Cohesion and coherence in theory and reading research

Glenn Fulcher

The English Institute, Cyprus

ABSTRACT

What is the relationship between cohesion and coherence? Researchers in the field of Applied Linguistics have traditionally attempted to list and define the cohesive devices in English which provide the basis for coherent text. Schema theoreticians, on the other hand, have argued that coherence is primary, that readers look for coherence given their existing schemata and extra-linguistic knowledge of the world and only then do they recognise cohesion.

This paper looks at these two approaches in the light of the conflict which has grown up around the relationship between the concepts of cohesion and coherence and suggests that the positions taken are the result of a theoretically different starting point. If the researcher is primarily interested in linguistic analysis then s/he will begin with cohesion whereas, if human psychology in the reading process is the main focus then it will be more natural to look at coherence. However, it seems to be at least intuitively obvious that both the text itself and the reader have a part to play in the reading process, that reading is simultaneously data-driven and concept-driven.

It is suggested that these two approaches would benefit from being a part of a larger theory of the reading process. In this context the work of Ruqaiya Hasan is reviewed as the most thorough attempt to provide a theory of text which accounts for both cohesion and coherence. Secondly, data are presented which suggest that a theory which integrates cohesion and coherence is necessary. Two studies are reported: an informal classroom experiment on the influence of pronominal reference on comprehension and an analysis of the results of a test designed to examine the relationships between theoretical constructs hypothesised to constitute (at least part of) the superordinate term "reading comprehension".

RÉSUMÉ

Cohésion et cohérence: théorie et recherche en lecture

Quelle relation y-a-t'il entre cohésion et cohérence? Les chercheurs en linguistique appliquée essaient traditionnellement de faire la liste et de définir les structures de cohésion qui, en anglais, sont à la base d'un texte cohérent. Les théoriciens du schéma, d'autre part, soutiennent que la cohérence est première, que les lecteurs cherchent la cohérence du fait de leurs schémas et de leurs connaissances extra-linguistiques, et seulement alors reconnaissent la cohésion.

Ce texte considère ces deux approches à la lumière du conflit qui s'est développé autour de la relation entre les concepts de cohésion et de cohérence. Il suggère que les positions adoptées résultent d'un point de départ théorique différent. Si le chercheur est avant tout intéressé par l'analyse linguistique, il/elle part de la cohésion, alors que si son centre d'intérêt principal est la psychologie humaine dans le processus de lecture, il/elle s'oriente naturellement vers la cohérence. Il semble pourtant, au moins intuitivement, que tant le texte que le lecteur ont un rôle à jouer dans le processus de lecture, que la lecture est à la fois guidée par les données et par les idées.

Nous suggérons que ces deux approches auraient tout à gagner à faire partie d'une théorie plus large du processus de lecture. De ce point de vue le travail de Ruqaiya Hasan que nous examinons nous paraît être l'essai le plus complet de théorie du texte prenant en compte la cohésion et la cohérence. Nous présentons par ailleurs des données suggérant la nécessité d'une théorie qui intègre la cohésion et la cohérence. Nous présentons deux recherches: une expérience relative à l'effet des référents pronominaux sur la compréhension dans un context scolaire informel, et l'analyse des résultats d'un test réalisé dans le but d'examiner les relations entre les variables théoriques hypothétiques élaborées pour constituer, ne serait-ce que partiellement, le terme surordonné de 'compréhension en lecture'.

INTRODUCTION

For a number of years, research papers and teaching materials dealing with the role played by cohesion in the reading process have been produced at a startling rate (see Grellet, 1981, 45–47 for examples). Not all these studies argue that the teaching of cohesive devices will solve student reading problems alone — so called 'conceptual relationships' are also stressed — but the emphasis has been on cohesion (see, for example, Wishart, 1987, 30–31). This focus has had a major influence upon linguistics and EFL/ESL reading theory, and it is with this area of reading that this paper is primarily concerned, although there is clear relevance for first language reading also.

This focus on cohesion has led to a strong backlash from a number of writers (Morgan, 1978; Morgan & Sellner, 1980; Carrell, 1982), mainly against the work of Halliday and Hasan (1976), which was the first systematic description of cohesion in English. The debate betewen the two sides seems to have been frequently misunderstood, as it is assumed that the disagreements will ultimately be solved by convincing

empirical research from one side or the other. This paper sets out to do two things only:

1. To show that the disagreement is fundamentally theoretical, not empirical, and
2. To present evidence to suggest that it is not necessary to choose one theory or the other, as both would benefit from being an integral part of a larger theory of reading comprehension.

Theoretical Considerations

Halliday and Hasan have been severely criticised for arguing that cohesion is the basis of coherence in text. For the purposes of the critics, 'texture' is taken to mean 'coherence' (Carrell, 1982, 481). Passages such as this are singled out for severe criticism:

> "What we are investigating in this book are the resources that English has for creating texture. If a passage of English containing more than one sentence is perceived as a text, there will be certain linguistic features present in that passage which can be identified as contributing to its total unity and giving it texture." (Halliday & Hasan, 1976, 2)

What angers the critics is not the suggestion that cohesion exists in texts, or that it may be *related* to coherence, but that Halliday and Hasan suggest that cohesion is the basis for coherence. For example, they state that

> ". . . cohesive ties between sentences stand out more clearly because they are the ONLY source of texture . . ." (ibid., 9)

Brown and Yule draw an important distinction with regard to the work of Halliday and Hasan:

> "This is the distinction between the 'meaning relations' which hold between items in a text and the explicit expression of those 'meaning relations' within a text." (Brown & Yule, 1983, 195)

In other words, do 'meaning relations' have to be explicit for there to be cohesion — and therefore coherence? Brown and Yule, along with Nuttall (1982, 15–17), fall back on the example provided by Widdowson (1978, 29) in order to tackle this issue:

A: That's the telephone
B: I'm in the bath
A: O.K.

This, they claim, demonstrates the existence of coherence without cohesion — although it is a spoken text dealing with coherence across turn boundaries. But the underlying notion which has been appealed to in choosing this example is Widdowson's view that coherence resides in discourse which is interactive, while cohesion resides in text, which is static (see also Widdowson, 1977). As such, the reference is

unfortunate on two counts: since 1978/9 Widdowson has been moving away from this position (Hoey, 1983a), and also Halliday and Hasan acknowledge that ". . . texture involves more than the semantic relations of the kind we call cohesive. . . . It involves also some degree of coherence in the actual meanings expressed." This involves the concepts of 'register' and 'context'. 'Texture' is not an 'all or nothing' thing, and as human beings

> ". . . we insist on interpreting any passage as text if there is the remotest possibility of doing so." (Halliday & Hasan, 1976, 23)

This allows Halliday and Hasan to explain such examples 'contextually' if they so wish. Carrell (1982, 481) notes this, but calmly rejects it as not being of central focus.

However, Carrell, drawing heavily on Morgan and Sellner (1980) attacks *her view* of Halliday and Hasan's work from the position of schema theoretical views of language comprehension. This is the key to the problem. Nuttall, although not really aware of the problem involved, provides an excellent example of the issue at stake here (Nuttall, 1982, 17):

> "When the male meets the female in the mating season, the two intertwine. The process looks rather laborious but at least it is not dangerous. Millipedes are entirely vegetarian." (from D. Attenborough, Life on Earth, Collins/BBC, 1979)

In order to understand this text, in which cohesion is lost between sentences 1/2 and 3, it is necessary to have a mental schematic picture of the female eating the male after mating in some species. Only when coherence is achieved can we see cohesive links.

Thus Carrell (1982, 482) says that

> "Schema theory maintains that processing a text is an interactive process between the text and the prior background knowledge or memory schemata of the listener or reader."

For schema theorists, the coherence of a text comes first, and cohesion is a 'linguistic consequence'. Indeed, it is only because of such schemata that we know what cohesion is when we read: we *assume* coherence and so make sense of cohesion. This draws on work done generally on 'Top-Down' or 'concept-driven' theories of reading (Carrell, 1983a, 1983b, 1984; Rumelhart, 1977, 1984). By *implication*, Halladay and Hasan are being 'placed' into the 'Bottom-Up' or 'data-driven' camp. (For a complete discussion of various models of reading, see de Beaugrande's review, 1981). The theoretical issue, with all this associated conceptual baggage amounts to: is cohesion the basis for coherence or is coherence the basis for cohesion?

Brown and Yule thought that the position of Halliday and Hasan was essentially 'ambivalent' (Brown & Yule, 1983, 195), but Hasan has now clearly stated that she believes cohesion to be the foundation of coherence (Hasan, 1984, 181), but also acknowledges that coherence "stands in some relation to some state of affairs in

the extralinguistic universe." She lays bare the fundamental assumption of her approach — that there is a systematic relationship between function and form, in which all context is relevant. A fairly long quotation will make this clear:

> "I believe that the act of meaning is made possible only through the creation and existence of codes which provide the potential for meaning; and that in a very important sense, we are able to mean through language, by virtue of the fact that the signs of language have meanings quite irrespective of what any one individual might contrive to mean by them on an individual occasion. . . . When I say that coherence in a text is the property of hanging together, I mean that the patterns of language manifest — or realize — the existence of semantic bonds, because it is in their nature to do so, not simply because someone is making them do so." (Hasan, 1984, 182–183)

For Hasan, coherence is a feature of language theoretically justified by her functional approach to the relationship between function and form. For Carrell and other schema theoreticians it stems from the individual's background knowledge — the psychological constructs which enable comprehension. Here, there is an apparent impasse. But this may not be so if we see that the two sides are essentially *doing* different things. Halliday and Hasan are essentially concerned with describing the language system, while Carrell and other schema theoreticians are primarily interested in human psychology and the reading process. They are approaching a common interest from, as it were, the opposite ends of the problem.

It would, however, appear that Carrell has seriously misinterpreted the key notion of 'texture' in the work of Hasan, and it is worth trying to set out and interpret this here, according to Hasan's most recent formulations (Hasan, 1984, 1985a). Texture exists because of 'meaning relationships' which are realized by the lexical and grammatical patterns in text, and all these patterns are, by definition, cohesive ties. However, Hasan (1985a, 94) asserts that

> ". . . cohesion is the foundation on which the edifice of coherence is built. Like all foundations, it is necessary but not sufficient by itself."

Cohesion, at its most general level, could be presented as in figure 1.

Figure 1. Endophoric and exophoric cohesion.
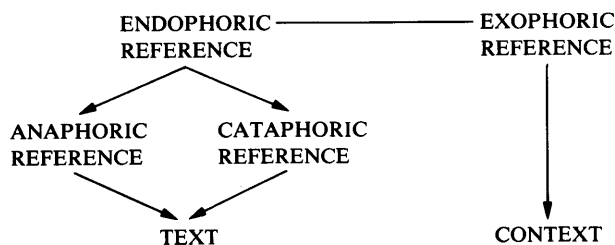
Exophoric reference from text to context — the world outside the text itself — provides the extra conditions needed to make a text meaningful (Hasan, 1984,

181–182). This may take a form such as the use of the definite article or a proper noun (linguistic exophora), the activation of background knowledge systems in interpretation by individual or clusters of lexical items (schematic exophora), or the register of the text which activates schemata conditioned by the text's relationship with other texts (schemata of intertextuality) (see Halliday, 1979, 137 & 141 on text type and social environment in the formation of coherence). This should be of great interest to schema theoreticians rather than being a point of attack, as linguistics is "essentially a quest for meaning" and not merely concerned with lexico-grammar (Hasan, 1985b, 105). In reply to her critics, Hasan (1985a, 78) says that

> "Whenever scholars have attempted to prove that it is possible to have texts without cohesion in order to demonstrate their point they have normally created what I would describe as 'minimal texts' consisting of either a single message by one participant, or one message per participant."

Such texts, she points out, are not typical and often have to be specially constructed for the purpose of exemplification. When working with real texts it is considerably more difficult to find appropriate examples. Cohesion is clearly a necessary condition of textuality in real language use.

Given that exophoric reference is a part of the notion of cohesion, connected with context of situation and register, Hasan can go on to place endophoric cohesive ties into three categories, which may again be subcategorized:

Co-referentiality: referring devices such as the pronominal system.

Co-classification: grammatical devices, such as elipsis.

Co-extension: lexical cohesion in the form of synonymy, hyponomy, antonymy, meronymy and repetition.

These cohesive devices allow the formation of what Hasan calls 'Cohesive Chains', and it is on this notion that endophoric coherence is based, and without which there could be no exophoric coherence. There are two types of chain, each constituted by categories of cohesive ties, as represented in figure 2.

Figure 2. Types of cohesive chains.

	IDENTITY CHAINS	SIMILARITY CHAINS
Composed of	co-referentiality co-extension	co-classification
Dealing with	reference to linguistic and extra- linguistic 'things'.	similarity of events, actions, objects and attributes.

Any element of a text which is a part of a chain is termed a 'relevant token', while an element which is not part of a chain is termed a peripheral token'. But, "although the chains go a long way towards building the foundation for coherence, they are

not sufficient" (Hasan, 1985a, 91). It is 'chain connection' (Hasan, 1984, 197) or 'chain interaction' (Hasan, 1985a, 91) which provides the sufficient foundation for coherence, and is termed 'cohesive harmony'. A chain interaction is a relation which associates elements from two or more separate chains. Elements of a chain which interact are termed 'central tokens' and those which do not interact are termed 'non-central tokens'. There follow three hypotheses (Hasan, 1985a, 93):

i. The lower the number of peripheral tokens, the greater the coherence.
ii. The higher the proportion of central to non-central tokens, the greater the coherence.
iii. The fewer breaks in interaction chains the greater the coherence.

Thus, "variation in coherence is the function of variation in the cohesive harmony of a text" (Hasan, 1985a, 94).

Hasan has produced a theory of text and texture which begins to account for the relationship between coherence and cohesion, stressing that they co-exist within meaningful text. Schemata are activated by linguistic items and relations, and linguistic items and relations are in turn interpreted by schemata, as Rumelhart (1984) suggests. Hasan's theory and method of analysis have much to offer in terms of the analysis of lexical cohesion, which is an aspect of the work of de Beaugrande and Dressler (1981) which is far from satisfactory. They rely almost totally on grammatical relationships within sentences because, following Morgan (1978) they argue that "the cohesion of the surface text rests on presupposed coherence of the textual world" (de Beaugrande and Dressler, 1981, 71). On the other hand, the shared assumption of Rumelhart and Hasan that linguistic structure and schemata are inextricably bound together is both more theoretically sound and more productive in the analysis of real texts.

There is clearly a theoretical divide, but it is argued here that this divide is a result of differences of approach. Given this, there seems to be no a-priori reason why the two theories should not be complementary rather than in opposition.

Empirical Evidence

Given what has been said so far, it is not surprising that Carrell can quote studies by Tierney and Mosenthal (1981), Freebody and Anderson (1981) and Steffensen (1981) to show that topic affects cohesion, that vocabulary knowledge but not cohesion affects reading comprehension, and that background knowledge — especially cultural knowledge — affects comprehension too. (See also Steffensen and Joag Dev, 1984). On the other hand, Hasan (1984) can demonstrate the links between cohesive chains and coherence, and Cooper (1984) can demonstrate that grammatical and lexical cohesion as described by Halliday and Hasan correlate highly with a general comprehension measure as well as distinguishing well between practised and non-practised readers.

The purpose of the experiment discussed here is to demonstrate that both 'cohesion theory' and 'schema theory' have something to offer to those interested in the reading process and the teaching of reading. The investigation falls into two parts:

(A) An informal classroom investigation into the role of cohesion and background knowledge in reading comprehension.

(B) Collection of data from a formal reading test containing a sub-test on cohesion, a sub-test on schematic background knowledge and a sub-test on schematic rhetorical patterns in text, which were analysed to see whether or not the results had anything to offer to this debate.

The test was not designed specifically for this purpose and the data collected were not originally gathered with this piece of research in mind. This being the case, one would suggest that there was little likelihood of theoretical bias in the construction of the instrument.

INFORMAL INVESTIGATION

The reading comprehension passage selected for the classroom stage of the work was taken from the University of London Examining Board GCE O Level syllabus 161 B (overseas) for June 1986. One of the reasons for this was that the research done was carried out in Cyprus with Greek- and Armenian-speaking students in the 5th and 6th classes of high school. The results of the classroom work are presented here, and the passage concerned is included in the appendix for reference.

Firstly, the pronouns and other referring devices in the passage were analyzed following the method of Brown and Yule (1983, 173–176) as closely as possible. This revealed that approximately 71% of referring elements are displaced, the largest category being pronouns (66%) and the second largest being of the form [DET + N] (24%). (DET = Determiner; N = Noun). Among current references the largest category was again pronouns (81%), while the first time an entity referred to was introduced, it was done by the method [DET + (M) + N] most often (57%) and secondly by [poss. pronoun + N] (13%). (M = Modifier; Round brackets = optional).

Only one proper name is used for a character in the text, and most displaced elements refer to characters.

In order to see whether or not these facts interfered with the L_2 readers' ability to activate a schema in order to comprehend the text, a second version of the text was produced, in which:

(i) All displaced pronouns were changed into a form corresponding to the structure [DET + (M) + N] where this appears natural.
(ii) 'Lingkongan Budi' was altered to the name of a main street in the city where the L_2 subjects lived.
(iii) 'The Great Hall' was altered to the name of a major construction programme being undertaken in the country where the L_2 subjects lived.
(iv) The name of the male nurse was altered to a name common in the country where the L_2 subjects lived, and the nationality and language mentioned were changed to more familiar terms in the country concerned.

Procedure

Group C (control, having nine students) were given the original text and Group E (experimental: having seven students) were given the altered text. The two groups

were then asked to do the following tasks independently of each other:

(i) Say whether or not they had problems in understanding the text after the first reading.
(ii) Make a list of the characters in the story.
(iii) Discuss the roles and relationships of the characters with the teacher.
(iv) Write a summary of the story without the text in front of them.

No statistical evidence is available for this part of the study as no scores were given to the student protocols. It was decided that on-line classroom investigation of this sort, as a part of the teaching programme, would be better assessed subjectively by teachers with experience in marking summaries and evaluating classroom discussion. (For the theoretical issues involved in classroom observation, which will not be discussed here, see Allwright, 1988; Chaudron, 1988).

RESULTS

(i) All nine students in Group C reported that the text was difficult to understand, while in Group E only one student reported problems in regaining what the students termed the 'full meaning' of the passage.
(ii) There was no difference between the two groups in the list of characters produced.
(iii) In the discussion it became clear that understanding of the roles and relationships of the characters had caused the differences between the two groups reported in (i). The main reason that Group C did not understand the text was because they could not keep track of pronominal reference, and failed to activate appropriate schemata for comprehending the text. In other words, an interactive reading process was not put into operation by students in Group C. In particular:

(a) In line 26 we have 'a friend of his' who persuaded the injured man (he) to let the author (me) take the man and the girl (them) to hospital. Then, in lines 27–28 we have '*He* helped *his friend* to tow the motorbike to the grass.' The expressions 'his friend' and 'a friend of his' were explicitly made to have the same referent in the story in Group E's text, as 'He' in line 26 had been altered to 'the injured man.' The original text at this point caused many problems for Group C, as they noticed that the injured man was 'badly hurt' (line 57), his arm may have been fractured (line 94), and his injured arm was mentioned several times in the text. Given these observations, which of the following interpretations is correct:

1. He (the injured man) helped his friend tow the motorbike to the grass.
2. He (a friend of his) helped his friend (the injured man) tow the motorbike to the grass.

The problem is that in the structure 'X helped Y' we assume that it is Y who is in need of the help and X who is capable of providing that help. The second reading is clearly the more natural of the two, and this was supported by the view of Group E,

in whose text the *first* reading had been made explicit, when they argued that the injured man was in fact faking his injuries.

(b) In lines 31–32 the sentence '*They* were both workers on the Great Hall' follows immediately upon the section describing the man and his friend, but the two sentences which follow are of the form 'He was (+description)' and 'She was (+description)'. Is the 'They' of line 31 anaphoric or cataphoric? Group C could not understand this line, while Group E had no problems as in their text 'They' had been altered to 'The man and the girl'.

In the discussion in Group C, much time was spent on the possibility of the collocability of 'girl' and '(construction) worker' which is improbable in their society. The relationship here between cohesion and schematic comprehension is clear: if 'They' is anaphoric then the girl may be either (i) a girl-friend on the man's motorbike at the time of the accident, or (ii) an independent character — perhaps a pedestrian — who was involved in the accident. If the 'They' is cataphoric then the girl would be a workmate. The importance of the decision here affects the reader's understanding of the girl's "concern" in the car on the way to the hospital, and the possible motives for deciding that she should be 'hurt' as well.

(iv) The recall protocols showed that Group E remembered the sequence of events more accurately than Group C, and included more descriptive detail, perhaps because their schematic understanding of the text had been fully activated, data and concepts coinciding to provide a unitary picture of the text.

It must be emphasized that the above experiment was informal and the assessment of the results subjective. However, the method used does go some way to tapping on-line reading procedures which can be checked by much more formal research designs.

FORMAL INVESTIGATION

As part of a larger project into the influence of various factors on reading comprehension, a battery of tests was designed and administered to 121 students in Cyprus preparing for the GCE English Language examination, drawn from six institutions. The battery is summarized in Table 1.

Table 1. Test Battery description.

Code	Description	Reliability
1A	Syntax	.74
2A	Ideational Schemata (Contextual setting/background)	.71
2B	Routine Schemata (Macro-level text patterning)	.88
3A	Frame Procedures (Cohesion)	.82
3B	Routine Procedures (Clause relational meaning)	.89

This battery was constructed on the basis of a discourse model, the superstructure of which was adopted from the work of Widdowson (1983). Although concerned

with developing a theoretical background to ESP (the teaching of English for Special Purposes) the theory is very much a discourse model based upon schema theory, and was therefore seen as an appropriate model within which to work. Widdowson isolates three levels of text which play a role in the reading comprehension process:

1. Systemic Level: linguistic competence.
2. Schematic Level: communicative competence.
3. Procedural Level: communicative capacity.

The distinction between levels 2 and 3 is important. "Competence" is interpreted as the ability to match the schematic world of the text with the schematic world of the reader, but Widdowson argues that if this takes place automatically because the schemata of text and reader are identical then learning does not take place. "Capacity" then is the ability to "negotiate" meaning, to compare conflicting or overlapping schemata so that the reader comes to comprehend a view of the world for which s/he did not previously have a schema.

Widdowson claims that each lower level performs a supportive role to the level immediately above it, but that in comprehending each level is exploited simultaneously, so that the reader is continuously sampling the text at all levels, modifying his own schema (internal "model" of the text), and sampling again (ibid. 65–66).

In order to understand the test battery the systemic level requires no further explanation here, while levels 2 and 3 must be defined, as it is argued that these two levels make up the bulk of what is referred to as "reading comprehension".

The Schematic Level

Widdowson distinguishes between two kinds of schemata, the "ideational", which are related to conceptual organization and the "interpersonal" which are related to "patterns of participation in social life" (ibid. 55–56) which he bases upon the work of Halliday. Widdowson also uses "frame" to refer to ideational schemata, and "routine" to refer to interpersonal schemata. Here these terms are used interchangeably.

It is unfortunate at this point that Widdowson does not go on to define exactly what may be involved under each of the superordinates which he sets up, although he does point to the work of Winter and Hoey as providing "a basic rhetorical routine" (ibid. 58) in an unmarked form. As such, the Routine Schemata subtest (2B) required the testees to demonstrate an awareness of text patterns such as PROBLEM-SOLUTION-EVALUATION which are common to large numbers of texts (Hoey, 1983b; Jordon, 1984; Winter, 1986). Exercise types used here were (i) summarizing health problems associated with alcoholism listed in an article together with solutions suggested to these problems by various organizations, and (ii) grid completion based on a second text: a partially completed grid headed with "Problem", "Solution", and "Further problem if solution not found".

While the Routine Schemata are concerned with anticipation in textual organization, Ideational Schemata are concerned with the "contextual setting" of the text. This refers to the reader's ability to construct a basic model of the background to the text by forming a picture of the potential audience of the writer, the topic, the

physical setting or background, the style used, the message form (advertisement, debate, etc.), the author's purpose in writing, and an awareness of the larger genre of which the passage is a part. The Ideational Schemata subtest (2A) included exercises in (i) matching newspaper headlines with the body of the text and (ii) isolating schematically intruding sentences in a grammatically (but not lexically) cohesive passage.

The Procedural Level

The Procedural Level is seen as significantly different from the Schematic Level in that it concerns the ways in which a reader goes about interpreting the schemata of the text and relating them to his own. It is failure in this activity which Widdowson claims is the most frequent cause of readers failing to comprehend a text.

Frame Procedures are those which establish and maintain reference, especially with regard to cohesion, and working out the "given" from the "new" information presented (ibid. 41–42). As cohesion is concerned with both endophoric and exophoric reference and lexical cohesion, it may be said that the frame procedures are those concerned with the interpretation and formation of the ideational schemata. Routine Procedures are allied in a similar way to the Interpersonal Schemata.

The Frame Procedure Subtest (3A) included (i) reading a text with referring devices underlined and requiring the testee to fill in a chart indicating the referent and (ii) a cloze exercise in which the referring devices had to be placed in the blanks (scored by the correct word method).

Routine Procedures are essentially concerned with the reader's ability to comprehend text through clause-relational meaning. The Routine Procedures subtest (3B) was designed to tap the testee's ability to comprehend those relationships which hold between clauses such as matching relations and cause-consequence relations as described by Winter (1977; 1978) and Hoey (1983b). Exercise types used in this section included (i) selecting one of three possible sentences to join together two pieces of text and (ii) the re-ordering of jumbled pieces of text.

A correlational analysis of the results of the test produced the results of Table 2.

Additional Notes on the battery:-

1. A second syntax measure was included in the battery (1B), but this is not reported

Table 2. The relationship between subtests measuring the theoretical constructs hypothesised to be components of the comprehension process in reading.

	Syntax 1A	Ideational Schemata 2A	Routine Schemata 2B	Frame Procedures 3A
Ideational Schemata 2A	.29			
Routine Schemata 2B	.36*	.42*		
Frame Procedures 3A	.48*	.11	.37*	
Routine Procedures 3B	.44*	.25	.05	.55*

* Significant at $p < .001$

here as the reliability coefficient was an unacceptable .34. The exercise in the syntax subtest reported (1A) involved the matching of sentence beginnings to sentence ends.

2. Reliability was calculated using the Kuder-Richardson Formula 21, and the reliability of the total test was .89. The standard error was 1.24, with a total mean score of 52.98±2.43. A maximum of 90 marks were available on the battery.

DISCUSSION

Firstly, it is necessary to observe that the correlations, even where significant, are rather low when their variance overlap with other factors is calculated. This is not surprising, as the test was designed to have low overlap between subtests. As such, any conclusions must only be tentative. Once this warning has been taken, it may be observed that on the surface, it appears that cohesion is associated with syntactic meaning (1A), text patterning (2B) and clause-relational meaning (3B), but not with contextual setting (2A). This gives some weight to the distinction between the concept of 'cohesion' and of 'schematic representation', but this must be tempered by looking at the correlation of both of these subtests with subtest 3B, which, according to Cooper (1984) is the highest level of discourse processing. It is clearly cohesive factors which are found to be more highly associated with text structuring clause-relational meaning. Next, it must be noted that the two 'schematic levels (2a,b) as described in this test correlate more highly with each other than any other subtest, just as the two procedural levels do (3a,b). It could be that schematic representations of knowledge (textual and 'real world') are separate from, but complementary to, procedures in decoding and constructing meaning as described in subtests 3A and 3B. (There is, after all, bound to be some degree of overlap between factors in a single process.) Indeed, it is the correlations reported here that give support to the claim that the theoretical constructs underlying the subtests may indeed be valid and that the subtests are tapping what they are claimed to be tapping. As such, the test does appear to be sensitive to cohesion and show its relationship to coherence. Nevertheless, it is clear that further validation studies would be required before stronger claims could be made.

It is suggested that failure to comprehend a text can result from the inability to follow pronominal reference (informal study) and that a conservative reading of the data (formal study) leads to the tentative conclusion that when failure to comprehend a text occurs it is associated with an inability to perceive semantic relationships between clauses, and schematic failure. The two aspects, however, seem highly likely to influence each other. But does this lead to some kind of a truce between schema theory and cohesion theory? It would seem reasonable to suggest that schemata and linguistic signals are two sides of the same coin for both theoretical and empirical reasons. Fillmore (1976) has attempted to associate linguistic signs with the activation of schemata, but his theory is, of necessity, far from being comprehensive. However, any future work on reading comprehension will not be able to ignore either side of the current debate, for a theoretically respectable model of comprehension must include components for schemata and linguistic devices, and show how they may be related: in other words the linguistic and psycholinguistic aspects of reading must be viewed as being equally important.

CONCLUSIONS

The factors analysed in these two studies cannot account for the totality of the failure to comprehend in the case of Group C in the informal experiment. However, one point may still be made with a fair degree of confidence: Hasan is probably correct in her belief that there is a link between cohesion and coherence, and that this is associated with semantic links within the text. This in turn, may affect the ability of the reader to construct a 'model' of the text which results in the inability to create a schematic understanding. Here, comprehension may break down.

This points the way forward to a number of areas where research is needed in the future discussion of cohesion and coherence in the reading process. Cohesion needs to be studied in relation to those semantic patterns across clauses isolated by Winter, Hoey and Jordan in relationship to the kinds of problems they can cause to readers when they are not recognized. Cohesive devices seem not only to hold things together, but be a part of the signalling devices within the text. Lexical cohesion needs to be looked at again (Hoey, in preparation). Clearly the concept of what Hasan calls 'instantial relationships' (Hasan, 1984, 201), which are text-bound and do not exist in the semantic system of the language are also extremely important cohesive devices. The study of such relationships has been begun in the pioneering work of McCarthy (1983, 1984) and Carter and McCarthy (1988), but not in relationship to these issues. If 'schemata' have any relationship to the way lexical items are stored in memory through a network of items learnt in contexts, then this too must inform any theory of cohesion and coherence. As such, Hasan's notion of instantial relations points forward to the connection between thought (and therefore schemata) and linguistic form as realized in specific contexts with locally created, existential meaning (Fulcher, 1987b, 14).

These notions are far from complete at the present time, and will require much more careful research and definition. When this is done, it will be possible to see how so called rival theories actually fit together into some larger pattern. It is hoped that this research may show that the development of some theory able to handle both cohesion and schema theory is possible, and that this will be of benefit to reading teachers and researchers in the future.

NOTE

The test used in the formal investigation is available from the author at the price of the photocopy + postage. In correspondence please state the use to which the test

will be put. Further details regarding the theoretical basis of the test may be found in Fulcher (1987a).

REFERENCES

ALLWRIGHT, D. (1988) *Observation in the Classroom*. London: Longman.

BROWN, G. and YULE, G. (1983) *Discourse Analysis*. London: Cambridge University Press.

BEAUGRANDE DE, R. (1981) Design criteria for process models of reading. *Reading Research Quarterly*, 2, VII/2, 261–351.

BEAUGRANDE DE, R. and DRESSLER, W. (1981) *Introduction to Text Linguistics*. London: Longman.

CARRELL, P. (1982) Cohesion is Not Coherence. *TESOL Quarterly*, 16, 4, 479–488.

CARRELL, P. (1983a) Some issues in studying the role of schemata, or background knowledge, in second language comprehension. *Reading in a Foreign Language*, 1, 81–92.

CARRELL, P. and EISTERHOLD, J.C. (1983b) Schema theory and ESL reading pedagogy. *TESOL Quarterly*, 17, 4, 553–573.

CARRELL, P. (1984) Evidence of a formal schema in second language comprehension. *Language Learning*, 34, 2, 87–108.

CARTER, R. and McCARTHY, M. (1988) Lexis and Discourse: Vocabulary in Use. In R. Carter and M. McCarthy (eds) *Vocabulary and Language Teaching*. London: Longman, 201–220.

CHAUDRON, C. (1988) *Second Language Classrooms: Research in teaching and learning*. London: Cambridge University Press.

COOPER, M. (1984) Linguistic competence of practised and unpractised non-native readers of English. In J.C. Alderson and A.H. Urquhart (eds) *Reading in a Foreign Language*. London: Longman, 122–138.

FREEBODY, P. and ANDERSON, R.C. (1981) *Effects of vocabulary difficulty, text cohesion, and schema availability on reading comprehension*. (Tech. Rep. No. 225). Urbana: University of Illinois, Centre for the Study of Reading.

FILLMORE, C.J. (1976) Frame Semantics and the nature of language. *Annals of the New York Academy of Sciences*, 20–31.

FULCHER, G. (1987a) *Discourse Analysis and the Testing of Reading Comprehension*. Unpublished MA thesis, University of Birmingham, English Language Research.

FULCHER, G. (1987b) Contextual Hyponomy: A communicative approach to teaching lexis in context. *Modern English Teacher*, 14, 3, 14–17.

GRELLET, F. (1981) *Developing Reading Skills: A practical guide to reading comprehension exercises*. London: Cambridge University Press.

HALLIDAY, M.A.K. and HASAN, R. (1976) *Cohesion in English*. (English Language Series 9). London: Longman.

HALLIDAY, M.A.K. (1979) The sociosemantic nature of discourse. In M.A.K. Halliday (ed.) *Language as a Social Semiotic: The social interpretation of language and meaning*. London: Edward Arnold, 128–151.

HALLIDAY, M.A.K. (1985) *An Introduction to Functional Grammar*. London: Edward Arnold.

HASAN, R. (1984) Coherence and Cohesive Harmony. In J. Flood (ed.) *Understanding Reading Comprehension*. International Reading Association, 181–219.

HASAN, R. (1985a) The Texture of a Text. In M.A.K. Halliday and R. Hasan (eds) *Language, context, and text: Aspects of language in a social-semiotic perspective*. Australia: Deakin University Press, 70–96.

HASAN, R. (1985b) *Linguistics, language, and verbal art*. Australia: Deakin University Press.

HOEY, M. (1983a) A tentative map of discourse studies and their place in linguistics. Mimeo: University of Birmingham, English Language Research.

HOEY, M. (1983b) *On the Surface of Discourse*. London: George Allen and Unwin.

HOEY, M. (in preparation) *The Patterning of Lexis in Text*.

JORDON, M. (1984) *Rhetoric of Everyday English Texts*. London: George Allen and Unwin.

McCARTHY, M. (1983) Lexis and Discourse. Mimeo: University of Birmingham, English Language Research.

McCARTHY, M. (1984) A new look at vocabulary in EFL. *Applied Linguistics*, 5, 1, 12–21.

MORGAN, J.L. (1978) *Toward a rational model of discourse comprehension.* (Theoretical issues in natural language processing 2), Urbana: University of Illinois, Centre for the study of reading.

MORGAN, J.L. and SELLNER, M.B. (1980) Discourse and linguistic theory. In R.J. Spiro, B.C. Bertram and W.F. Brewer (eds) *Theoretical issues in reading comprehension*. Hillsdale, NJ: Lawrence Erlbaum Associates.

NUTTALL, C. (1982) *Teaching Reading Skills in a Foreign Language.* (Practical Language Teaching 9), London: Heinemann Educational Books.

RUMELHART, D.E. (1977) Toward an interactive model of reading. In S. Dormic (ed.) *Attention and Performance IV*. Hillsdale, NJ: Lawrence Erlbaum Associates, 573–603.

RUMELHART, D.E. (1984) Understanding Understanding. In J. Flood (ed.) *Understanding Reading Comprehension*. International Reading Association, 1–20.

STEFFENSEN, M.S. (1981) *Register, cohesion, and cross-cultural reading comprehension.* (Tech. Rep. No. 220). Urbana: University of Illinois, Centre for the Study of Reading.

STEFFENSEN, M.S. and JOAG-DEV, C. (1984) Cultural knowledge and reading. In J.C. Alderson and A.H. Urquhart (eds) *Reading in a Foreign Language*. London: Longman, 48–61.

TIERNEY, R.J. and MOSENTHAL, J.H. (1980) *Discourse comprehension and production: Analyzing text structure and cohesion.* (Tech. Rep. No. 221). Urbana: University of Illinois, Centre for the Study of Reading.

WIDDOWSON, H.G. (1977) The process and purpose of reading. In H.G. Widdowson (ed.) (1979) *Explorations in Applied Linguistics*. Oxford: Oxford University Press.

WIDDOWSON, H.G. (1978) *Teaching Language as Communication.* Oxford: Oxford University Press.

WIDDOWSON, H.G. (1983) *Learning Purpose and Language Use.* Oxford: Oxford University Press.

WINTER, E.O. (1977) A Clause Relational Approach to English Texts: a study of some predictive lexical items in written discourse. *Instructional Science*, 6, 1, 1–92.

WINTER, E.O. (1978) A look at the role of certain words in information structure. In K.P. Jones and V. Horsnell (eds) *Informatics 3*. London: ASLIB.

WINTER, E.O. (1986) Clause Relations as Information Structure: two basic text structures in English. In M. Coulthard (ed.) *Talking About Text*. (Discourse Analysis Monograph 13), University of Birmingham: English Language Research, 88–108.

WISHART, E. (1987) Textual Cohesion and Effective Teaching: A teaching strategy. *Reading*, 21, 1, 30–42.

Address for correspondence: GLENN FULCHER (Director of English Studies), The English Institute, C/o The English School, Nicosia, Cyprus.

APPENDIX

GCE O Level Comprehension Test: Syllabus 161 B (Overseas). June 1986

I didn't know that there had been an accident or that I had been involved — for there had been nothing, not a sound to suggest it — until I looked in the mirror and saw the injured man pointing the finger of blame at me. His other hand was held to his forehead. The girl was slower in getting up. She was half rising from her knees. The motorbike sprawled on the road, leaning on its handle-bar, rather like a man leaning forward on his elbow in a match to test his strength. A boy I knew came by and stopped beside my car. He was a student too. He asked if he could help. I wanted to be helped but I heard myself saying 'No, it's alright.' He left and I felt abandoned, like a sailor who refuses a lifeboat in a shipwreck with the perverse explanation, 'I can swim.'

As I walked towards them I noticed the girl appeared dazed but had no external injuries apart from a few scratches. The man had blood on his singlet and cuts on his cheek and forehead and on his arm. He kept scolding me, loosening his hold on his

injured arm to make gestures of blame and abuse. Perhaps I really hadn't signalled before turning into Lingkongan Budi, perhaps he would have scolded me anyway, because if you scold you aren't to blame.

In an accident you took the injured to hospital. 'I'll take you to hospital,' I said. I wanted the scolding to stop. But he went on to illustrate how I had suddenly swerved to the right until a friend of his suggested that he should let me take them to the hospital. He helped his friend tow the motorbike to the grass. The rim of the bulb case had come off and he pushed the loose ring back into place. The handle-bar was twisted and the carrier was dented. He pointed these out to me. They were both workers on the Great Hall. He was small and he had new blue sneakers. She was plump, and the brim of her straw hat was torn. One of her sleeves was also torn. They got into my car. I drove quickly out of the University, quickly, but handicapped by not knowing the exact whereabouts of the nearest hospital. The possibility that I might have another accident passed through my mind unpleasantly. The girl had recovered and she leaned forward from her back seat to the man and laughed at the novelty of it. But the man groaned. He worried about his arm and his forehead which hurt. The girl became serious and leaned forward in concern. The man's head was bent low, in his hands. The girl also felt obliged to discover some corresponding injury on her person and decided on her wrist. From then onwards, every time she referred to her wrist her face twisted into a studied expression of pain. It was filled with a certain hostility and an uneasiness that wanted the pain seen to at once. I asked twice on the way and I found the hospital after a search.

I got out quickly. I had comforting visions of attendants rushing out with stretchers and a doctor with a stethoscope and an authoritative air who would manage everything. I went in by the first entrance I could find and found myself in a room with four or five nurses having a morning chat. 'I have an accident case. A man and a girl. The man is quite badly hurt.'

'Bring them in that way, the Main Entrance, please.' She was pleasant but untroubled.

We found the main entrance and the room which happily had a notice 'Accident cases to be treated here'. We waited for what seemed an infinitely long time before a nurse appeared inclined to take an interest in us.

'His card, where is his identity card?'

'Can't you treat him first?' I asked impatiently and with a suggestion of rudeness. She wasn't rude in return, only matter-of-fact. 'No, we must have his card.' She wrote down his name and address, the girl's name and address and my name and address. I suppose the more accident cases you saw, the less impatient you were that the injured should be treated with record speed. The nurse then looked at the man with a placidly critical eye, and after another placid delay asked him to lie on a slender bed behind a curtain. The curtains kept blowing so that the man's feet which touched it seemed to be rotating slowly, to the right and then to the left when they were really still. Finally the doctor came, and looked at the man. Then she asked the nurse to undress him. The nurse called a male nurse. He was Malay, but he answered in Cantonese, saying words with a lethargic luxury. 'What is it?' The nurse was half-amused, half-irritated by his question. 'What is it? Come and help, that is what.' Ali sauntered in, scratching his sleeve.

The doctor examined the man, then she sat down at a small desk near the door and wrote in a book all that was wrong with him in medical terms, sometimes

stopping to think of the best way to express it. I was a little surprised as if I hadn't expected a doctor to have such a mundane trouble as having to find the right phrase.

The doctor asked me about the accident. 'Whose fault was it?' The advantage I felt was somehow peculiarly mixed with an apprehensiveness about the injured man. I asked the doctor if he had any internal injuries. She said his arm might be fractured. He would have to be X-rayed first. She gave the nurse instructions and left. The nurse and Ali dressed the patient's wounds. He was quiet now, I believe he had fallen asleep.