmy while he was lying in his cot. She doubled his food ration which only seemed to increase his appetite for human flesh. She let him sleep on top of her bed and Dad moved onto the downstairs sofa. In fact, it wasn't Montie who should have felt neglected, it was us!

When Dad came in one day and told us that the house next door had been bought we were, needless to say, extremely alarmed. When he further told us that its buyer was an elderly retired schoolmistress, we were speechless with horror. So far all Montie's victims has been sturdy farmers or their children, whom Mother could bribe or cajole into not taking any action against us. An elderly spinster was quite a different matter.

Miss Hayman, for that was our new neighbour's name, arrived about a month later, and for two weeks we managed to confine Montie to the backyard. Eventually, after much indecision and with grave forebodings, Mother decided she would have to invite Miss Hayman for afternoon tea. For the first time in his life, and much against Mother's better feelings, Montie was locked up in the shed with a good supply of meat and water.

Miss Hayman was thin and frail. She sipped at her tea delicately and talked softly about her experiences in schools. She reminded me of nothing more than a timid bird that has broken a wing and must therefore endure human contact. Still all went well until she asked Mother innocently whether we had any pets.

'Yes,' said Mother absently, 'a dog.'

'Oh, may I see it?' asked Miss Hayman, 'I love dogs.'

'Well he's in the shed at the moment', said Mother doubtfully.

'Oh do bring him in, please', twittered Miss Hayman. 'I once had a dog of my own, a Pekinese called Pansy'.

'That's torn it', said Dad, shooting a dark look at Mother as he walked
resignedly out of the door. He came back a few minutes later holding Montie on as short a lead as he dared. 'Oh what a big dog,' cried Miss Hayman, 'what is his name?'

'Montie', replied Dad, keeping as near to the door as he could. Montie growled.

'Hullo Montie,' cooed Miss Hayman, 'come here Montie, there's a good doggie.'

Montie approached warily and Miss Hayman patted him on the head. We all held our breaths. Montie lay down at her feet and she sat there gently stroking him behind the ears. The whole family breathed a sigh of relief.

'I do love........ooh!' cried Miss Hayman. Before we could do a thing about it Montie had her ankle in a vice-like grip.

'Wicked dog!' she cried and much to Mother's horror she gave him a sound box on the ear. Montie let out a yelp of surprise. And retired to a corner with his tail between his legs and with a puzzled look on his face. He tentatively advanced again but retired under the stern and threatening look in the schoolmistress's eye. That was Montie's last taste of human blood. The method that had tamed hundreds of school children tamed him too. We decided that Mother must have read the wrong psychology book.
Apart from the friendly rivalry between Australia and Pakistan in cricket, hockey and squash, what ought to bring the two friendly peoples closer together would be awareness of the fact that Pushtun camel drivers from Pakistan played a historic role in the opening up and the development of the Australian outback. Very few people in Australia or Pakistan perhaps know in detail about the tremendous contribution made in the second half of the nineteenth century by these early migrants from the South Asian Sub-Continent, in fact from the parts which now constitute Pakistan.

The simple, but hardy and hardworking cameleers were commonly known in 'Australia as Afghans or simply as 'Ghans' though very few of them came from Afghanistan. They were actually of the Pushtun stock and hailed from the North West Frontier and Baluchistan provinces of British India which now form a part of Pakistan.

The first group of cameleers were brought into Victoria in 1860, by private enterprise, to provide transport to the Burke-Wills Expedition undertaken to explore the entire stretch of Australian desert.

In the following decades, the so-called 'Ghans' and their camels were in great demand. They provided the most efficient and reliable transport system in the far flung areas. The camels were effectively used in carrying ore from the mines, carting machinery from the dockyards and transporting all kinds of heavy merchandise through areas where there were no roads and consequently no transport.

Their contribution has been most valuable in such projects as the erection of the border fence in Queensland and overland telegraph lines between Adelaide and Darwin, laying of railway lines between Port Augusta and Kalgoorlie, and construction of the Canning Stock Route in Western Australia. The train, affectionately known as 'the Ghan', which runs between Adelaide and Alice Springs was named after the cameleers as a tribute to their services.
Camel drivers' historic role

By A.Q. QUreshi

Apart from the friendly rivalry between Australia and Pakistan in cricket, hockey and squash, what ought to bring the two friendly peoples closer together would be awareness of the fact that Pashtun camel drivers from Pakistan played a historic role in the opening up and the development of the Australian outback. Very few people in Australia or Pakistan perhaps know in detail about the tremendous contribution made in the second half of the nineteenth century by these early migrants from the South Asian Sub-Continent, in fact from the parts which now constitute Pakistan.

The simple, but hardy and handworking camel-drivers were commonly known in Australia as Afghan or simply as 'Ghans' though very few of them came from Afghanistan. They were actually of the Pashtun stock and hailed from the North West Frontier and Baluchistan provinces of British India which now form a part of Pakistan.

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Documentary Film

THE BATTLE FOR MOUNT ETNA (Film script and scenes)

Compere of the show speaking- Picture of Mt Etna in the background, right hand side of the screen. Picture labelled 'Mt Etna Battle'.

Well, for some time now, there has been a battle going on in Queensland over a mountain.

Map of Queensland showing Mt Etna lying between Rockhampton and Brisbane.

Mt Etna is in Central Queensland about 40 kms north of Rockhampton and the battle is between conservationists and a cement company.

Back to compere and the picture of Mt Etna in the right hand side of screen.

Well, last week the cement company which operates a mine on the mountain said it was planning to blast two caves in the mountain. The conservationists are trying to stop the blasting. They've even hidden three people with a supply of food somewhere in the caves.

Let's take a look at Mt Etna now to find out just why they want to save it.

(Birds twittering) Picture of Mt Etna from a distance showing its cone shape.

Mt Etna gets its name from an angry volcano in Sicily which has a similar cone shape.

Shows the side of the mountain the mountain that has the caves and appears undisturbed by mining.

It's composed of limestone and is riddled with limestone caves.

Shows the mined side of the mountain.

Our Mt Etna became a quarry 22 years ago. The limestone is used to make cement.

Zooms in to a close up of bulldozers, trucks and other equipment.

But, like all natural sites where mining takes place, there is an impact on the environment.

Shows the denuded landscape on the side of the mountain that is being mined. Then switches to the mining activity on the site.

One side of the mountain is slowly being eaten away by the limestone quarry.
Shows the side of the mountain that is undisturbed by mining. Zooms into the entrance of one of the caves. This has caused an outcry from conservationists.

Mt Etna is honeycombed with 46 caves. Some have already been destroyed by mining.

A still photograph of two people in a cave standing next to a limestone formation in the cave.

This one, called the Crystal Palace was completely destroyed 5 years ago.

(Music) Still photographs of some of the beautiful formations in the Crystal Palace.

Only photographs and memories remain.

Shots of Resurrection Cave.

This is Resurrection Cave, one of the best but it bears the scars of mining.

(Voice of commentary different to that of the main compere) Shots show the chamber.

One of the big shames about this chamber is that it is undoubtedly one of the best chambers in this cave.

Shows the formation described.

And this formation here that was a stalactite about 30 ft long has been broken from the ceiling and speared into the floor.

(Voice of the compere again) Pictures the cave entrance and swarms of bats.

And this is Bat Cleft home for the Little Bent Wing Bat.

Graphic illustration of the cave which shows how the warm air circulates.

It's unique because, unlike most caves, it's warm. Every summer thousands of bats come here to rear their young.

Cave entrance and swarms of bats.

Over 80% of all Little Bent Wing Bats in Australia were born in Bat Cleft.

Shows cave and close up shots of the Ghost Bats.

Mt Etna is also home to the very rare Ghost Bat. There are only 3,000 of these creatures left in Australia. One hundred and fifty of them live at Mt Etna.

A view of the foot of Mt Etna then an explosion from the mining operations.

For Central Queensland Cement, Mt Etna is a valuable source of limestone.

A view of the beautiful limestone formations in the caves.
But for cavers and conservationists, it is something else. A place of rare beauty and a haven for bats.

A view of cavers climbing into a cave.

The mining company has held a mining lease on the mountain for 22 years but earlier this year (Picture of Premier Ahern from Queensland) and the state government forced it to surrender the lease for the land around Bat Cleft.

A Poster with the words 'Save Mt Etna'.
Conservationists say this is not enough.

An interview with Dr. Bob Brown. His name is flashed up on the screen.

"It's outrageous. One of the most magnificently decorated caves on this planet, a small cave, pulverized by bulldozers to make cement floors in office buildings. We as a sophisticated society must do better than that.

View of the side of the mountain that is being mined

There is only one answer to Mt Etna and that is that the whole mountain is protected".

Views of the mining of Mt. Etna. See an explosion and shots of the denuded landscape and the machinery used in the mining operation.

But the mining still goes on. And caves are still unprotected by the government's announcement.

Central Queensland Mining says that stopping mining at Mt Etna would cost 130 jobs.

Views of bush walkers on the unmined side of the mountain.

Conservationists say the company could get its limestone from other deposits in the area and what's left of the mountain should be declared a National Park.

View of the Ghost Bats.

Mining and jobs versus bats and caves. The struggle for Mt Etna continues.
RECALL INSTRUCTIONS

A. A short story: Our dog Montie

"I am going to read you a short story and I want you to relax and enjoy the story. After I have finished reading, I am going to ask you to retell it for me in as much detail as you can remember as if you were retelling it to a friend who wants to hear it. I will record your retell on this tape recorder here. I will also ask you some questions on the story."

After 30 minutes
"Do you remember the story I read to you? Retell it for me again as if you were retelling it to another friend in as much detail as you can remember."

After one week
"Do you remember the story I read to you last week? Retell it to me in as much detail as you can."

Prompt
It was called 'Our Dog Montie'.

B. The newspaper article: Camel Drivers' Historic Role

"I am going to give you a short newspaper article to read. I will give you 4 minutes to read the article at your leisure. I will then ask you to recall the article for me in as much detail as you can as if you were telling it to someone who hadn't read the article but was interested in the information it contained. I will record your retell on this tape recorder here. I will also ask you some questions on the article."
B. The newspaper article: (continued)

After 30 minutes
"Do you remember the newspaper article you read? Retell it to me as if we were retelling it to another friend in as much detail as you can remember."

After one week
"Do you remember the newspaper you read last week? Retell it to me in as much detail as you can."

Prompt
Show the subject a cut out of the heading of the article 'Camel Drivers' Historic Role'.

C. The film: The Battle over Mt Etna

"I'm going to show you a short documentary film and after it is finished I'm going to ask you to tell me what the film was about in as much detail as you can as if you were retelling it to a friend who hadn't seen the film but was interested in the information it contained. I will record your retell on this tape recorder here. I will also ask you some questions on the film."

After 30 minutes
"Do you remember the film you saw? Retell it to me as if were retelling it to another friend in as much detail as you can remember."

After one week
"Do you remember the film you saw last week? Retell it to me in as much detail as you can."

Prompt
The film was about Mt Etna.
D. The WMS passages

"I am going to read to you a little selection of about 4 or 5 lines. Listen carefully because when I am through I want you to tell me everything I read to you. Are you ready?" (WMS Handbook p. 7)
I will also ask you some questions on the content of the selection."
"After reading the first selection, say 'Now what did I read to you?' Tell me everything and begin at the beginning."
"Now I am going to read you another little selection and see how much more you can remember on this. Listen carefully." (WMS Handbook p. 8)
"I will also ask you some questions on the content of this selection."

After 30 minutes
" Do you remember the two short passages I read to you? Retell them to me in as much detail as you can remember."

After one week
" Do you remember the two short passages I read to you last week? Retell them to me in as much detail as you can remember."

Prompts
It started
"Anna Thompson......."
It started
"The American liner......."
QUESTIONS ON TEXTS

Acceptable answers to the details questions in brackets

A. THE SHORT STORY

Gist question
1. What do you think the main theme of this story is? ie. What was the author trying to tell the reader in this story?

Detail questions
2. What was the title of the story? (Our Dog Montie)
3. Who were the main characters? (Montie, narrator, mother, father, the school teacher or Miss Hayman. Correct if named any three.)
4. Can you remember any of the minor characters? (Correct if mentioned any two by name or by description.)
5. What was one of the ways the mother tried to change the dog’s behaviour? (Any one method she used.)

B. THE NEWSPAPER ARTICLE

Gist question
1. What do you think the article was about? Give your answer in about one sentence.

Detail questions
2. Do you recall the title of the article or any words from the title? (Camel Drivers’ Historic Role at least three or more words from the title)
3. What were the cameleers commonly called? (Afghans or Ghans)
4. Why were the cameleers first brought to Australia? (For the Burke and Wills Expedition)
5. Name one of the projects mentioned in the article that the cameleers contributed to in Australia. (Any one)
C. THE FILM

Gist question
1. What was the film about? Give your answer in about one sentence.

Detail questions
2. What was the name of the mountain and why was it called that? (Mt. Etna because either named after a mountain in Sicily or a reference to its cone shape).
3. Can you remember the name of any of the caves mentioned in the film? (Crystal Palace or Resurrection Cave or Bat Cleft)
4. What animals that inhabit the caves were mentioned in the film? Can you name one of the two types of these animals that were discussed? [Bats and either the (Little) Bent Wing Bat or the Ghost Bat]
5. Name the mining company. (Central Queensland Cement or Mining)

D. WMS PASSAGES

(i) Anna Thompson passage

Gist question
1. What was the passage about?

Detail questions
2. What was the name of the woman? (Anna or Anna Thompson or Ms Thompson)
3. Where was she from? (East Sydney or Sydney)
4. How many children did she have? (four)
5. How much money did she lose? ($15.00)

(ii) American Liner passage

Gist question
1. What was the passage about?

Detail questions
2. What was the name of the liner? (New York)
3. What did the liner strike? (a mine)
4. What was the weather like? (snow storm, stormy)
5. How many passengers were there? (sixty)
APPENDIX C
## Wechsler Memory Scale Texts

### Anna Thompson

### Gist

1. A woman
2. reported
3. to Police
4. that she had been held up
5. and robbed.
6. She had children
7. the rent was due
8. they had not eaten
9. the policemen took up
   a collection for her.

### Details

1. Anna
2. Thompson
3. of East
4. Sydney
5. employed
6. as a cleaner
7. in an office building
8. Police Headquarters
9. on High St.
10. the night before
11. of $15
12. four
13. little
14. for two days
15. touched
16. by the woman's story.
<table>
<thead>
<tr>
<th>Gist</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The liner or a ship/boat</td>
<td>1. American</td>
</tr>
<tr>
<td></td>
<td>2. New York</td>
</tr>
<tr>
<td>2. struck/ hit something.</td>
<td>3. a mine</td>
</tr>
<tr>
<td></td>
<td>4. near Liverpool</td>
</tr>
<tr>
<td></td>
<td>5. Monday</td>
</tr>
<tr>
<td></td>
<td>6. evening</td>
</tr>
<tr>
<td>3. The weather was bad.</td>
<td>7. blinding</td>
</tr>
<tr>
<td></td>
<td>8. snowstorm</td>
</tr>
<tr>
<td></td>
<td>9. darkness</td>
</tr>
<tr>
<td>4. The passengers</td>
<td>10. 60 (passengers)</td>
</tr>
<tr>
<td></td>
<td>11. including 18</td>
</tr>
<tr>
<td></td>
<td>12. women</td>
</tr>
<tr>
<td>5. were all rescued.</td>
<td>13. though the boats</td>
</tr>
<tr>
<td></td>
<td>14. were tossed about</td>
</tr>
<tr>
<td></td>
<td>15. like corks</td>
</tr>
<tr>
<td></td>
<td>16. in the heavy sea</td>
</tr>
<tr>
<td>6. They were brought into port</td>
<td>17. the next day</td>
</tr>
<tr>
<td>7. by a another ship.</td>
<td>18. British</td>
</tr>
<tr>
<td></td>
<td>19. steamer</td>
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# Short Story

## Our Dog Montie

### Gist

1. We bought the dog when he was just a pup
2. Part Labrador
3. And several parts something else
4. It was the part Labrador that decided us
5. Because they never bite
6. We never found out what the parts something else were
7. But they certainly made up for the part Labrador.
8. The dog bit people.
9. We didn’t take much notice at first because he was small (only a pup)
10. But he grew into a very large dog
11. The dog would never bite more than one person per day.
12. But he always made sure of getting that one person

### Details

1. Montie
2. The salesman said
3. Mother said
4. They are the most gentle dogs alive
5. Just getting used to his teeth
6. Dad would say
7. Besides a bite from that tiny thing would hurt anybody
8. Within six months
9. The dog was as big as a Shetland pony
10. My sister’s
11. The local chemist was making a fortune
12. From the bandages and antiseptics we bought
13. He might bite someone early in the morning
14. In which case, the rest of the family could walk in safety for the remainder of the day
15. Or he might wait until evening
16. When as soon as he entered the sitting room
17. Those members of the family who thought it was their turn to be bitten
18. Would go to bed
13. No one ever tried to punish the dog for his misbehaviour (He was spoilt etc.)

14. Mother thought of smearing us with repellant

15. To discourage the dog from biting us

16. But he bit the postman

17. Mother was determined to love the dog (whatever his sins) OR What we had to do was to show him that he was loved and wanted

18. She had read a book on Child Psychology

19. And deciding that dogs and children had a lot in common, applied what she had read to the dog

20. We lived in an open farming area

21. Apart from the house next door

22. The nearest house was some distance away

23. Even so the neighbours came in for their fair share of bites

24. All day long we wandered around the house

25. Greased up like Red Indian Warriors

26. That afternoon

27. He has an inferiority complex

28. He bit people to compensate for it

29. To demonstrate this she threw her arms around his neck

30. And gave him a big kiss

31. He responded by nearly biting off her ear

32. Her left ear

33. Which had been empty

34. For the past 5 years

35. A quarter of a mile away

36. And their children
<table>
<thead>
<tr>
<th>Gist</th>
<th>Details</th>
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<tbody>
<tr>
<td>24. It was only the kindness of these people.</td>
<td></td>
</tr>
<tr>
<td>25. And the cash Mother (we) paid per bite</td>
<td>37. Cold</td>
</tr>
<tr>
<td>26. That the dog was never reported to the police</td>
<td></td>
</tr>
<tr>
<td>27. In fact, one neighbour sent one of his children up to be bitten whenever he was short of cash</td>
<td>38. Sammy Griffiths</td>
</tr>
<tr>
<td>28. Mother made the dog feel wanted to the neglect of the family</td>
<td>39. Who lived on the child endowment</td>
</tr>
<tr>
<td></td>
<td>40. From his 11 children</td>
</tr>
<tr>
<td></td>
<td>41. And drank methylated spirits</td>
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<tr>
<td></td>
<td>42. She gave him the run of the house</td>
</tr>
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<td></td>
<td>43. And found him trying to get at her young son in his cot</td>
</tr>
<tr>
<td></td>
<td>44. Young Jimmy</td>
</tr>
<tr>
<td></td>
<td>45. She doubled his food rations</td>
</tr>
<tr>
<td></td>
<td>46. Which only increased his appetite for human flesh</td>
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<tr>
<td></td>
<td>47. She let him sleep on top of her bed</td>
</tr>
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<td></td>
<td>48. And Dad moved onto the downstairs sofa</td>
</tr>
<tr>
<td>29. Dad came in and told us (we found out) the house next door had been bought (sold)</td>
<td>49. Speechless with horror</td>
</tr>
<tr>
<td>30. We were alarmed</td>
<td>50. Retired school mistress</td>
</tr>
<tr>
<td>31. Its buyer was an elderly school mistress (lady)</td>
<td></td>
</tr>
<tr>
<td>32. So far all the dog's victims had been sturdy country people</td>
<td>51. Farmers or their children</td>
</tr>
<tr>
<td>33. An elderly lady was a different matter</td>
<td>52. Who could be bribed or cajoled into not taking action</td>
</tr>
<tr>
<td>34. At first we kept the dog in the backyard (away from her etc.)</td>
<td></td>
</tr>
<tr>
<td>35. Eventually mother (we) invited the school teacher (elderly lady) in</td>
<td></td>
</tr>
<tr>
<td>36. The dog was locked up in the shed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>53. Spinster</td>
</tr>
<tr>
<td></td>
<td>54. Miss Hayman</td>
</tr>
<tr>
<td></td>
<td>55. Arrived about a month later</td>
</tr>
<tr>
<td></td>
<td>56. For two weeks</td>
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<tr>
<td></td>
<td>57. After much indecision</td>
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<tr>
<td></td>
<td>58. And with grave foreboding</td>
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<tr>
<td></td>
<td>59. For afternoon tea</td>
</tr>
<tr>
<td></td>
<td>60. For the first time in his life</td>
</tr>
<tr>
<td></td>
<td>61. Against Mother's better feelings</td>
</tr>
<tr>
<td></td>
<td>62. With a good supply of meat and water</td>
</tr>
</tbody>
</table>
The school mistress turned out to be thin and frail (or anything that suggests vulnerability)

Still all went well until she asked if we had any pets

Yes a dog (Mother said)

The school mistress said she loved dogs and asked to see him

Dad (we) reluctantly brought the dog in

The school mistress called the dog over to her

And patted him

He lay at her feet

The whole family was relieved (held their breaths)

Before we could do a thing about it, he bit her

She sipped her tea delicately

She talked softly of her experiences in schools

She was like a timid bird

That has a broken wing

And therefore must endure human contact

Absently (without thinking)

Mother said doubtfully that he was in the shed

She said she once had a dog

A Pekinese

Called Pansy

Dad shot a dark look at Mother

Holding the dog on as short a lead as he dared

The school mistress said what a big dog

And asked his name

Dad kept the dog as near to the door as he could

The dog growled

She said Hello

The dog approached warily

There's a good doggie

On the head

She gently stroked him behind the ear

I do love..Oh! OR She let out a cry.

On the ankle

A vice-like grip
<table>
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<tr>
<th><strong>Gist</strong></th>
<th><strong>Details</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>47. She yelled at him (spoke sternly)</td>
<td>87. Wicked dog</td>
</tr>
<tr>
<td>48. And hit him</td>
<td>88. Box on the ear</td>
</tr>
<tr>
<td>49. The dog yelped in surprise and went to the corner</td>
<td>89. Much to Mother's horror</td>
</tr>
<tr>
<td></td>
<td>90. With his tail between his legs</td>
</tr>
<tr>
<td></td>
<td>91. And with a puzzled look on his face</td>
</tr>
<tr>
<td>50. He tried to come towards the school mistress again</td>
<td>92. Tentatively advanced</td>
</tr>
<tr>
<td>51. But the stern (threatening) look in her eye told him not to</td>
<td>93. His last taste of human blood</td>
</tr>
<tr>
<td>52. That was the last time the dog bit anyone</td>
<td>94. Tamed hundreds.</td>
</tr>
<tr>
<td>53. The method (discipline) that worked on school children worked on the dog too</td>
<td></td>
</tr>
<tr>
<td>54. We decided Mother must have read the wrong psychology book.</td>
<td></td>
</tr>
</tbody>
</table>
## Gist

1. Australia and Pakistan have friendly sporting ties.

2. What ought to bring them closer together would be

3. An awareness of the contribution camel drivers from Pakistan played in the development of the Australian outback.

4. Very few people from Australia or Pakistan know about this.

5. Cameleers were called Afghans or Ghans

6. But very few came from Afghanistan

7. They actually came from what is now Pakistan.

8. The first group of cameleers were brought in to provide transport to explore the desert.

9. In the following years, the Ghans (cameleers and their camels were in great demand

## Details

1. rivalry
2. cricket
3. hockey
4. squash
5. historic role
6. opening up
7. second half of the nineteenth century
8. early migrants
9. from South Asian Sub-Continent
10. simple
11. hardy
12. hard working
13. Pushtun stock
14. North West Frontier (province)
15. Baluchistan (province)
16. of British India
17. Victoria
18. 1860
19. private enterprise
20. Burke & Wills Expedition
21. decades
Gist

10. Cameleers/camels provided transport in far flung areas (OR in areas where there were no roads and no transport).

11. The contribution of the cameleers/Ghans has been most valuable in a number of major projects.

12. A train was named after the cameleers as a tribute to their service.

Details

22. efficient
23. reliable
24. carrying ore
25. from the mines
26. carting machinery
27. from the dock yards
28. transporting heavy merchandise
29. erection of the border fence
30. in Queensland
31. overland telegraph lines
32. between Adelaide and Darwin
33. laying railway lines
34. between Port Augusta and Kalgoolie
35. construction of a stock route
36. the Canning Stock Route
37. in Western Australia
38. known affectionately as the Ghan
39. which runs between Adelaide and Alice Springs.
## Documentary Film

### The Battle over Mt. Etna

<table>
<thead>
<tr>
<th>Gist</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. There has been a battle going on over a mountain.</td>
<td>1. Central Queensland</td>
</tr>
<tr>
<td>2. The mountain is Mt.Etna in Queensland.</td>
<td>2. 40 kms</td>
</tr>
<tr>
<td>3. The battle is between conservationists and a cement company.</td>
<td>3. north of Rockhampton</td>
</tr>
<tr>
<td>4. The cement company operates a mine (quarry) on the mountain.</td>
<td>4. last week</td>
</tr>
<tr>
<td>5. The conservationists have hidden people in the caves to try to stop the blasting.</td>
<td>5. two caves</td>
</tr>
<tr>
<td>6. Mt. Etna (or the mountain) is composed of limestone.</td>
<td>6. three (people)</td>
</tr>
<tr>
<td>7. The limestone is used for making cement.</td>
<td>7. with a supply of food</td>
</tr>
<tr>
<td>8. Mt Etna (the mountain) has many (limestone) caves.</td>
<td>8. gets its name from a volcano</td>
</tr>
<tr>
<td>9. Some caves have already been destroyed (or damaged) by mining.</td>
<td>9. in Sicily</td>
</tr>
<tr>
<td></td>
<td>10. which has a similar cone shape</td>
</tr>
<tr>
<td></td>
<td>11. the mountain became a quarry</td>
</tr>
<tr>
<td></td>
<td>12. 22 years ago</td>
</tr>
<tr>
<td></td>
<td>13. one side of the mountain is being slowly eaten away</td>
</tr>
<tr>
<td></td>
<td>14. honeycombed (with caves)</td>
</tr>
<tr>
<td></td>
<td>15. 46 (caves)</td>
</tr>
<tr>
<td></td>
<td>16. the Crystal Palace</td>
</tr>
<tr>
<td></td>
<td>17. 5 years ago</td>
</tr>
<tr>
<td></td>
<td>18. only photographs remain</td>
</tr>
<tr>
<td></td>
<td>19. only memories remain</td>
</tr>
<tr>
<td>Gist</td>
<td>Details</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10. One cave is where many bats rear their young.</td>
<td>20. Resurrection Cave</td>
</tr>
<tr>
<td>11. A large number of one type of bat were born (live) in this cave</td>
<td>21. One of the best</td>
</tr>
<tr>
<td>12. Mt Etna (the mountain) is also home to a rare bat.</td>
<td>22. in one of its best chambers</td>
</tr>
<tr>
<td>13. The government has forced the mining company to surrender part</td>
<td>23. a formation - a stalactite</td>
</tr>
<tr>
<td>14. Conservationists say this is not enough (or we as a sophisticated</td>
<td>24. about 30 ft long</td>
</tr>
<tr>
<td>society can do better than this).</td>
<td>25. broke off the ceiling</td>
</tr>
<tr>
<td></td>
<td>26. and speared into the floor</td>
</tr>
<tr>
<td></td>
<td>27. Bat Cleft</td>
</tr>
<tr>
<td></td>
<td>28. unique</td>
</tr>
<tr>
<td></td>
<td>29. it's warm</td>
</tr>
<tr>
<td></td>
<td>30. every summer</td>
</tr>
<tr>
<td></td>
<td>31. over 80%</td>
</tr>
<tr>
<td></td>
<td>32. Little Bent Wing Bats</td>
</tr>
<tr>
<td></td>
<td>33. in Australia</td>
</tr>
<tr>
<td></td>
<td>34. Ghost Bat</td>
</tr>
<tr>
<td></td>
<td>35. only 3000</td>
</tr>
<tr>
<td></td>
<td>36. in Australia</td>
</tr>
<tr>
<td></td>
<td>37. 150 (live at Mt. Etna)</td>
</tr>
<tr>
<td></td>
<td>38. Central Queensland Cement (Mining)</td>
</tr>
<tr>
<td></td>
<td>39. 22 year lease (or the lease)</td>
</tr>
<tr>
<td></td>
<td>40. state (government) OR Premier Ahern (pictured)</td>
</tr>
<tr>
<td></td>
<td>41. for the area around Bat Cleft (or the cave where the bats breed)</td>
</tr>
<tr>
<td></td>
<td>42. Dr. Bob Brown (pictured)</td>
</tr>
<tr>
<td></td>
<td>43. it's outrageous</td>
</tr>
<tr>
<td></td>
<td>44. one of the most magnificently decorated caves</td>
</tr>
<tr>
<td></td>
<td>45. on this planet</td>
</tr>
<tr>
<td></td>
<td>46. pulverized by bulldozers</td>
</tr>
<tr>
<td></td>
<td>47. to make cement floors</td>
</tr>
<tr>
<td></td>
<td>48. for office buildings</td>
</tr>
</tbody>
</table>
Gist
15. The whole mountain needs to be protected (or the mountain could be declared a National Park).

16. The mining company says that stopping mining would cost jobs.

17. Conservationists say the company could get its limestone from somewhere else.

Details
49. 130 jobs

50. from other deposits in the area
APPENDIX D
Wechsler Memory Scale

Anna Thompson
(IF Scores in brackets)

Gist

1. A woman (1.00)
2. reported (0.64)
3. to Police (0.69)
4. that she had been held up (0.22)
5. and robbed (0.83)
6. She had children (0.97)
7. the rent was due (0.60)
8. they had not eaten (0.49)
9. the policemen took up a collection for her (0.92)

Details

1. Anna (0.53)
2. Thompson (0.39)
3. of East (0.64)
4. Sydney (0.64)
5. employed (0.47)
6. as a cleaner (0.56)
7. in an office building (0.25)
8. Police Headquarters (0.09)
9. on High St. (0.25)
10. the night before (0.25)
11. of $15 (0.50)
12. four (0.44)
13. little (0.31)
14. for two days (0.33)
15. touched (0.75)
16. by the woman's story (0.42)
**Wechsler Memory Scale**

**The American Liner**  
(IF Scores in brackets)

<table>
<thead>
<tr>
<th>Gist</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The liner or a ship/boat (1.00)</td>
<td>1. American (0.67)</td>
</tr>
<tr>
<td></td>
<td>2. New York (0.78)</td>
</tr>
<tr>
<td>2. struck/ hit something. (0.83)</td>
<td>3. a mine (0.36)</td>
</tr>
<tr>
<td></td>
<td>4. near Liverpool (0.33)</td>
</tr>
<tr>
<td></td>
<td>5. Monday (0.11)</td>
</tr>
<tr>
<td></td>
<td>6. evening (0.08)</td>
</tr>
<tr>
<td>3. The weather was bad. (0.50)</td>
<td>7. blinding (0.03)</td>
</tr>
<tr>
<td></td>
<td>8. snowstorm (0.39)</td>
</tr>
<tr>
<td></td>
<td>9. darkness (0.19)</td>
</tr>
<tr>
<td>4. The passengers (0.72)</td>
<td>10. 60 (passengers) (0.33)</td>
</tr>
<tr>
<td></td>
<td>11. including 18 (0.58)</td>
</tr>
<tr>
<td></td>
<td>12. women (0.61)</td>
</tr>
<tr>
<td>5. were all rescued. (0.78)</td>
<td>13. though the boats (0.42)</td>
</tr>
<tr>
<td></td>
<td>14. were tossed about (0.42)</td>
</tr>
<tr>
<td></td>
<td>15. like corks (0.31)</td>
</tr>
<tr>
<td></td>
<td>16. in the heavy sea (0.22)</td>
</tr>
<tr>
<td>6. They were brought into port (0.32)</td>
<td>17. the next day (0.25)</td>
</tr>
<tr>
<td>7. by a another ship. (0.33)</td>
<td>18. British (0.31)</td>
</tr>
<tr>
<td></td>
<td>19. steamer (0.22)</td>
</tr>
</tbody>
</table>
# Short Story

**Our Dog Montie**

(If Scores in brackets)

## Gist
1. We bought the dog when he was just a pup (0.92)
2. Part Labrador (0.97)
3. And several parts something else (0.81)
4. It was the part Labrador that decided us (0.75)
5. Because they never bite (0.75)
6. We never found out what the parts something else were (0.56)
7. But they certainly made up for the part Labrador. (0.28)
8. The dog bit people. (1.00)
9. We didn't take much notice at first because he was small (only a pup) (0.64)
10. But he grew into a very large dog (0.67)
11. The dog would never bite more than one person per day. (0.83)
12. But he always made sure of getting that one person (0.44)

## Details
1. Montie (0.97)
2. The salesman said (0.19)
3. Mother said (0.56)
4. They are the most gentle dogs alive (0.39)
5. Just getting used to his teeth (0.47)
6. Dad would say (0.33)
7. Besides a bite from that tiny thing would hurt anybody (0.39)
8. Within six months (0.25)
9. The dog was as big as a Shetland pony (0.47)
10. My sister's (0.44)
11. The local chemist was making a fortune (0.22)
12. From the bandages and antiseptics we bought (0.22)
13. He might bite someone early in the morning (0.58)
14. In which case, the rest of the family could walk in safety for the remainder of the day (0.64)
15. He might wait until evening (0.64)
16. When as soon as he entered the sitting room (0.47)
17. Those members of the family who thought it was their turn to be bitten (0.61)
18. Would go to bed (0.53)
<table>
<thead>
<tr>
<th>Gist</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. No one ever tried to punish the dog for his misbehaviour (He was spoilt etc.) (1.00)</td>
<td>19. Mother said it would only build up resentment inside him (0.03)</td>
</tr>
<tr>
<td>14. Mother thought of smearing us with repellant (0.33)</td>
<td>20. Besides you couldn't get near enough to him (0.06)</td>
</tr>
<tr>
<td>15. To discourage the dog from biting us (0.33)</td>
<td>21. And cutting down his food would have been done at great personal risk (0.06)</td>
</tr>
<tr>
<td>16. But he bit the postman (0.44)</td>
<td>22. Bitter tasting (0.11)</td>
</tr>
<tr>
<td>17. Mother was determined to love the dog (whatever his sins) OR What we had to do was to show him that he was loved and wanted (0.97)</td>
<td>23. Insect repellant (0.28)</td>
</tr>
<tr>
<td>18. She had read a book on Child Psychology (0.97)</td>
<td>24. All day long we wandered around the house (0.06)</td>
</tr>
<tr>
<td>19. And deciding that dogs and children had alot in common, applied what she had read to the dog (0.39)</td>
<td>25. Greased up like Red Indian Warriors (0.03)</td>
</tr>
<tr>
<td>20. We lived in an open farming area (0.50)</td>
<td>26. That afternoon (0.00)</td>
</tr>
<tr>
<td>21. Apart from the house next door (0.69)</td>
<td>27. He has an inferiority complex (0.61)</td>
</tr>
<tr>
<td>22. The nearest house was some distance away (0.67)</td>
<td>28. He bit people to compensate for it (0.14)</td>
</tr>
<tr>
<td>23. Even so the neighbours came in for their fair share of bites (0.50)</td>
<td>29. To demonstrate this she threw her arms around his neck (0.56)</td>
</tr>
<tr>
<td></td>
<td>30. And gave him a big kiss (0.28)</td>
</tr>
<tr>
<td></td>
<td>31. He responded by nearly biting off her ear (0.47)</td>
</tr>
<tr>
<td></td>
<td>32. Her left ear (0.08)</td>
</tr>
<tr>
<td></td>
<td>33. Which had been empty (0.64)</td>
</tr>
<tr>
<td></td>
<td>34. For the past 5 years (0.31)</td>
</tr>
<tr>
<td></td>
<td>35. A quarter of a mile away (0.25)</td>
</tr>
<tr>
<td></td>
<td>36. And their children (0.22)</td>
</tr>
</tbody>
</table>
### Gist

<table>
<thead>
<tr>
<th>24.</th>
<th>It was only the kindness of these people. (0.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.</td>
<td>And the cash Mother (we) paid per bite (0.83)</td>
</tr>
<tr>
<td>26.</td>
<td>That the dog was never reported to the police (0.81)</td>
</tr>
<tr>
<td>27.</td>
<td>In fact, one neighbour sent one of his children up to be bitten whenever he was short of cash (0.72)</td>
</tr>
<tr>
<td>28.</td>
<td>Mother made the dog feel wanted to the neglect of the family (0.42)</td>
</tr>
<tr>
<td>29.</td>
<td>Dad came in and told us (we found out) the house next door had been bought (sold) (1.00)</td>
</tr>
<tr>
<td>30.</td>
<td>We were alarmed (0.75)</td>
</tr>
<tr>
<td>31.</td>
<td>Its buyer was an elderly school mistress (lady) (0.89)</td>
</tr>
<tr>
<td>32.</td>
<td>So far all the dog’s victims had been sturdy country people (0.56)</td>
</tr>
<tr>
<td>33.</td>
<td>An elderly lady was a different matter (0.44)</td>
</tr>
<tr>
<td>34.</td>
<td>At first we kept the dog in the backyard (away from her etc.) (0.56)</td>
</tr>
<tr>
<td>35.</td>
<td>Eventually mother (we) invited the school teacher (elderly lady) in (0.92)</td>
</tr>
<tr>
<td>36.</td>
<td>The dog was locked up in the shed (0.89)</td>
</tr>
</tbody>
</table>

### Details

<table>
<thead>
<tr>
<th>37.</th>
<th>Cold (0.06)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.</td>
<td>Sammy Griffiths (0.03)</td>
</tr>
<tr>
<td>39.</td>
<td>Who lived on the child endowment (0.36)</td>
</tr>
<tr>
<td>40.</td>
<td>From his 11 children (0.31)</td>
</tr>
<tr>
<td>41.</td>
<td>And drank methylated spirits (0.44)</td>
</tr>
<tr>
<td>42.</td>
<td>She gave him the run of the house (0.53)</td>
</tr>
<tr>
<td>43.</td>
<td>And found him trying to get at her young son in his cot (0.14)</td>
</tr>
<tr>
<td>44.</td>
<td>Young Jimmy (0.14)</td>
</tr>
<tr>
<td>45.</td>
<td>She doubled his food rations (0.55)</td>
</tr>
<tr>
<td>46.</td>
<td>Which only increased his appetite for human flesh (0.31)</td>
</tr>
<tr>
<td>47.</td>
<td>She let him sleep on top of her bed (0.58)</td>
</tr>
<tr>
<td>48.</td>
<td>And Dad moved onto the downstairs sofa (0.47)</td>
</tr>
<tr>
<td>49.</td>
<td>Speechless with horror (0.08)</td>
</tr>
<tr>
<td>50.</td>
<td>Retired school mistress (0.78)</td>
</tr>
<tr>
<td>51.</td>
<td>Farmers or their children (0.19)</td>
</tr>
<tr>
<td>52.</td>
<td>Who could be bribed or cajoled into not taking action (0.00)</td>
</tr>
<tr>
<td>53.</td>
<td>Spinster (0.31)</td>
</tr>
<tr>
<td>54.</td>
<td>Miss Hayman (0.14)</td>
</tr>
<tr>
<td>55.</td>
<td>Arrived about a month later (0.06)</td>
</tr>
<tr>
<td>56.</td>
<td>For two weeks (0.17)</td>
</tr>
<tr>
<td>57.</td>
<td>After much indecision (0.03)</td>
</tr>
<tr>
<td>58.</td>
<td>And with grave foreboding (0.06)</td>
</tr>
<tr>
<td>59.</td>
<td>For afternoon tea (0.81)</td>
</tr>
<tr>
<td>60.</td>
<td>For the first time in his life (0.08)</td>
</tr>
<tr>
<td>61.</td>
<td>Against Mother’s better feelings (0.00)</td>
</tr>
<tr>
<td>62.</td>
<td>With a good supply of meat and water (0.81)</td>
</tr>
</tbody>
</table>
37. The school mistress turned out to be thin and frail (or anything that suggests vulnerability) (0.72)

38. Still all went well until she asked if we had any pets (1.00)

39. Yes a dog (Mother said) (1.00)

40. The school mistress said she (1.00)

41. Dad (we) reluctantly brought the dog in (1.00)

42. The school mistress called the dog over to her (0.53)

43. And patted him (0.89)

44. He lay at her feet (0.72)

45. The whole family was relieved (held their breaths) (0.53)

46. Before we could do a thing about it, he bit her (0.97)

63. She sipped her tea delicately (0.25)

64. She talked softly of her experiences in schools (0.22)

65. She was like a timid bird (0.25)

66. That has a broken wing (0.17)

67. And therefore must endure human contact (0.17)

68. Absently (without thinking) (0.14)

69. Mother said doubtfully that he was in the shed (0.33)

70. She said she once had a dog (0.17)

71. A Pekinese (0.22)

72. Called Pansy (0.05)

73. Dad shot a dark look at Mother (0.28)

74. Holding the dog on as short a lead as he dared (0.81)

75. The school mistress said what a big dog (0.08)

76. And asked his name (0.28)

77. Dad kept the dog as near to the door as he could (0.17)

78. The dog growled (0.03)

79. She said Hello (0.17)

80. The dog approached warily (0.08)

81. There's a good doggie (0.14)

82. On the head (0.56)

83. She gently stroked him behind the ear (0.39)

84. I do love...Oh! OR She let out a cry. (0.56)

85. On the ankle (0.94)

86. A vice-like grip (0.61)
Gist
47. She yelled at him (spoke sternly) (0.28)
48. And hit him (1.00)
49. The dog yelped in surprise and went to the corner (0.78)
50. He tried to come towards the school mistress again (0.47)
51. But the stern (threatening) look in her eye told him not to (0.47)
52. That was the last time the dog bit anyone (1.00)
53. The method (discipline) that worked on school children worked on the dog too (0.89)
54. We decided Mother must have read the wrong psychology book (0.61)

Details
87. Wicked dog (0.08)
88. Box on the ear (0.81)
89. Much to Mother's horror (0.14)
90. With his tail between his legs (0.22)
91. And with a puzzled look on his face (0.14)
92. Tentatively advanced (0.02)
93. His last taste of human blood (0.53)
94. Tamed hundreds (0.31)
Newspaper Article
The camel drivers' historic role
(IF Scores in brackets)

Gist

1. Australia and Pakistan have friendly sporting ties. (0.86)
2. What ought to bring them closer together would be (0.56)
3. An awareness of the contribution camel drivers from Pakistan played in the development of the Australian outback. (0.94)
4. Very few people from Australia or Pakistan know about this. (0.81)
5. Cameleers were called Afghans or Ghans (0.94)
6. But very few came from Afghanistan (0.97)
7. They actually came from what is now Pakistan. (0.97)
8. The first group of cameleers were brought in to provide transport to explore the desert. (0.97)
9. In the following years, the Ghans (cameleers and their camels were in great demand (0.92)

Details

1. rivalry (0.17)
2. cricket (0.67)
3. hockey (0.44)
4. squash (0.33)
5. historic role (0.19)
6. opening up (0.25)
7. second half of the nineteenth century (0.31)
8. early migrants (0.00)
9. from South Asian Sub-Continent (0.20)
10. simple (0.00)
11. hardy (0.00)
12. hard working (0.00)
13. Pushtun stock (0.31)
14. North West Frontier (province) (0.06)
15. Baluchistan (province) (0.08)
16. of British India (0.22)
17. Victoria (0.11)
18. 1860 (0.47)
19. private enterprise (0.31)
20. Burke & Wills Expedition (0.58)
21. decades (0.03)
10. Cameleers/camels provided transport in far flung areas (OR in areas where there were no roads and no transport). (1.00)

11. The contribution of the cameleers/Ghans has been most valuable in a number of major projects. (0.97)

12. A train was named after the cameleers as a tribute to their service. (0.85)

Details

22. efficient (0.06)
23. reliable (0.06)
24. carrying ore (0.25)
25. from the mines (0.39)
26. carting machinery (0.44)
27. from the dock yards (0.17)
28. transporting heavy merchandise (0.56)
29. erection of the border fence (0.50)
30. in Queensland (0.42)
31. overland telegraph lines (0.64)
32. between Adelaide (0.50)
33. and Darwin (0.47)
34. laying railway lines (0.50)
35. between Port Augusta (0.17)
36. and Kalgoolie (0.28)
37. construction of a stock route (0.00)
38. the Canning Stock Route (0.14)
39. in Western Australia (0.08)
40. known affectionately (0.31)
41. as the Ghan (0.78)
42. which runs between Adelaide (0.44)
43. and Alice Springs. (0.56)
The Battle over Mt. Etna
A documentary news report
(IF Scores in brackets)

Gist

1. There has been a battle going on over a mountain. (1.00)

2. The mountain is Mt. Etna in Queensland. (0.97)

3. The battle is between conservationists and a cement company. (1.00)

4. The cement company operates a mine (quarry) on the mountain. (1.00)

5. The conservationists have hidden people in the caves to try to stop the blasting. (0.39)

6. Mt. Etna (or the mountain) is composed of limestone. (1.00)

7. The limestone is used for making cement. (0.94)

8. Mt Etna (the mountain) has many (limestone) caves. (1.00)

9. Some caves have already been destroyed (or damaged) by mining. (0.86)

Details

1. Central Queensland (0.14)
2. 40 kms (0.33)
3. north of Rockhampton (0.75)
4. last week (0.00)
5. two caves (0.05)
6. three (people) (0.33)
7. with a supply of food (0.33)
8. gets its name from a volcano (0.42)
9. in Sicily (0.50)
10. which has a similar cone shape (0.47)
11. the mountain became a quarry (0.22)
12. 22 years ago (0.44)
13. one side of the mountain is being slowly eaten away (0.31)
14. honeycombed (with caves) (0.22)
15. 46 (caves) (0.14)
16. the Crystal Palace (0.22)
17. 5 years ago (0.08)
18. only photographs remain (0.08)
19. only memories remain (0.02)
10. One cave is where many bats rear their young. (0.86)

11. A large number of one type of bat were born (live) in this cave (on the mountain). (0.94)

12. Mt Etna (the mountain) is also home to a rare bat. (0.97)

13. The government has forced the mining company to surrender part of its lease. (0.53)

14. Conservationists say this is not enough (or we as a sophisticated society can do better than this). (0.64)

20. Resurrection Cave (0.17)
21. One of the best (0.03)
22. in one of its best chambers (0.00)
23. a formation - a stalactite (0.44)
24. about 30 ft long (0.00)
25. broke off the ceiling (0.25)
26. and speared into the floor (0.25)
27. Bat Cleft (0.19)
28. unique (0.22)
29. it's warm (0.61)
30. every summer (0.14)
31. over 80% (0.22)
32. Little Bent Wing Bats (0.42)
33. in Australia (0.17)
34. Ghost Bat (0.64)
35. only 3000 (0.36)
36. in Australia (0.44)
37. 150 (live at Mt. Etna) (0.31)
38. Central Queensland Cement (Mining) (0.02)
39. 22 year lease (or the lease) (0.36)
40. state (government) OR Premier Ahern (pictured) (0.33)
41. for the area around Bat Cleft (or the cave where the bats breed) (0.19)
42. Dr. Bob Brown (pictured) (0.36)
43. it's outrageous (0.14)
44. one of the most magnificently decorated caves (0.11)
45. on this planet (0.00)
46. pulverized by bulldozers (0.00)
47. to make cement floors (0.31)
48. for office buildings (0.25)
Gist
15. The whole mountain needs to be protected (or the mountain could be declared a National Park). (0.94)

16. The mining company says that stopping mining would cost jobs. (0.64)

17. Conservationists say the company could get its limestone from somewhere else. (0.78)

Details
49. 130 jobs (0.19)

50. from other deposits in the area (0.39)
APPENDIX E
The most memorable items  
Wechsler Memory Scale

1. Anna Thompson

Most Memorable Gist
IF Scores 0.85 or greater

1. A woman 1.00

6. She had children 0.97

9. the policemen took up a collection for her. 0.92

Most Memorable Details
IF 0.75 or greater

15. touched 0.75

2. The American Liner

Most Memorable Gist
IF Scores 0.85 or greater

1. The liner or a ship/boat 1.00

Most Memorable Details
IF 0.75 or greater

2. New York 0.78
The most memorable items

Short Story

Our Dog Montie

Most Memorable Gist
IF Scores 0.85 or greater

(Items are numbered as in the text analysis and listed in order of presentation)

1. We bought the dog when he was just a pup
2. Part Labrador
8. The dog bit people.
13. No one ever tried to punish the dog for his misbehaviour (He was spoilt etc.)
17. Mother was determined to love the dog (whatever his sins) OR What we had to do was to show him that he was loved and wanted
18. She had read a book on Child Psychology
29. Dad came in and told us (we found out) the house next door had been bought (sold)
31. Its buyer was an elderly school mistress (lady)
35. Eventually mother (we) invited the school teacher (elderly lady) in
36. The dog was locked up in the shed
38. Still all went well until she asked if we had any pets
39. Yes a dog (Mother said)
40. The school mistress said she loved dogs and asked to see him
41. Dad (we) reluctantly brought the dog in
43. And patted him
Most Memorable gist (continued)  

46. Before we could do a thing about it, he bit her  
48. She hit him  
52. That was the last time the dog bit anyone  
53. The method (discipline) that worked on school children worked on the dog too  

Most Memorable Details  
IF Score 0.75 or greater  

1. Montie  
50. retired school mistress  
59. for afternoon tea  
62. with a good supply of meat and water  
74. holding the dog on as short a lead as he dared  
85. on the ankle  
88. box on the ear
The most memorable items

Newspaper article

The camel drivers' historic role

Most Memorable Gist
IF Scores 0.85 or greater

(Items are numbered as in the text analysis and listed in order of presentation)

1. Australia and Pakistan have friendly sporting ties. 0.86
2. What ought to bring them closer together 0.94
5. Cameleers were called Afghans or Ghans 0.94
6. But very few came from Afghanistan 0.97
7. They actually came from what is now Pakistan. 0.97
8. The first group of cameleers were brought in to provide transport to explore the desert. 0.97
9. In the following years, the Ghans (cameleers and their camels were in great demand 0.92
10. Cameleers/camels provided transport in far flung areas (OR in areas where there were no roads and no transport). 1.00
11. The contribution of the cameleers/Ghans has been most valuable in a number of major projects. 0.97
12. A train was named after the cameleers as a tribute to their service. 0.85

Most Memorable Details
IF Score 0.75 or greater

42. the Ghan (ie. the name of the trian) 0.78
The most memorable items

Documentary Film

The Battle over Mt Etna

Most Memorable Gist
IF Scores 0.85 or greater

(Items are numbered as in the text analysis and listed in order of presentation)

1. There has been a battle going on over a mountain. 1.00
2. The mountain is Mt. Etna in Queensland. 0.97
3. The battle is between conservationists and a cement company. 1.00
4. The cement company operates a mine (quarry) on the mountain. 1.00
6. Mt. Etna (or the mountain) is composed of limestone. 1.00
7. The limestone is used for making cement. 0.94
8. Mt Etna (the mountain) has many (limestone) caves. 1.00
9. Some caves have already been destroyed (or damaged) by mining. 0.86
10. One cave is where many bats rear their young. 0.86
11. A large number of one type of bat were born (live) in this cave (on the mountain). 0.94
12. Mt Etna (the mountain) is also home to a rare bat. 0.97
15. The whole mountain needs to be protected (or the mountain could be declared a National Park). 0.94

Most Memorable Details
IF Score 0.75 or greater

3. North of Rockhampton 0.75
APPENDIX P
High Gist/High Details
WMS Texts
Anna Thompson

High Gist (In order of presentation with item numbers preserved)
1. A woman
6. She had children

High Details (In order of presentation with item numbers preserved)
3. of East
4. Sydney
6. cleaner
16. touched

Low Gist/Low Details

Low Gist (In order of presentation with item numbers preserved)
4. that she had been held up
8. They had not eaten

Low Details
7. in an office building
8. Police Headquarters
9. on High Street
10. the night before
High Gist/High Details

WMS Texts
American liner

High Gist (In order of presentation with item numbers preserved)
1. The liner or a ship/boat
2. struck something

High Details (In order of presentation with item numbers preserved)
1. American
2. New York
11. including 18
12. women
13. though the boats
14. were tossed about

Low Gist/Low Details

Low Gist (In order of presentation with item numbers preserved)
6. They were brought into port
7. by another ship

Low Details
5. Monday
6. evening
7. blinding
9. darkness
16. in the heavy seas
19. steamer
High Gist/ High Details  
Short Story

High Gist (In order of presentation with item numbers preserved)
2. (ie. The dog, Montie, was) Part Labrador
8. The dog bit people.
13. No one ever tried to punish the dog for his misbehaviour (He was spoilt etc.)
17. Mother was determined to love the dog (whatever his sins) or What we had to do was to show him that he was loved and wanted
18. She had read a book on Child Psychology
29. Dad came in and told us (we found out) the house next door had been bought (sold)
38. Still all went well until she (ie. the elderly school mistress) asked if we had any pets
39. Yes a dog (Mother said)
40. The school mistress said she loved dogs and asked to see him
41. Dad (we) reluctantly brought the dog in
46. Before we could do a thing about it, he bit her
48. She (ie. the elderly school mistress) hit him
52. That was the last time the dog bit anyone

High Details (In order of presentation with item numbers preserved)
1. Montie
14. In which case, the rest of the family could walk in safety for the remainder of the day
15. Or he might wait until evening
17. Those members of the family who thought it was their turn to be bitten
27. He has an inferiority complex
33. Which had been empty
50. Retired school mistress
59. For afternoon tea
62. With a good supply of meat and water
74. Holding the dog on as short a lead
85. On the ankle
86. A vice-like grip
88. Box on the ear
Low Gist/ Low Details
Short Story

**Low Gist** (In order of presentation with item numbers preserved)
7. But they certainly made up or the part Labrador.
12. But he always made sure of getting that one person
14. Mother thought of smearing us with repellent
15. To discourage the dog from biting us
16. But he bit the postman
19. And deciding that dogs and children had a lot in common, applied what she had read to the dog
23. Even so the neighbours came in for their fair share of bites
24. It was only the kindness of these people.
28. Mother made the dog feel wanted to the neglect of the family
33. An elderly lady was a different matter
47. She yelled at him (spoke sternly)
50. He tried to come towards the school mistress again
51. But the stern (threatening) look in her eye told him not to

**Low Details** (In order of presentation with item numbers preserved)
20. Besides you couldn’t get near enough to him
21. And cutting down his food would have been done at great personal risk
22. Bitter tasting (*ie.* *Insect repellent*)
24. All day long we wandered around the house
32. Her left ear
37. Cold (*ie.* *cash*)
49. Speechless with horror
55. (*ie.* Miss Hayman) Arrived about a month later
58. And with grave foreboding
60. For the first time in his life
75. The school mistress said what a big dog
80. The dog approached warily
87. Wicked dog
High Gist (In order of presentation with item numbers preserved)

6. But very few came from Afghanistan
7. They actually came from what is now Pakistan
8. The first group of cameleers were brought in to provide transport to explore the desert
10. Cameleers/camels provided transport in far flung areas (OR in areas where there were no roads or transport.
11. The contribution of the cameleers/Ghans has been most valuable in a number of major projects.

High Details (In order of presentation with item numbers preserved)

2. cricket
18. 1860
20. Burke & Wills Expedition
28. transporting heavy merchandise
29. erection of the border fence
31. overland telegraph lines
32. between Adelaide
33. and Darwin
34. laying railway lines
41. (known) as the Ghan
43. and Alice Springs
Low Gist/Overview
Newspaper article

Low Gist (In order of presentation with item numbers preserved)

1. Australia and Pakistan have friendly sporting ties.
2. What ought to bring them closer together would be
4. Very few people from Australia or Pakistan know about this
9. In the following years, the Ghans (cameleers and their camels were in
great demand
12. a train was named after the cameleers as a tribute to their service

Low Details (In order of presentation with item numbers preserved)

8. early migrants
10. simple
11. hardy
12. hard working
14. North West Frontier (province)
15. Baluchistan (province)
21. decades
22. efficient
23. reliable
37. construction of a stock route
39. in Western Australia
High Gist/High Details

Documentary Film

**High Gist** (In order of presentation with item numbers preserved)

1. There has been a battle going on over a mountain.
3. The battle is between conservationists and a cement company.
4. The cement company operates a mine on the mountain.
6. Mt. Etna is composed of limestone.
8. Mt. Etna has many limestone caves.

**High Details** (In order of presentation with item numbers preserved)

3. north of Rockhampton
8. gets its name from a volcano
9. in Sicily
10. which has a similar cone shape
12. 22 years ago
23. a formation - a stalactite
29. It's warm
32. Little Bent Wing Bats
34. Ghost Bat
35. only 3000 (ie. Ghost Bats left)
36. in Australia (ie. referring to the Ghost Bats)
39. 22 year lease
42. Dr. Bob Brown
50. from other deposits in the area
Low Gist/Low Details

Documentary Film

Low Gist (In order of presentation with item numbers preserved)

5. The conservationists have hidden people in the caves
13. The government was forced to surrender part of its lease
14. Conservationists say this is not enough (or we as a sophisticated society can do better than this).
16. The mining company says that stopping mining would cost jobs.
17. Conservationists say the company could get its limestone from somewhere else.

Low Details (In order of presentation with item numbers preserved)

1. Central Queensland
4. last week
5. two caves
15. 46 caves
17. 5 years ago
18. only photographs remain
19. only memories remain
21. one of the best
22. in one of its best chambers
24. about 30 ft long
38. Central Queensland Cement
44. one of the most magnificently decorated caves
45. on this planet
46. pulverized by bulldozers