Chapter Two
Review of Related Literature

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CHAPTER 2
REVIEW OF RELATED LITERATURE

2.1. Introduction

Hinkel (2004) believes that without a clear, reasonably accurate, and coherent text there can be no academic writing in a second language. Therefore, focusing on isolated and grammatically correct sentences is no guarantee for writing a successful text, for a text preexists a sentence and textual strategies often determine the choice of words and the syntactic structure of the sentences (Enkvist as cited in Hinkel, 2002).

Various definitions of text have been proposed, each looking at it from a different perspective (for example, Halliday and Hasan, 1976; de Beaugrande and Dressler, 1981; Hank, 1989). Halliday and Hasan define text as “… any passage, spoken or written, of whatever length, that does form a unified whole. We know, as a general rule, whether any specimen of our own language constitutes a TEXT or not” (p. 1). For Halliday and Hasan, there are several objective factors that characterize a text. A text may be spoken or written. It may be in any form or genre, verse or prose, or of any length and size, like a whole story to a single proverb or even a short cry for help. A text is a semantic unit of language in use, not a grammatical one. A text is not a combination of sentences rather it is encoded or realized in sentences. Halliday and Hasan talk of a distinctive property of text that makes it a text – texture:

The concept of texture is entirely appropriate to express the property of ‘being a text’. A text has texture, and this is what distinguishes it from being something that is not a text. It derives the texture from the fact that it functions as a unity with respect to its environment (p. 2).

According to Hank (1989), the qualifier ‘coherent’ distinguishes text from an undisclosed array of other non-textual or anti-textual phenomena … “(p. 96), and textuality roughly means “the quality of coherence or connectivity that characterizes text” (p. 96). However, Hank calls these definitions vague and tries to give a clearer account of the two terms, text and textuality. To him, there are the concepts of co-text, meta-text, context, pre-text, sub-text, and after-text. The relative association and interconnection of these concepts contributes to the making of text. He defines these concepts as follows:
Text and textuality, then, are part of a family of loosely interconnected concepts that includes at least the following: "Co-text" designates the accompanying discourse in a single text; "Meta-text" is any discourse that refers to, describes, or frames the interpretation of text; "Con-text" is the broader environment (linguistic, social, and psychological) to which text responds and on which it operates. What might be called "pre-text" encompasses whatever prepares the ground for or justifies the production or interpretation of text. "Sub-text" focuses on whatever understandings or themes form the background or tacit dimensions of a text, inferable but not explicitly stated. The constellation of consequences and outcomes of producing, distributing, or receiving a text, whether intended and foreseen or not, might be thought of as an "after-text." The precise semantic shading and extension of the term "text" changes depending upon which portions of this range of concepts one chooses to include (p. 96).

No matter what purposes texts serve and through what features they intend to reach their communicative goals, there are certain characteristics which they all share. de Beaugrande and Dresser (1981) identified seven characteristics or “standards”: cohesion, coherence, intentionality, acceptability, informativity, situationality, and intertextuality. If any of these standards are not met, the text is not considered to have fulfilled the function and cannot be considered communicative.

dé Beaugrand and Dressler consider cohesion and coherence of text the most obvious of textuality standards. They show how different components of a text hang together and make sense. In fact coherence concerns the relationships among conceptual units and cohesion among verbal ones. Intentionality and acceptability, the former being writer oriented and the latter reader oriented, are two of the standards of textuality. According to de Beaugrande and Dressler, even if a text is cohesive and coherent, the writer must consider the attitudes of the text users and must intend his or her writing to be a text and accepted by the reader, i.e., the producer of the text must intend it to contribute towards some communicative goal (such as giving/demanding information/goods-and-services) and the receiver of it must accept that, indeed, it is fulfilling such a purpose. Informativity is yet another standard of textuality. According to de Beaugrand and Dressler, informativity, being the extent to which the presented materials are new or
unexpected, exerts important controls on the selection and arrangement of options in the text. Such controls are a very important factor in limiting and motivating the use of particular options in all kinds of contexts. The sixth standard is **situationality**. The situation which occurs through the complex interactions between text and context and sophisticated processes of mediation and monitoring is another text linguistics standard that makes a text. Texts not only contain information but also they possess a degree of relevance or situationality in so far as they exist for a particular communicative purpose and link communicative acts (discourse) to the situation in which they occur. Indeed, it is crucially important for the assessment of the appropriateness of a text to know where it occurred and what function it had in that particular situation. The standard of situationality may be utilized to meet some definite expectations and to reach some goals. Whether a text is acceptable may depend not on the "correctness" of its "reference" to the "real world", but rather on its believability and relevance to the participants' outlook regarding the situation (Beaugrande & Dressler 1981:179). And finally, the last standard is **intertextuality**. Intertextuality refers to the relationship between a particular text and other texts which share characteristics with it; the factors which allow text-processors to recognize, in a new text, features of other texts they have encountered. What is involved here is the notion of genre or text-type and the crucial role played by knowledge of previous texts in making sense of newly encountered texts.

Thus cohesion, coherence and connectivity underlie almost all the definitions of **text** and **textuality** presented above. In fact if a text is intended to make sense and be understood in relation to a given context, it must be cohesive and coherent. These two concepts have had a good share in reading and writing research, and different scholars have sought to give clear definitions of the terms from different perspectives (e.g., Halliday and Hasan, 1976; Reinhart, 1980; de Beaugrande and Dressler 1981; Steven Witte and Lester Faigley, 1981; Harabagiu, 1998; Colomb and Griffin, 2004; Grosz, Joshi and Winstein, 1995).

### 2.2. The concept of coherence

Coherence and its concomitant, cohesion, is a familiar term for linguists both pure and applied. It is a sense-making feature of any given text or discourse. This concept plays...
a very important role in our life too. It is the essential condition for acting, thinking, and understanding, yet it is so commonplace an idea that it is noticed only when it is absent (Colomb and Griffin, 2004). Before its introduction into the field of linguistics, coherence was a subject of discussion in the fields of science and humanities. Christopher Herbert (2004) traces the general idea of coherence to the nineteenth century. He contends that the notion of coherence is in a conundrum, “because while it seems, on the one hand, to represent the necessary presupposition of any research aspiring to scientific rigor, it seems, on the other hand, to be self-contradictory in ways that fatally compromise all research conducted under its auspices. The idea of coherence seems not to be coherent, in other words.” (p. 189). He refers to the concept of coherence when it was believed that all things were exhaustively interconnected. This new scheme of thought was said to be held by the evolutionary biologist Charles Darwin who believed that the biological nature can only be described as an inextricable web of ... affinities. All things are in relation to one another in one way or the other; they are interdependent. This idea was strongly supported by Herbert Spenser who maintained that organisms in their totality are mutually dependent, and in that sense integrated. This trend of thinking has been held in humanities too. It was applied to the ethnographic study field of culture. According to this concept, every item in social life from religion to mythology, costume and table manners belongs to an inextricable web of ... affinities constituted by all the various practices and values of the society (Herbert, 2004: 188-189).

The coherence paradigm was also extended and applied to linguistics in the first decade of the twentieth century by Ferdinand de Saussure. He considered language as a system in which all the terms are interdependent and the value of each term results from the simultaneous presence of the others. Although the idea of textual coherence has been a major concern for rhetoricians, it was not until 1960s that it gained popularity and was systematically studied, and many insightful results were obtained so that they could benefit composition studies and composition teaching (Jin, 1998). It has become an ever tenable concept in the fields of pure and applied linguistics too.
2.2.1. Definitions of coherence

Although many definitions have been proposed for cohesion and coherence, it was Halliday and Hasan who first raised and popularized the idea in their influential work ‘Cohesion in English’ in 1976. Their book has had an immense impact on the concept and the teaching of coherence. They speak of textual coherence as having two characteristics somewhat different from those in the traditional definitions: cohesion (i.e., ties between sentences) and register (i.e. the coherence with a context):

A text is a passage of discourse which is coherent in these two regards: it is coherent with respect to the context of situation, and therefore consistent in register; and it is coherent with respect to itself, and therefore cohesive (p. 23).

Following Halliday and Hasan some other researchers have provided definitions for coherence. For instance, de Beaugrande and Dressler (1981) define coherence as the ways in which the components of the textual world, i.e., the concepts and relations which underlie the surface text are mutually acceptable and relevant. For Witte and Faigley (as cited in Bamberg 1983: 418-419), coherence refers to “those underlying semantic relations that allow a text to be understood and used and coherence relations are governed by the writer’s purpose, the audience’s knowledge and expectations, and the information to be conveyed.” A sequence of sentences in a text must also display logical connection accounting for the coherence of the text. If cohesion is a term for sticking together, then coherence is a term for making sense. Grosz, Joshi and Weinstein (1995) make a distinction between global and local coherence. The former “refers to the ways in which the larger segments of discourse relate to one another. It depends on such things as the function of a discourse, its subject matter and rhetorical schema. The latter “refers to the ways in which individual sentences bind together to form larger discourse segments. It depends on such things as the syntactic structure of an utterance, ellipsis, and the use of pronominal referring expressions.” Thus, Global coherence can be responsible for the overall unity of the text, and local coherence can be synonymous with cohesion.

Therefore, all the units in a well-written text are both explicitly and implicitly interconnected; in other words, two types of connectedness make text a unified whole: explicit connectedness (cohesion) and implicit connectedness (coherence). Todd, et al. (2007) talk about two kinds of coherence or implicit connectedness: propositional and
interactional coherence. Propositional coherence refers to those links that readers identify between the concepts and propositions within a text using their background knowledge. Propositional coherence plays a great role in providing unity to written text, as it involves both the text and the reader, and the interplay of the text and the background knowledge of the readers make the text coherent. There are different options available for the analysis of propositional coherence like topic shift and drift, topic-based analysis by topical structure or theme-rheme progression. On the other hand, interactional coherence refers to the identification of implicit links in text that involves communicative functions or acts in the discourse. Interactional coherence provides unity to a text via a connected series of pragmatic functions or speech acts. It seems that interactional coherence plays a more dominant part in spoken discourse; nonetheless, it can be considered in the analysis of coherence of written discourse too.

2.2.2. Coherence and cohesion

Cohesion and coherence are the basic features of a text. These two features affect the quality of texts to a large extent so much so that without them the text is not comprehensible enough to the intended audience (Louwerse, 2002; McNamara et al., 1996). A coherent text is written in a way that the readers are able to understand the relations between the ideas in it (McNamara and Kintsch, 1996); otherwise, the readers make use of their own background information of the text, world and social knowledge, inference making and problem solving abilities to bridge the gaps between the ideas in the text in order to understand it (McNamara et al, 1996; McNamara and Kintsch, 1996; Graesser, 2006).

Although often used together and one taken for the other, cohesion and coherence are not one and the same. Cohesion is specifically a characteristic of the text whereas coherence is a characteristic of the reader’s mental representation of the text content; in other words, cohesion is an objective property of the explicit language and text (Graesser et al. 2004). It is the presence of certain elements and cues that help the ideas in a text to hang together, and coherence refers to how these elements are used in the construction of mental representation of the text (McNamara and Cai, 2005). Based on this distinction,
one can conclude that cohesion is a property of text and a textual construct whereas coherence is a mental and psychological construct (Graesser, 2004).

Therefore, contrary to the common belief, coherence and cohesion are not one and the same. From a textual point of view, and in a narrower sense, these two terms are closely related, but, in a broader sense, they are two different concepts. While cohesion refers to the syntactic and semantic connectedness of linguistic forms at a surface level (Halliday and Hasan, 1976), coherence refers to content and organization connectivity at a global level. Both of the concepts play a crucial role in giving sense to a text and facilitating reading and comprehension. However, this does not mean that they are essentially correlated. A cohesive text does not necessarily lead to a coherent text, nor does coherence guarantee cohesion. Yet, the quality and comprehensibility of the text largely depends on both coherence and cohesion. This dependence and relationship creates a continuum of gradability in terms of textual connectivity: a good text must be both coherent and cohesive: a bad text is neither coherent nor cohesive. Between these two extremes can lie any number of texts that could be coherent but not cohesive or cohesive but not coherent (Jin, 1998).

Thus underlying all these definitions of text and textual coherence, there are the ideas of “hanging together”, “connectedness”, “understanding” and “making sense.” It follows that coherence has a crucial role not only in writing but in reading as well. However, there is still disagreement among scholars over the issue. Some applied linguistics scholars consider it as a concept related to writing: they consider it synonymous with cohesion and have traditionally tried to define and give a list of cohesive ties, claiming that cohesion provides a basis for the coherence of the text. Conversely, some other scholars consider readers responsible for the coherence of the text. For example, schema theoreticians contend that coherence is primary and, that readers can recognize cohesion if they have the necessary schemata or the background knowledge of the text and the general knowledge of the world. It is the interaction of the background knowledge and the text that the reader or listener can process the text and make sense of it. They claim that cohesion is too inadequate to be responsible for comprehensibility of text because cohesion operates on superficial textual features.
Karen Feathers (as cited in Patricia Carrell, 1982) criticized Halliday and Hasan’s concept of cohesion arguing that this theory operates on the superficial surface structure of the text. Feathers, instead, suggests analysing the text into its underlying propositional units first and then looking for cohesive ties between the units. Moreover, Morgan and Sellner (as cited in Patricia Carrel, 1982) contend that coherence is not the consequence of cohesive ties within a text; rather it is the content that results in the coherence of the text. Examining the following two sentences by Halliday and Hasan, as an example of a coherent text,

\[ \text{Wash and core six cooking apples. Put them into a fireproof dish (p. 2)} \]

Morgan and Sellner claim that these two sentences form a coherent text not because “them” refers back to the linguistic expression “six cooking apples”, as Halliday and Hasan believe it does, but because the writer uses “them” to refer back to objects in the real-world outside the text. Similarly, Patricia Carrel (1982) questions Halliday and Hasan’s cohesion theory and considers it incomplete and warns of its dangers if it were to be applied to second language teaching. She argues that the background knowledge and schema underlying the text is far more important to the coherence and understanding of the text than textual cohesion. She goes on to claim that “if a reader does not have or fails to access the appropriate background schema underlying the text, all the cohesive ties in the world won’t help that text cohere for that reader” (458).

de Beaugrande and Dressier (1981: 3), too, think of cohesion as “…the ways in which the elements of the surface text, i.e. the words we hear and see, are mutually linked within a sequence, such that cohesion relies upon grammatical dependencies.” However, the mere grammatical connectedness of text is not sufficient for the comprehension of the text. In fact, we can comprehend the messages of a text if we have the knowledge of that specific subject. In other words, we cannot read between the lines unless we read some texts about the subject. In this context, de Beaugrande and Dressler state that “The production and reception of a particular text depends on the participants' knowledge of other texts. This knowledge can be applied by a process describable in terms of meditation (the extent to which one feeds one's current beliefs and goals into the model of the communicative situation); the greater the expense of time and of processing activities between the use of the current text and the use of previously encountered texts, the greater
the meditation” (Beaugrande & Dressler 1981: 182). During a text production or reception people use their private semantic fields to communicate effectively. There is always an interaction between the text-presented knowledge and the stored knowledge. The participants decide, infer, deduce and comprehend by analyzing the current text in the light of their own organized mental patterns. Therefore, an understander decides what kind of implications are worth attending to and disregards others (Neisser 1967).

On the other hand, some other scholars believe that schema theory is efficient in providing answers as to how people understand texts but fails to explain how sentences are linked to achieve texture, textuality and cohesion (Ghadessy, 1983). Responding to Patricia Carrel, Ghadessy argues that cohesion and coherence are two separate entities, and Halliday and Hasan address only the concept of cohesion not coherence. Rankin (1984), too, rejects Carrel’s criticism of the theory of cohesion and the danger of its teaching in ESL classes. arguing that cohesion plays a major part in understanding a text. She considers cohesion as a text-bound notion and. therefore, believes that being text-bound while working with ESL materials may make more efficient ESL teachers and more successful students.

Now it is well-known that cohesion is not the same as coherence; rather, as Halliday and Hasan point out, it is a way of getting a text to “hang together as a whole.” It is by no means a guarantee for text coherence per se; however, it is a device that joins with register to determine coherence. Mosenthal and Tienrey (1984: 242) define register as a concept that “embodies those facts that invoke in the reader the relevant prior knowledge necessary to the understanding of a text”. In other words, cohesion is a term for sticking together of sentences in text and coherence is a term for making sense (Harabagiu, 1998).

Considering the important role they play in reading and writing, cohesion and coherence have been the subject of myriads of scholarly studies since Halliday and Hasan first published their influential book “Cohesion in English” in 1976. They were probably the first who systematically studied cohesion from a textual perspective and laid the foundation for later linguistic and psycholinguistic studies. These studies primarily focused on the nature of text and what constitutes a text, the cohesive devices and the role they play in reading, coherence relations, textual coherence and reading comprehension, models of text coherence, evaluation and assessment of textual coherence, etc. (e.g.
When writing a text, the writer tries to influence the online construction of mental representation. He tries to help the readers to build explicit or implicit coherence relations between text segments. Sometimes linguistic markers are used to make the coherence relations more explicit and, thus, facilitate the interpretation of the intended coherence relations (Sanders and Noordman, 2000). At times it is left to the readers to use their own background knowledge to discover the unstated coherence relations.

2.3. Coherence Relations

Discourse segments are interrelated, i.e., all the adjacent segments joined by cohesive devices of some kind are bound by some coherence relations. These relations are conducive to the overall coherence of a text. They also help comprehension and interpretation of the discourse. Nevertheless, there is no general agreement on the number and the types of coherence relations, and classifying these relations poses problems due to the following reasons, according to Degand (1998: 30) “(i) coherence relations are not always marked linguistically, (ii) there is no one to one mapping between coherence relation and linguistic discourse marker and (iii) there is no general consensus on the type of linguistic construction that may function as discourse markers (connectives, prepositions, adverbials, intonation patterns, cue phrases, etc.).” So far the number of these relations are said to vary from 2 to 100 (Knott and Sanders, 1998). Some of these classifications will be reviewed below.

2.3.1. Grime’s relations

According to Alistair Knott (1996), the earliest classification of coherence relations came from Ballard et al in 1971 but was later refined by Longacre in 1971. In Longacre’s new account of relations, there is a distinction between predications which are typically expressed in clauses and the relations between predications which are expressed
in more than one clause. He talks about two types of possible relations between clauses: 
*basic* and *elaborative*. The basic relations are divided into four propositional operations: 
conjoining, alteration, implication, and temporal. There is also a set of elaborative 
relations: paraphrase, illustration, deixis and attribution. Additionally, there is a parallel 
set of frustrated relations. These are relations that are expected to happen but do not.

In Grimes’ model (in Knott, 1996) the relations play two roles: they give 
information (just as clauses do) and they also bind the clauses together to make a coherent 
discourse. These rhetorical relations can exist not only between clauses but also within 
clauses, for example

This neither-here-nor-there policy will certainly cause unnecessary confusion 
among school children.

Also the arguments of a lexical predicate can occur in several clauses for instance 
the arguments of ‘drop’ might be presented as follows:

The stone dropped. It hit the ground. Zeg made it happen.

Grimes makes a distinction between *paratactic* and *hypotactic* relations. By 
paratactic relations he means those relations whose predicates dominate their arguments in 
a coordinate fashion. For example, in the alternative relation encoded in *He is either in the 
study or he is in the living room*, the arguments are the two propositions expressed in the two 
clauses and the predicate, dominating both propositions, state that exactly one of them is 
true. Hypotactic relations, on the other hand, link a central proposition to a subsidiary one. 
The central proposition then dominates both the subsidiary one and the hypotactic 
predicate itself. For instance, in *He saved the day; he made three touch-downs*, the predicate 
particularly specifies that the proposition in the second clause gives details about the one 
in the first. So this rhetorical proposition, and the specific proposition it refers to are both 
subordinate to the proposition in the first clause.

There is yet another class of relations in Grimes’ model and that is *neutral* 
relations. These relations can be both *paratactic* and *hypotactic* depending on the context 
in which they appear. Thus the relation *collection* can either put a set of entities all in one 
group (we went jogging) or identify one entity in particular, and associate a secondary 
group of entities with it (he went jogging with George and Henry).
2.3.2. Halliday and Hasan’s Relations

Halliday and Hasan’s theory of cohesive relations focuses on the analysis of linguistic resources that signal explicit relations in the surface structure with little emphasis on the deep structure of the text. They published their theory in a book entitled “Cohesion in English” in 1976. For them, cohesion can be thought of as all the grammatical and lexical links that connect one part of a text to another and is largely responsible for the creation of texture (the state of being a text). For Halliday and Hasan cohesion depends on lexical and grammatical relationships that allow sentences to be understood as a connected discourse or text, rather than as independent sentences.

Halliday and Hasan define two main categories of cohesive ties or devices that bind different parts of the text together: grammatical cohesion and lexical cohesion. The former includes reference, substitution, ellipsis, and conjunction. Among these devices, ellipsis and substitution are more frequently used in spoken language because the omitted and substituted elements are heavily dependent on the context for their recovery (Michael McCarthy, 46).

2.3.2.1. Grammatical relations

Reference

Reference, one of the most frequently used cohesive ties, refers to the semantic relation in which a word or words are used so that the reader or listener can identify someone or something in the text. The word or words used for reference are called the reference items. The persons or things identified by the reference items are called the referents. Halliday and Hasan (1976: 31) define reference as a case where the information to be retrieved is the referential meaning, the identity of the particular thing or the class of things being referred to. There is cohesion “in the continuity of reference, whereby the same thing enters into the discourse a second time.” In other words, reference cohesion occurs when one item in a text points to another element for its interpretation. For instance, them in the example below (by Halliday and Hasan, 1976: 2) refers to the linguistic expression ‘six cooking apples’:

Wash and core six cooking apples. Put them into a fire proof dish.
There are two types of reference: exophora and endophora. The former refers to the outside context of situation to supply the reference with a referent and the latter looks for a referent inside the text. e.g.

**Exophoric reference (situational):**

Put it in the fridge, please! (said to a person who is there with a bottle of milk.)

**Endophoric reference (textual):**

A university professor was giving a lecture to the audience. He came from the States.

Endophora includes two subclasses of reference: anaphora and cataphora. Anaphoric reference occurs when the referent appears at an earlier point in the text. For instance, the following sentence is an example of anaphora where the referent of *he* lies in the first part of the text:

His friend is a distinguished university professor. He has published several books so far.

Cataphoric reference, on the other hand, occurs when the referent appears in the subsequent part of the text. e.g.

After his retirement, my friend is going to take a trip around the world.

Here, in this example, pronoun *his* precedes its referent, *my friend*.

Reference items include such grammatical categories as personal reference, demonstratives and comparatives. Personal reference includes nouns, pronouns, determiners that point back to different people or objects or even part of a text. For instance, pronouns can be used in a way that ties them to certain nouns preceding or following them in the text. In sentence (a) below, pronoun *her* points back to Mary as its referent (anaphora), and in sentence (b) pronoun *he* looks forward for its referent (cataphora).

a) Mary was trying to convince everyone that Tom was to blame for the accident, but no one believed her.

b) From street singer to a vocalist with an international reputation, he has breathed life into Punjabi folk and Sufiana. Hans Raj Hans tells ITY JAIN ‘how music found me’ ....

(Hindustan times, Chandigarh, December 31, 2006: 2)
Demonstrative reference includes words that refer to locative proximity like *this* and *these* which point to something nearby, and *that* and *those* that point to something located farther away from the speaker. They can be used with or without a noun. The following example from Raphael Salke (1995: 67-8) will illustrate the point:

In the final year, a number of special option courses allow specialization in areas of particular interest to the student. *These* normally include Syntax, Semantics and Pragmatics, Second Language Acquisition, Experimental Phonetics....

Another cohesive reference is the comparative construction. The comparison establishes a link between two or more parts of the text; therefore, it will lead to the cohesion of the text, for example,

John wanted to stay only a *fortnight* with them but their cousins insisted that he stay even longer.

**Ellipsis and Substitution**

Ellipsis, or as Halliday and Hasan termed it ‘substitution by zero’, is another cohesive device that contributes to the cohesion of the text. It is the omission of the elements normally required by the grammar, but the listener or the reader can reconstruct the missing element using the surrounding context. There are three kinds of ellipsis: nominal, verbal, and clausal. In nominal ellipsis the head noun is left out, depending on the determiner preceding it. Determiners like ‘some’, ‘all’, ‘other’ allow the head noun to be omitted.

A: How many of these books have you read so far?

B: I have read all.

Verbal ellipsis refers to the omission of the main verb. L. A. Thomas (as cited in Michael McCarthy, 1991) talks about two types of verbal ellipsis: echoing and contrasting. An echoing verbal ellipsis occurs when an element from the verb group is repeated, e.g.

A: Has anybody seen the Great Wall of China?

B: Yes, Tom has.

Whereas in contrasting verbal ellipsis the auxiliary changes:

A: Did you talk to the manager?

B: No, but I will some time later.
In clausal ellipsis an element of the clause is dropped, for instance, instead of “It doesn’t matter,” one might say “doesn’t matter” or instead of saying “I hope so” one may say “hope so.”

Substitution is another kind of formal tie between sentences, and it contributes to the cohesion of the text. Substitution is the replacement of the words that have already been used with some specific words. Like ellipsis, substitution operates at nominal, verbal, or clausal level. The special words used as substitutes are one(s) (for a noun), do or any of its different forms does, did, and done (for a verb), and so/not (for a clause), e.g.

Nominal: I decided to buy my son a bike, but he said he didn’t need one.

Verbal: A: Do you feel tired?
   B: Yes, I do

Clausal: A: Will he go with us to the meeting?
   B: Yes, I think so.

**Conjunction**

A fourth major class of grammatical ties is Conjunctive Cohesion. Conjunctive elements are not cohesive in themselves, but they “express certain meanings which presuppose the presence of other components in the discourse.” (Halliday and Hasan, 1976: 226). Conjunctive elements exhibit the kind of relationship that exists between one clause or sentence and another. They may add more information to the preceding clause or sentence (and, moreover, additionally, etc.) or elaborate or exemplify it (for instance, thus, for example, etc.), or they may contrast new information with old information or put another side to the argument (on the other hand, or, however, conversely etc.) Also they may establish cause-effect relationship (so, because, consequently, etc.) or a time link (previously, formerly, before, then, etc.) between utterances, and finally they may show a new departure or summary (by the way, well, to sum up) (Cook, 21).

Halliday and Hasan distinguish five major types of conjunctive cohesion. These conjunctive elements include additive (and, furthermore, additionally, etc.), adversative (on the other hand, conversely, but), causative (so, because, consequently, etc), temporal (before, formerly, previously, etc.) and continuative (well, of course, etc.). The following examples will illustrate these five types of conjunctive cohesive ties:
Additive:
The books in the school library are very interesting; moreover, they will help the pupils in their subjects.

Adversative:
He said he was ready to meet the opposition; however, he ruled out any possibility of a compromise.

Causal:
John gave up all his social activities and devoted much of his time to his studies. Consequently, he could pass his exams with flying colors.

Temporal
When the guests arrived, we all stood up in respect.

Continuative
Success in the competition is quite possible. This, of course, depends on how hard you try.

2.3.2.2. Lexical Relations
Another major type of cohesive devices is lexical cohesion, which is achieved by “the selection of vocabulary”. According to Halliday and Hasan (1976) a class of general nouns stands at the borderline between lexical cohesion and grammatical cohesion because it is a lexical item which is a member of an open set and a grammatical item which is a member of a closed system. They argue that, on the one hand, a general noun, as a cohesive tie, is almost always accompanied by a determiner like the or that which makes it function like an anaphoric reference item, a grammatical tie. On the other hand, a general noun as a lexical item might be a superordinate member of major lexical sets which anaphorically act as a kind of synonym; thus it functions as a lexical cohesive tie. Also Halliday and Hasan talk about two other principal kinds of lexical relations in a text: reiteration and collocation. Reiteration refers to the repetition of the same word (“money” can refer back to “money”), synonym (“ape” can refer to “monkey”), near synonym (“cash” can refer to “money”), and superordinate (“vessel” can refer to “boat”). Collocation, which is the most problematic part of lexical cohesion, refers to “the association of the words that regularly co-occur” (284), or words that are semantically related to one another. For instance, in the following example, the italicized words link the
second sentence to the first one by semantically relating to the words “camping trip” and chores:

Collocation:
On a camping trip with their parents, teenagers willingly do the household chores that they resist at home. They gather wood for a fire, help put up the tent, and carry water from a creek or lake.


2.3.3. Martin’s Relations
Like Halliday and Hasan’s theory, Martin’s coherence relations (in Knott, 1996) focus on explicit linguistic conjunctions. He tries to expand on Halliday and Hasan’s theory in two respects: first, he gives a better account of the relationship between deep and surface relations. There is implicit relation at a particular point in a text if a conjunctive phrase can be inserted at that point. This test can be used to identify implicit relations and classify them. This taxonomy of underpinning relations will essentially reflect that of the linguistic devices for signaling them. A second expansion on Halliday and Hasan’s theory by Martin is that they look into the sentence for ways to signal relations. This expands the range of analysis and makes more generalizations possible. It manages to avoid the danger of encroaching on an account of clause-internal semantics; although some clause-internal correlates of conjunctions are discussed, these are regarded as separate from the class of cohesive devices. Knott (1996) gives Martin’s taxonomy of relations in the following figure:

![Figure 2.1. Martin’s taxonomy of relations](image-url)
This taxonomy, according to Knott, is designed as a systemic network offering a range of high-level and low-level choices. The writer begins to make high-level decisions about the nature of the relations and then proceeds with the low-level relations and accordingly decides about a given conjunction. The relations start from a central division of *additive, comparative, temporal* and *consequential* relations that are supplemented by orthogonal distinctions between internal and external (taken by Halliday and Hasan) and Paratactic and hypotactic (taken from Grime’s). At lower levels, there is an extremely subtle classification which distinguishes around 100 different kinds of conjunctions.

### 2.3.4. Hobb’s Taxonomy of Relations

Hobbs (1985) stresses the amount of the world knowledge needed for the interpretation of discourse which he considers as “… a process of using our knowledge gained in the past to construct a theory of what is happening in the present” (p.2). For him “frequently a message is coherent because it tells about coherent events in the world” (p.9). And the inference one can make, using one’s background knowledge, determines the relations between discourse segments. He finds four major classes of such relations, and in each class the coherence relations are motivated by the requirements of discourse situation: *occasion, evaluation, background and explanation*, and *expansion*. The first class of these relations is *occasion* which refers to 1) a change of state that can be inferred from the assertion of the immediately preceding segment (SO) whose final state can be inferred from the current clause or the larger segment (SI) and 2) a change of state can be inferred from the assertion of SI whose initial state can be inferred from the SO, e.g.

a) Walk out of the door of this building.

b) Turn left.

c) Go to the corner.

In this example, the first sentence, according to Hobbs, describes a change of location the final state of which holds during the event described in the next sentence and that location is the initial state in the change of location described in the last sentence.

The next class of relations, *evaluation*, which Hobbs believes is close to his *explanation* class of relations, and usually serves as a conversational goal, suggests that a)
SI tells you why SO was said, and b) From SO infer that SI is a step in a plan for achieving some goal of the discourse.

1) Could you lend me your pen? I left mine at home.
2) The funniest thing happened to me. (a story). Or
   (A story). It was funny at that time (p.12).

The third class of relations includes background and explanation. Background relation helps to infer from SO a description of a system of entities and relations, and infer from SI that some entity is placed or moves against that system as a background, or vice versa:

Background:

Ernest Hemingway was a great American writer. He wrote “The Old Man and the Sea” which won the Pulitzer Prize in 1953.

And explanation relation (cause effect relation) infers that the state or event asserted by SI causes or could cause the state or event asserted by SO, e.g.

Explaination: John did not feel well. He did not attend school today.

And, the final and the largest class of Hobbs’ coherence relations is expansion. This relation expands the discourse in space and deals with inferential relations between the different segments of text and can be involved in easing the listeners’ inference process. This class of relation involves two relations: parallel (or elaboration) relation and contrast. In parallel relation the same proposition is inferred from the assertions of SO and SI; in fact the second segment adds some more important information.

John was the topper of our class. He got the highest mark.

And contrast relation suggests two clauses (or discourse segments) which refer to related situations or themes that imply a contradiction. It is this relationship of comparing something similar, yet different, that is believed to be typical of contrastive relations, e.g.

He is not likely to do well on the test, but he is most likely to do better than any other of his classmates
2.3.5. Grosz and Sidner’s theory of relations

Grosz and Sidner (1986) take a different approach to discourse structure in general and coherence relations in discourse from Hobbs. In their theory, they stress the role of purpose and processing in discourse. For them discourse segments are the main units of structure which are linked by a small number of relations to make a larger discourse segments. They state the gist of their theory as follows:

Discourse structure is a composite of three interacting constituents: a linguistic structure, an intentional structure, and an attentional state. These three constituents of discourse structure deal with different aspects of the utterances in a discourse. Utterances - the actual saying or writing of particular sequences of phrases and clauses - are the linguistic structure's basic elements. Intentions of a particular sort and a small number of relationships between them provide the basic elements of the intentional structure. Attentional state contains information about the objects, properties, relations, and discourse intentions that are most salient at any given point. It is an abstraction of the focus of attention of the discourse participants: it serves to summarize information from previous utterances crucial for processing subsequent ones, thus obviating the need for keeping a complete history of the discourse (p.177).

According to Grosz and Sidner (1986) discourse participants have an overall purpose in a discourse, i.e., they intend to entertain, convince, move into action, and
describe an event etc. This is called discourse purpose (DP). Each segment in the
discourse, in turn, has a purpose to contribute to the achievement of the overall discourse
purpose which is called discourse segment purpose (DSP). In fact DPs and DSPs are of
the same kinds of intentions. These intentions appear to offer a good way of defining
relations in discourse.

Grosz and Sidner distinguish two structural relations that play an important part in
discourse structure: dominance and satisfaction-precedence:

An action that satisfies one intention, say DSP1, may be intended to provide part
of the satisfaction of another, say DSP2. When this is the case, we will say that
DSP1 contributes to DSP2; conversely, we will say that DSP2 dominates DSP1
(or DSP2 DOM DSP1). The dominance relation invokes a partial ordering on
DSPs that we will refer to as the dominance hierarchy. For some discourses,
including task-oriented ones, the order in which the DSPs are satisfied may be
significant, as well as being intended to be recognized. We will say that DSP1
satisfaction-precedes DSP2 (or DSP1 SP DSP2) whenever DSP1 must be
satisfied before DSP2.

In other words, Discourse Segment Purpose 2 (DSP2) dominates Discourse
Segment Purpose 1 (DSP1) if the satisfaction of DSP1 is intended to provide part of the
satisfaction of DSP2. In the following text by Knott (1996), there is a dominance relation:

Television is bad for children. They grow up on a steady diet of violence and
advertising.

Moreover, DSP1 satisfaction-precedes DSP2 if both purposes are dominated by
some other purpose DSP3, but in order to satisfy DSP3, DSP1 must be satisfied before
DSP2. Again the following text by Knott, will illustrate the point:

Try out the gun by firing off a few rounds. First, release the safety catch; then
squeeze the trigger gently.

This theory suggests that all the segments in discourse must not only be
interrelated and serve the purposes of one another but also serve the main purpose of the
discourse.

2.3.6. Centering Theory

Centering theory was formulated within the framework of Barbara J. Grosz’s
focusing model which claimed that in a discourse certain entities are potentially the focus
of attention. She made a distinction between two types of focusing: immediate (or local) and global focusing. “While global focusing is determined by the total discourse and situational setting of an utterance and influences … the overall interpretation of an utterance, immediate focus refers to the influence of a listener’s memory for the linguistic form of an utterance (the actual words and the syntactic structure) on his interpretation of a subsequent utterance” (Grosz and Sidner, 1998). Centering theory seeks to explain the differences in the ways the same piece of information is expressed in different ways by looking beyond the surface form of the utterances in the discourse. The use of different referring expressions and various syntactic forms make different inference demands on hearers and readers of the discourse, and these differences in inference load lead to certain differences in coherence (Grosz, Joshi, and Weinstein, 1995), i.e., the manner in which the propositional content is expressed in different linguistic forms, certain ambiguities may result and an inference load is placed on the hearer or reader, and he resorts to certain resources to infer to remove the ambiguities and comprehend the discourse.

One source of ambiguity in discourse is the identification of referents of some noun phrases. The process of determining these referents involves some degree of inference on the part of the hearer or reader. That is to say, if the hearer or reader wants to have a coherent understanding of the discourse, he or she must take recourse to some linguistic and extra-linguistic resources to extract information from the text and infer about the referents of the noun phrases in the discourse. In the following example Grosz, Joshi and Weinstein (1995) illustrates how the use of pronoun “he” in utterance (e) leads to the ambiguity of the text:

a. Terry really goes sometimes.
b. Yesterday was a beautiful day and he was excited about trying out his new sailboat.
c. He wanted Tony to join him on a sailing expedition.
d. He called him at 6 A.M.
e. He was sick and furious at being woken up so early.

At the first glance, the referent of pronoun “he” in utterance (e) is not clear, i.e., it is not known whether it refers to Terry or Tony; however, the word “sick” can help the reader to infer that “he” may refer to Tony, not Terry.
Thus Grosz, Joshi, and Weinstein set the goal of centering theory on the interactions of choice of referring expressions, attentional state, the inferences required to determine the interpretation of an utterance in a discourse segment, and coherence (Grosz, Joshi, and Weinstein, 1995).

Grosz, Joshi and Weinstein used the centering terminology to avoid confusion with the word “focus” previously used in linguistics. Thus they introduced the terms “forward-looking” and “backward-looking” centers to correspond roughly to Sidner’s potential foci and discourse focus. For them, the term Centers are those entities that serve to link that utterance to other utterances in the discourse segments which contain it; moreover, an utterance is uttering of a sequence of words in a given point in the discourse and it is the utterance not an isolated sentence that contains the centers.

Centering theory (which is said to account for the local coherence of discourse) is based on the assumption that a discourse segment (DS) is comprised of a sequence of utterances (Ui .... Um). In each utterance (U), there is a list of forward-looking centers Cf (Un)—entities which can potentially become the center of the next utterance (Un+1). Based on the grammatical salience ranking of a forward-looking center in the list, it is likely to be the preferred center (Cp) of the next utterance (Un+1), which is the first entity (or in English the subject of the sentence). An utterance (Un) actually centers or is “about” only one entity at a time, the backward-looking center (Cb) which must specifically be realized (mentioned) in the immediately preceding utterance (Un-1).

Centering theory makes certain claims about discourse coherence, but the most fundamental one maintains that the more the discourse sticks to the centering constraints and rules, the more its coherence increases, and the less inference load will be placed upon the hearer or reader for its interpretation. Grosz and Sidner (1998) summarize the claims as follows:

1) There is only one backward-looking center (Cb) for each utterance; there are multiple ranked members of forward-looking centers (Cf’s). For instance, in the following sentence there are three potential candidates for becoming the center of the next utterance: internet, role, student’s life, but only one of these nouns has the chance of being the center (topic) of the next sentence:

Internet plays an important role in a student’s life.
2) The ordering of forward-looking centers (Cp’s) and the identification of backward-looking centers (Cb’s) are affected by their syntactic role in the utterance rather than by their thematic role, e.g., the noun that plays the role of the grammatical subject is more likely to become the center of the next sentence; hence, in the above example sentence, internet is more likely to be the center of the next sentence.

3) Surface order affects forward-looking centers but not the identification of backward-looking centers.

4) Centering theory can be applied to the explanation and interpretation of different linguistic devices in different languages; other linguistic constructions, such as topic markers, function in part to determine the center.

Grosz, Joshi and Weinstein (1995) distinguish three major types of transitions (topic shift) from one utterance to the next in Centering Theory: These transitions, which are created by the speaker or writer’s choice of the linguistic realizations that form the segment, affect the coherence of the segment. The transitions are center continue, center retain, and center shift. While center continue creates the highest degree of local coherence, the center shift yields the lowest. The three transitions are defined as follows:

1. **Center continue**: \( \text{Cb(Un+1)} = \text{Cb(Un)} \). In this type of transition the backward-looking center (Cb) of the utterance is the same as the backward looking center of the next utterance. Thus, a CONTINUE transition occurs when the backward-looking center (Cb) and the preferred center (Cp) of the current utterance are the same and; in addition, the Cb of the current utterance is the same as the Cb of the previous utterance. The following sentences from the students’ essay corpus will clarify the point. (Sentences are original and no corrections have been made).

   Internet plays an important role in a student’s life. It is like an electronic encyclopedia which consists of information about every field…. Internet has proceed to be a boon for students who can’t afford to buy costly books.

   (Essay 1, appendix I. A)

2. **Center retain**: \( \text{Cb(Un+1)} = \text{Cb(Un)} \). This entity differs from the previous one in that the backward looking center (Cb) is not the most highly ranked element in the forward looking centers \( \text{Cf(Un+1)} \), subsequently the backward-looking center of
the next utterance is not the most likely candidate for the backward looking center of the utterance after it. Although it is retained as backward-looking (Cb) in the next utterance (Un+1), it is not likely to play that role in the utterance after it (Un+2).

Internet is a global computer network providing a variety of information and communication facilities. Nowadays every information is available on Internet.

(These are originally the students' sentences. No corrections have been made.)

In the above example there is a retain transition in that the center of the second utterance (information) and the center of the first sentence (internet) do not co-refer. The center (or topic) of the second utterance (information) is picked out from among the forward looking centers (Ci) of the previous utterance, namely internet, computer network, and communication facilities.

3) Center shift: Cb(UnH) / Cb(Un). This type of transition occurs when the backward-looking center (Cb) of an utterance is not the same as the Cb of the next utterance. There is no coherence or cohesion link between the utterance pairs, for example.

Students waste their parents money doing all these things which have no use. At the end internet is boom and curse both.

(These are originally the students' sentences. No corrections have been made.)

2.3.7. Thompson and Mann’s theory

Rhetorical structure theory (RST) was developed by Thompson and Mann (1988) as a tool for the analysis, generation and understanding of text as a means of communication. Upon examining a corpus of 400 texts of varying genres and lengths, Thompson and Mann, found that pairs of regions whose mutual relevance, position, and form can be identified with recurrent relations between them. They formulated 3 basic testable assumptions underpinning their rhetorical structure theory: first, texts are hierarchical groups of clauses that relate to one another in different ways. Second, these relations which can be described functionally in terms of the purpose of the writer and the writer’s assumptions about the reader, reflect the writer’s options for organizing and
presenting the concepts and finally, there is the most common type of relation that is
called nucleus-satellite in which one part of the text is central and the other is ancillary or
supplementary to it.

Knott (1996) finds, among others, three distinctive features in Mann and
Thompson’s Rhetorical Structure Theory (RST). Firstly, RST relations make reference to
propositional content of text spans, as well as to the intentions of the writer in presenting
them. For example, the MOTIVATION relation indicates that one of the spans puts forth
an action to be carried out by the reader, or SEQUENCE relation specifies that a
succession relationship must exist between related spans. The second feature of RST is its
de-emphasizing the role of linguistic devices to signal rhetorical relations. Mann and
Thompson even go further in claiming that some rhetorical relations do not have
corresponding conjunctive signals. Finally, the central feature of RST is its notion of
nuclearity. Based on this concept, among the text spans one is more central to the intention
or the purpose of the writer. The most central span of the text is called the nucleus and the
less central one is the satellite. According to Mann and Thompson, the majority of text
spans are structured using nucleus-satellite relations, i.e., one span is at the center of the
text and others are supplementary to it so that if the nuclear span is omitted from the text
the significance of the material which is in its satellite(s) should be unclear (Mann &
Thompson, 1987).

Rhetorical structure theory offers some 23 relations. The top level distinction is
made between Subject-Matter and Presentational relations. Subject-Matter relations affect
the reader so that he can recognize them between the text spans, e.g., the reader
understands that there is an Antithesis relation (which is a Subject-Matter relation)
between the following two clauses (text spans):

1) But I don't think endorsing a specific nuclear freeze proposal is appropriate for CCC.
2) We should limit our involvement in defense and weaponry to matters of process, such
as exposing the weapons industry's influence on the political process.

In the above example, the first text span is the nucleus and the second is its
satellite. There is an antithesis relation between the two spans; there are two contrasting
spans but the reader clearly recognizes the writer’s positive regard for the nucleus. On the
other hand, Representational relations seek to increase some inclination in the reader. For
instance, Motivation relation is representational in that it tries to motivate the reader into carrying out the action put forth in the nucleus span:

1) Now, buy a specially marked box of 10 Memorex 5 ¼ mini flexible discs
2) and we’ll send you an additional mini disc FREE.

In this example the writer tries to influence the reader to buy the mini flexible discs presented in the first text span or the nucleus. Thus the relations of the nucleus span and the satellite is that of motivation and, hence, representational. The following figure by Knott (1968) depicts the taxonomy of RST relations:

Figure 2.3. Mann and Thompson’s taxonomy of RST relations

Mann and Thompson’s RST is characterized by its strong structural description of text. For them a text span is arbitrary. It can be a clause or larger spans made up of clauses. No matter what size the text span takes, it should have independent and functional integrity. In RST, relations must hold between non-overlapping text spans and fitted onto structures called schema applications which are derived from simpler structures called schemas. The following diagram based on Mann and Thompson (1987) illustrates the application of the use of RS schemas in the description of texts:

1) A classical music concert will be held in the city’s main concert hall next Sunday.
2) Tickets are $7.50 except for the opening night.
3) Some of the best musicians will be playing in the event.
4) They will have their best performance.

Furthermore, there is yet another kind of schema called *joint* that is used for lists and consists of as many nuclei as there are items in the list with no related satellites. For instance, the following text by Mann and Thompson is a case in point:

1) Skies will be partly sunny in the New York metropolitan areas today.
2) It will be more humid, with temperatures in the middle 80’s.
3) Tonight will be mostly cloudy, with the low temperature between 65 and 70.

The following diagram depicts the JOINT RS relation between the above text spans:

**Figure 2.5. Sample JOINT RS relations**

2.4. Text coherence and text processing models

Reading and writing are the two sides of the same coin. A writer writes to be read, and the reader reads the product of the writer. However, for a writer to be able to produce a comprehensible text, he has to have a good awareness of language and variation, play in
meaning, and also “an ability to shift from the perspective of the writer to that of the reader” (Horning 1991, p. 135). That is to say, the writer has to identify himself with the reader and think of how he can write a readable and comprehensible text for the prospective reader and get into an efficient interaction with him or her. Reading research findings can have important implications for not only teaching reading but teaching composition as well because they reveal clear facts about the nature of reading and writing, how reading comprehension occurs, and what features of the text contribute to successful understanding and comprehension of the text.

Thus much research has gone into the ways that lead to the readability and comprehensibility of text as well as reader-writer’s effective interaction (Horning 1991). Different readability formulae have been developed offering numerical measures for text difficulty levels. Almost all of these formulae depend on such surface characteristics of a text as the number of words, sentences, and syllables. For instance, Gunning Fog readability formula takes into account the number of words and sentences as well as the number of three or more syllable words. Fry readability formula depends on the number of sentences and syllables per hundred words. Flesch-Kincaid Readability Formula rely on the average sentence length in words or average number of words in sentence and average number of syllables per word. Smog readability index considers the number of sentences and the number of polysyllabic words (words with three or more syllables). And finally Dale-Chall readability formula calculates the US grade level of a text sample based on sentence length and the number of unfamiliar words (words that do not appear on a specially designed list of common words that are familiar to most 4th-grade students).

Despite their high correlation for their reliance on the surface features of texts, readability formulae suffer serious problems in terms of their validity, utility and credibility. For instance, readability formulae fail to assess the readability index of technical texts since they are mainly devised to measure the difficulty level of school and college writings. Their credibility was also questioned. For example, using the Fry Formula, Gordon (as cited in Oakland and Lane 2004), found the readability of passages from Plato’s *Parmenides* to be between the sixth and tenth grades (i.e., ages 12 and 16 respectively, and between the fourth and eighth grades (i.e., ages 10 to 14 respectively) using Dale-Chall formula. Rygiel (as cited in Oakland and Lane 2004) found Tolstoy’s
Anna Karenina to be a seventh grade level text and both Chaucer’s *Canterbury Tales* and Voltaire’s *Candide* as eighth grade level texts, levels considered to be much lower than the actual readability of the texts.

Although the readability formulae are being widely used, they fail to take into consideration such high level features of text as cohesion and coherence as well as readers’ background knowledge which play a far more significant part in the readability level of a text. Therefore, a large number of linguistic and cognitive studies have been conducted and enormous strides have been taken since 1970’s to investigate into textual and extratextual factors that lead to the readability and comprehensibility of the text (For instance.; Zwaan, 2004; McNamara and Kintsch, 1996; Mackeown et. Al. 1992; Horning, 1991; Trabasso and Sperry, 1985; Stotsky, 1983; Kintsch and Van dijke, 1978). Some of these studies focus on the role of cohesive text elements such as reference, different connectives, and lexical cohesion in reading comprehension and some others take a cognitive or psychological approach in investigating reading comprehension. In addition to the information they add to our knowledge of reading comprehension process, these finding can have valuable practical implications for teaching of writing.

The fundamental rule of writing is that the text should be both locally and globally coherent, i.e., the ideas should flow easily and smoothly from one sentence to another. As each idea is introduced into the text, it is easily linked to the information that readily precedes it. According to O’Brien and Myers (1999), models of text comprehension agree on the readers’ use of information in working memory when integrating each new sentence into text comprehension; however, there is less agreement on when a sentence is integrated with information that is not present in the working memory. Therefore, these models disagree over the extent to which it is assumed that readers will access related distant information when the text is locally coherent.

There are two viewpoints regarding the issue of text processing: “minimalist” position (which gives a passive role to the reader and a “constructionist” position (which assigns a more active role to the reader). The main difference between these two positions is the extent to which the information from the earlier parts of the text and the background knowledge is available to the reader when reading a text. According to a strong version of the minimalist approach the amount of information readily available to the reader is quite
limited. When the text is locally coherent, no connection is made with the earlier parts of
the text, and little activation of world knowledge is needed. Conversely, the
constructionist view maintains that reading is an active process, and the reader
continuously searches for meaning in the text and tries to bridge the gaps between ideas in
the text with whatever information is available to him including information from the
previous portions of the text as well as his background world knowledge. In fact neither of
these two views can be absolutely correct because unlike the strong version of the
minimalist view, in reading even locally coherent texts there may be reactivation of
information present in the preceding portions of the text, and contrary to the strong version
of constructionists, limited capacity constraints does not permit the readers possibly to
find and make every possible connection. If they did, as text length increased, reading
speed would have to steadily slow down because the reader would have to actively search
increasing amount of information to link ideas together for full comprehension and this is
far beyond the memory capacity of the readers.

There is yet another view that takes into consideration both the minimalist and
constructionist view points. According to this memory-based view, the reader links the
concepts that are currently in the working memory to those which were previously
processed and the related concepts from the general world knowledge (O’Brien and
Myers, 1999; Graesser et al. 1999). This memory-based view of text comprehension laid
the basis for some text processing models such as Causal Network Model (Trabasso,
1989), Construction-Integration Model (Kintsch, 998) and Landscape Model (van den
Broek, et al 1996). The central point in all these models is that efficient reading involves
reader’s construction of a coherent mental representation which usually goes beyond the
information presented in the text and involves varying degrees of the reader’s background
knowledge (van den Broek and Gustafson, 1999).

2.4.1. Causal Network model

Causal Network Model developed by Trabasso (as cited by Goldman et al., 1999.
Magliano, 1999, and van den Broek, 1999) is based on the assumption that a coherent
mental representation of a text is best captured by a network of interconnected nodes
representing the text elements with the connections between them showing the semantic
relations identified by the reader. Causal network plays a major role in narratives as well as some kinds of expository texts. This model assumes that comprehension is achieved through causal reasoning and the resulting inferences link the story elements. It follows that most of inferences that are made online are causal in nature. To find out what and when causal references should be made while reading a story, the causal network model seeks to provide a basis for determining causal relationships between sentences in stories (Magliano, 1999).

Story sentences, based on Causal Network Model, can be put into five categories depending on how they fit into an episode structure which is composed of a set of story units. These categories include: settings, events, goals, attempts, outcomes, and reactions. A typical story structure may begin with Setting, events that introduce a protagonist and specify the physical circumstances (e.g., time, and location) of the story. An initiating event includes a problem or precipitating event that stimulates a Reaction from the protagonist, which in turn results in the establishment of a Goal. The protagonist's goal motivates Actions, which in turn produce an Outcome that leads to a Reaction or Ending to the story. Stories with more complex structures with multiple protagonists and multiple sequences of events can be built from these basic story-grammar categories (Lorch et. al. 1999).

The following simple story illustrates the causal relationships among its sentences:

<table>
<thead>
<tr>
<th>Story sentences</th>
<th>Episode category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billy went to the zoo.</td>
<td>event</td>
</tr>
<tr>
<td>The zoo had many kinds of animals.</td>
<td>setting</td>
</tr>
<tr>
<td>Billy saw monkeys, birds, and a lion.</td>
<td>event</td>
</tr>
<tr>
<td>Billy liked the lion the best.</td>
<td>reaction</td>
</tr>
<tr>
<td>He heard the lion roar.</td>
<td>event</td>
</tr>
<tr>
<td>The roar was so loud;</td>
<td>setting</td>
</tr>
<tr>
<td>Billy had to cover his ears.</td>
<td>outcome</td>
</tr>
<tr>
<td>Billy wasn't afraid of the lion.</td>
<td>reaction</td>
</tr>
<tr>
<td>The lion was in a cage.</td>
<td>setting</td>
</tr>
</tbody>
</table>

The most important feature of text elements in a causal network representation is that they are different in the number of causal connections that they have to other
elements. This feature has been claimed to be a strong predictor of performance on memory tasks (Van den Broek and Gustafson, 1999). Although the network of causal relations are mainly applied to the analysis of narratives, it plays a major part in reading comprehension and recall of texts. Readers have been found to remember and recall a text which is more causally connected better and faster (Obrien and Myers, 1987; Van den Broek and Gustafson, 1999; Tapiero, 2007) because, among other relations, causal and enabling inferences that link ideas and events into a network-like text representation are vital. And “... if a connection between two text units is identified, the processing is successful and the reader can go on to the next text unit” (Tapiero, 2007, p. 116).

The degree of the causal connectedness between text units affects the reader’s recall differently. According to Horiba (1996), readers recall sentences that are moderately related to each other better than both minimally connected sentences and highly connected ones. The reason for this, according to Myers (as cited in Horiba, 1996), is that for moderately connected sentences readers are more likely to generate a causal inference that relates the first and the second sentence in the pair. This elaborate inference along with the information of the original sentences are kept in memory representation that later facilitates recall of sentences, whereas highly related sentences are directly related to one another leaving no room for the generation of causal inference by the reader. On the other hand, it is also unlikely to make an inference for a minimally related sentence pair because the event in the first sentence and that in the second sentence do not put enough constraint on one inference; therefore, many alternative inferences become possible.

2.4.2. Construction-Integration (CI) Model

Reading comprehension involves a process of construction of a coherent mental representation that may mirror different levels of understanding; in other words, a text can be comprehended by varying degrees ranging from the most superficial to deep understanding (Cote’, et. al., 1998; McNamara and Kintsch, 1996; Kintsch, 1988; van Dijk and Kintsch, 1983), and essential to the theory of construction-integration model is the distinction made between these different levels of understanding a text: the surface code, the text-base, and the situation model (Kintsch, 2002). The first and the most superficial of these three levels is the surface code. This level addresses the surface
features of text, that is, the words and the phrases are encoded or comprehended as are the linguistic relations between them. The next level is the text-base. This level of text encoding captures the meaning relations among different elements within the individual sentences and across sentences throughout the text cued by the text and reflecting little prior knowledge. At this level the reader makes use of his/her syntactic and semantic knowledge with little recourse to his/her background knowledge. The final product of comprehension is the situation model which is a mixture of the structures directly derived from the text and the structures which are added from the reader’s prior knowledge and captures the referential meaning of the text, i.e., the real or imaginary situation in the world. Thus in the construction of a situation model, the reader has to go far beyond the text-base and make use of different types of world knowledge as well as discourse knowledge such as text structure, and recognizing and using rhetorical devices etc. (Kintsch, 2002; Cote’ et. al., 1998).

There are two more levels added by some psycholinguists: communication and text genre (Grässer, Millis and Zwaan, 1997). Communication level refers to the pragmatic communicative context within which the text is used. At this level, the writer aims at conveying ideas to the audience or communicating story episodes to the readers. As to the text genre, discourse analysts have identified many categories and subcategories of text genre through which the writers organize and convey their ideas such as narrative, exposition, description, jokes, etc. Thus not every genre is possible or available for a specific text (Kaplan, 1996). However, of these five levels of text understating, the text-base and the situation model levels are the most fundamental and relevant to the construction-integration (CI) model.

Construction-integration model attempts to simulate the computations involved in the construction of a mental representation of a text in human comprehension. In this model, processing of a text takes place in two stages: construction and integration. In the construction stage, textual concepts, syntax, semantics and world knowledge are activated without considering the global constraints to create an activated network of concepts. In the integration stage activation occurs through the concepts already activated, and those concepts that are compatible with the context mutually enhance the activation of one another and the concepts which are not compatible with context are not activated. This
theory concentrates on two aspects of text comprehension: The text itself and the background knowledge of the text reader, which when integrated with the text-base produces a situation model for the text in question. A text-base in CL represents the meanings of the phrases and sentences of a text through a set of interrelated propositions or roughly simple sentences. Moreover, there is also a global propositional representation of macro-propositions which are organized hierarchically, including larger text units such as paragraphs, different parts of a text and finally the whole text itself (Kintsch, 2002).

According to Kintsch, there are also three macro-rules that permit to trace the construction of macro-propositions. These rules are: deletion, generalization, and construction. Deletion is responsible for the omission of those propositions which are not relevant to the macro-propositions. Generalization replaces a general concept with a specific one, and finally, construction substitutes a general event for a series of specific ones. Though these rules are not strong enough to create macrostructures, they can be used to explain how a macrostructure is generated.

Thus, the mental representation of the text, the global organization of which may digress from the macrostructure of the text, is constructed through the interaction of the text information with the comprehender’s background knowledge. The information provided by the textbase makes it possible for the reader to establish a link between the new information and the relevant background knowledge. And the successful linkage between the text information and the reader’s background knowledge is of vital importance for understanding the text and learning from it so that he/she can apply the information to novel situations and integrate it with the prior knowledge (McNamara and Kintsch, 1996; Kintsch, 1988; Kintsch, 2002).

2.4.3. The Landscape Model

Landscape model is another major model which was proposed by Paul van den Brock. This computational model seeks to explain the processes involved in text comprehension during reading and in the construction of memory representation (van den Brock et. al., 2002, Ward and Littman, 2005). Based on this model, reading is a cyclical and dynamic process, that is, the ideas and concepts associated with the text fluctuate in their activation. As the reader goes on reading text, each consecutive text segment such as
phrases, clauses, and sentences elicit an array of cognitive processes in the reader including associative, spread-of-activation processes as well as deeper comprehension process. Consequently, the reader’s working memory content or attention buffer changes, i.e. new text elements are activated, others are deactivated, and yet others increase or decrease in their activations. Therefore, during reading the entire elements fluctuated in their activations, they create a landscape of activation (van den Broek et. al. 2002; van den Broak, 1995) the shape of which differs from individual to individual and is determined by such factors as reader’s attentional resources and his/her attempts to maintain coherence.

Figure 2.6. Paul van den Broek’s landscape of activation for the “Knight” story (1996, p. 173).

In the above illustration, van den Broek (1996, page 137) depicts the landscape of activation of concepts across reading cycle of a story called “Knight”. This story contains some concepts or propositions. The picture reflects the pattern of activation of the concepts on the right column. The major concept in the story is “dragon” which is either directly mentioned or referred to by a pronoun. It is sometimes needed for causal coherence, or at some points in the story this concept is not mentioned at all. However, the cross-section of the landscape shows that all the concepts are simultaneously activated (van den Broek, 1996). The activation of these concepts will lead to the construction of mental representation of the text.

Therefore, in Landscape model, activation comes from four potential sources at any reading cycle: the first source is the textual input or the text currently being processed supplemented by activation from other sources, secondly, information immediately preceding the current text and carried over in working memory into the current cycle, the
third source is episodic memory and the information that is activated even earlier constructed over the preceding cycles, and finally, the reader’s semantic memory and background knowledge offers yet another source of activation which is accessed through elaborative inferences that embellish the information by the text itself (van den Broek, 2002).

A fundamental factor in determining which of these sources are accessed at any particular cycle in reading consists of standards of coherence maintained during reading. These standards reveal the readers’ beliefs and ideas about components of good comprehension, as well as readers’ specific goals for reading a given text. Readers also use these standards to measure comprehension and to decide whether to get involved in more comprehension processes. These standards differ from reader to reader depending on the individual’s differences, reading goals, text types, etc. (van den Broek, 1995; van den Broek, et al. 2002).

In all the above comprehension models, the text and the textual elements play a major role. Unless the writer makes the right choice of vocabulary, makes the right sentences and establishes the right links between sentences, the relevant concepts and background knowledge will not be activated in the minds of the readers. For instance, in a narrative text, which is normally dominated by causal and temporal cohesion, the writer has to establish the causal links between discourse segments through the proper use of causal verbs, i.e., the verbs that bring about a change in its objects (cause, kill, fill, change etc.) and causal particles such as conjunctions and transitional adverbs and other forms of connectives (so, because, so that, consequently, etc.). Similarly, the writer is required to use proper verbs with particular tense and aspect and temporal adverbial particles like adverbial time clauses and conjunctions (before, after, then, formerly, etc.) if he or she wants to create temporal cohesion in his text.

Furthermore, even the much-adored notion of textual coherence does not avail all readers in the same way. The degree of textual coherence must be geared to the reader’s knowledge of the content of the text. McNamara et al. (1996) found that only low-knowledge readers could benefit from highly coherent texts. These readers used the explicit textual ties to save the inference of unstated relations in the text. By contrast, high-knowledge readers profited more from minimally coherent texts because a poorly
written text makes the knowledgeable readers use their background information of the text domain to infer the unstated relations.

2.5. Text Coherence and background knowledge

Both the writer and the reader are equally responsible for the successful comprehension of a text. The writer must put into the text all the elements that result in a cohesive, well-connected, locally and globally coherent text. He must observe all the conventions of writing and care for the surface features of the text like the rules of spelling, paragraphing, indentation hyphenation etc. He must also know his readers and have a clear intention to write for them. Therefore, it is only through controlling of writing conventions that the writer, as the text generator, can meaningfully interact with the reader or receiver of the text (Kaplan, 2005). On the other hand, the reader must be held responsible for efficient reading comprehension too. He must be able to decode words and associate them with their meanings. He must be fluent enough in dealing with phrases and sentences so that their meanings are not lost before the next one is processed (Curtis and Kruidenier, 2005). Moreover, the reader must have enough background knowledge of the text domain so that he can use it to make inferences while reading the text. The process of inference making is crucial to comprehension. It becomes even more important when the text does not have enough cohesion and coherence. In other words, the less cohesive and coherent the text is, the more inference load is placed on the reader. Therefore, the reader’s background knowledge not only makes up for the lack of coherence and connectivity of the text but also facilitates and enhances comprehension and learning (McNamara and Kintsch, 1996).

Numerous psycholinguistic research articles with conflicting results regarding the role of connectives and lexical markers in discourse processing have been published. Some find explicit discourse markers as facilitating the reading process and contributing to the reader’s formation of a coherent mental representation of the text. For example, Stoodt (1972) found significant correlations between the readers’ ability to identify relationships that conjunctions signal and reading comprehension. She also found a significant difference in the difficulty of various conjunctions. Haberlandt, (1982) observed that readers benefit from the presence of the markers of causal relations both in
Sanders (2000) discovered that explicit marking of the relations resulted in faster processing but did not affect recall. Degand et al (1999) found out that the existence of connectives in the text actually improved comprehension. And finally, Degand and Sanders (2002) indicated that readers benefit from the presence of causal relational markers both in LI and in L2.

Studies have also suggested that a number of conjunctives are more difficult than others (Stoodt, 1972) and some others are more helpful to reading comprehension. For instance, causal conjunctions facilitate reading comprehension more than additive conjunctions. Moreover, some researchers have even claimed that certain conjunctions not only fall short of facilitating reading comprehension but also hinder comprehension.

Despite the general consensus that explicit cohesive devices have an important role in reading comprehension and text recall, some psycholinguistic studies show that background knowledge of the readers plays at least an equal role. For instance, in order to find out if background knowledge would make up for the less coherent text or whether an advantage would still be demonstrated for the coherent text, McKeown et al. (1992) manipulated 3 passages to improve their coherence. She then gave the original passages to a group of fifth graders and the manipulated versions to a similar group. She provided both groups with the necessary background knowledge of the texts’ domains. The results indicated that the students who read the revised texts were able to use the information gained from the background knowledge provided prior to taking the tests. It appears that the coherent nature of the manipulated texts along with the background information was responsible for the better achievement of the students. On the other hand, the students who read the original texts, though they had been provided with the same background knowledge, were less able to use the advantage of the given information to construct meaning from the text. It was seemingly due to the nature of the original texts with coherence gaps.

In another study motivated by construction-integration model of comprehension, McNamara and Kintsch (1996) investigated the effects of background knowledge on learning from high- and low-coherence history texts. The results indicated that low-knowledge students could benefit from highly coherent (revised) texts whereas high-knowledge students could perform better on texts which were less coherent. McNamara
and Kintsch concluded that “revising instructional texts to be more coherent and explicit can indeed foster better text memory and learning. However, such revisions are beneficial only for low-knowledge students and may be counterproductive for students who have the necessary knowledge background to understand low-coherence texts on their own” (p. 282).

2.6. Assessment of text coherence: models and techniques

The concepts of coherence and cohesion are two of the textual features without which a text simply makes no sense. They are among the high level features that play a crucial role in determining the quality of an essay. Therefore, to help learners write coherent and meaningful texts, teachers must incorporate into their lesson plans ways to teach textual coherence and cohesion to students and to evaluate their compositions. To evaluate a text, one has to take into account, among other things, the degree to which the ideas hold together and make a cohesive, coherent and comprehensible whole.

The need for the assessment of textual coherence led some researchers to think up models and techniques based on coherence relations theory that can be used to evaluate and measure coherence of texts. For example, Halliday and Hasan’s taxonomy (1976), Lautamatti’s Topical Structure Analysis model (1978) and Givon’s Topic Continuity Model (1983), Hoey’s lexical cohesion model (1991), and Latent Semantic Analysis (LSA) technique are some of the models that have been applied to assess the local and global coherence of texts.

Halliday and Hasan proposed a taxonomy of coherence ties that can be used to identify cohesive ties between different text segments and thereby assess the cohesion and coherence of that text. According to their model, a text is regarded as a semantic unit. The parts of the text are linked by some explicit cohesive ties. These cohesive devices go beyond "sentence boundaries" and make the sequences of sentences to be understood as a text. These cohesive ties fall into three classes: grammatical, lexical and conjunctive. Each of these classes is divided into subclasses.

Lautamatti’s (1987) topical structure analysis views a text’s coherence as the way in which certain key words or topics are repeated in a text and the way these topics are developed across sentences leaving three different progression patterns: parallel,
sequential and extended parallel. Though the density of parallel progression will lead to more locally coherent texts, they often result in underdevelopment of the main discourse topic. On the other hand, more sequential progressions will result in more development of the main topic of the discourse but too many sequential progressions will lead to drifting away from the main topic and hence a lack of textual coherence.

For Givon (as cited in Jin, 1998), coherence can be viewed in terms of topic continuity. Distinguishing between micro and macro organizational levels of language, he suggests the study of referential distance (the gap between two occurrences of a referent/topic in the discourse), topic persistence (frequent occurrence of important topics in discourse), and potential interference (the disruptive effect that other referents may have on topic availability and identification). And finally, by the same token, Hoey (cited in Jin, 1998) sees cohesion as the property of a text and coherence as the facet of readers’ evaluation of the text. For him, cohesion and coherence are interrelated textual and cognitive features, the former facilitating the latter, and lexical repetition is the key cohesive device forming a web of bonds within a text.

There have been some computational models developed with the computational theory of coherence relations. Some of these models evaluate the local coherence and some global coherence of a text, for instance drawing upon centering theory of coherence. Lapata and Barzilay (2005) devised a model for automatic evaluation of the local coherence of a text. The basic assumption in this model is that certain types of entity transitions are likely to appear in locally coherent discourse. These entities tend to appear in prominent syntactic positions such as subject and object. This model capitalizes on the similarity between sentences suggesting that the more an entity is shared by the sentences throughout a text, the more locally coherent a text is. In other words, if the same entity is repeated in the same syntactic position across the sentences of a text, the text will be more topically focused and more locally coherent.

Another computational model for the evaluation of textual coherence is the Latent Semantic Analysis. This model was developed by Landau and Dumais (as cited in Wolfe, 2005) within the Kintsch’s Construction-Integration model of coherence.
Since LSA model (technique) and, subsequently, the TSA have been used as the tools to measure the coherence and cohesion of the students’ essays in this study, they merit more detailed discussions in the following sections.

2.6.1. Latent semantic Analysis

Latent Semantic Analysis (LSA) developed by T. K. Landauer and S. T. Dumais (Landauer, Foltz, Laham, 1998) refers to a theory and method for extracting and representing the contextual usage meanings of words through some statistical computations which are applied to a large enough corpus of text. It possibly approximates Halliday and Hasan’s collocation lexical cohesion. The underpinning idea is that the meaning of a passage depends largely on the words it contains and changing of even a single word can affect the meaning of the whole passage. On the other hand, two texts with seemingly different words might have a very similar meaning (Landauer et al. 2004). In other words, the overall meaning of a passage is made up of the sum of the meanings of all the words in the passage. And the entirety of information about all the word contexts in which a given word does or does not occur provides a set of constraints that principally determines the similarity of meaning of words and set of words to one another (Landauer, Foltz and Laham, 1998). The semantics of a word in LSA is determined from all the contexts (or paragraphs) where that word appears. For example, the word apple occurs in the context of fruit, tree, leaves, flowers, etc. Therefore, if two or more of these words co-occur in a similar context, they are regarded as semantically close, and their corresponding vectors in the semantic space will be close to each other too (Dessus et. al., 2000).

In order to determine the semantics of a word or its similarity to other words through LSA, the related semantic space must be chosen or built first. The semantic space is created by considering the number of occurrences of each word in each piece of text (paragraph). For instance, with 300 paragraphs and a total of 2000 words a 300 x 2000 word matrix will be produced. Each word is then represented by a 300-dimensional vector and each paragraph by a 2000-dimensional vector which is too large. However, LSA is powerful enough to reduce these dimensions by a special mathematical method called singular value decomposition (SVD) (Dessus et.al 2000).
Singular value decomposition is an algebraic technique which allows the decomposition of the information about the word use into two components: the semantic essence underpinning the word use and the information related to specific contexts. The latter is discarded and the former is used to provide the semantic representation of I.SA which is a high dimensional space of about 300 dimensions in which the semantic content of words, sentences, paragraphs and the whole texts can be represented as vectors. These vectors can be interpreted only if they are compared with other vectors. For instance, the computation of the meaning vector for *apple* can be meaningful if it is compared with other similar words like "fruit", "tree", etc. The similarity of these vectors are represented by the angle between two vectors which are measured by the cosine between two vectors: two identical vectors will have a cosine of 1 whereas two dissimilar or orthogonal vectors have a cosine of 0 (Kintsch, 2002). Therefore, singular value decomposition enables the I.SA technique to reduce the semantic dimensions to a reasonable size of 100 to 300 vectors. According to Dumais (1991), if the number of dimensions is too small, too much information is lost, and if it is too big, irrelevant terms or words will be included or retrieved. Both of these cases will result in the imprecision of the I.SA.

Latent semantic analysis method has also proved to be a robust statistical technique applicable to a variety of areas ranging from information retrieval (Deerwester et al. 1990) to many different educational issues such as coherence assessment and comprehension prediction, essay scoring, and text selection.

**Coherence assessment and Comprehension prediction**

One of the applications of I.SA in textual aspect, which is directly relevant to this work, is its capability of automatically measuring coherence and cohesion. This application has been successfully tested and produced satisfactory results (Dessu, Lemaire, and Vernier, 2000; Landauer, Foltz, and Laham, 1998; McCarthy et al. 2006). By comparing the vectors of two adjacent segments of a text, I.SA seeks to account for the degree of semantic relatedness between the segments. That is to say, the more semantically related the segments of a text are, the more coherent the whole text is. These segments can be individual words, sentences, paragraphs, or even whole books. However, Foltz, Kintsch and Landauer (1998) recommend sentences as the basic unit of text for I.SA, because sentences embody a small set of textual information (e.g., typically 3-7
propositions) and, therefore, would be somewhat consistent with the amount of information that is held in short-term memory. Thus, LSA compares different segments of a text to see if there are any semantic proximities and argument overlap between the segments. The more semantically similar two segments are, and the more argument overlap there is between them, the more coherent the text will be.

Research has shown that text comprehension depends heavily on its coherence. In other words, the amount of coherence can be a predictor of comprehension. To assess coherence, one has to break up the text first into its constituent propositions, and then look for the possible overlap between them. Nevertheless, the manual method of propositionalization limits its application to only small samples of text and its application to a large scale of texts is time-consuming and rather impractical. Latent Semantic Analysis has been found to be capable of measuring text coherence and predict comprehension scores. For instance, Landauer, Foltz, and Laham (1998) reported a case in which LSA was able to predict the comprehension scores “extremely well”, \( r = 0.93 \). It could also aptly characterize the places in a text where coherence breaks down.

**Essay scoring**

LSA has proved its applicability to essay scoring and dealing with many of the multifaceted factors that influence grading essays (Foltz, P., Laham, D., & Landauer, T. (1999). LSA is able to evaluate essays and assign scores to essays so that they correlate significantly well with those of human judges. In some cases it proved that it could even outperform human graders. Nevertheless, like its applications in other areas, LSA must first be trained on domain-representative texts like articles and essays, textbooks, and other samples of writings that a student would come across during learning in that domain. Then student essays are characterized by LSA representations of the meaning of the words used, and they are compared with essays of known quality in regard to their degree of conceptual relevance and the amount of relevant content (Rehder, et. al, 1998; Foltz, Laham & Landauer, 1999).

According to Foltz, Laham and Landauer (1999), there are several techniques for assessing student essays by LSA system. One of these methods provides a holistic score for an essay. In this method, each individual essay is compared against some previously graded ones (around 10) and the score is determined based on how well the overall
meaning matches that of the previously graded essays. This method has been tested on a large number of essays covering a wide range of topics. For each set of these essays, LSA is first trained on a set of pre-graded essays on the topic. In each case, the essays were also graded by at least two course instructors or expert graders. Across the datasets, LSA’s performance produced reliabilities within the range of their comparable inter-rater reliabilities and with the generally accepted guidelines for minimum reliability coefficients. The average correlation between two graders was 0.83, while the correlation of LSA’s scores with the human graders was 0.80. These results are indicative of LSA’s scoring reliability is equivalent to that of human graders.

Unlike the holistic method which relies on comparing essays against some pre-graded ones, there is yet another method called the “Gold standard” which can efficiently characterize essay quality. In this method, the teacher can write his or her own ideal or quality essay, and all other student essays are then compared to portions of the original text or compared to subcomponents of texts or essays and judged on the basis of how closely they are similar to the teacher’s essay. This technique also shows a high correlation between LSA technique and human graders.

**Text selection**

Selection of an appropriate text is part and parcel of an educational curriculum, i.e. a text that contains enough information for the reader to learn from. The ability of a reader to learn from a text depends on the match between his background knowledge and the text difficulty. Wolfe et al. (1998) discovered that latent semantic analysis (LSA) was found to be able to predict how much readers will learn from texts based on the estimated match between their knowledge of the topic and the text information. To this end, the subjects in the experiment were given four texts on the same topic with varying degrees of difficulty. They were then tested by such knowledge assessment instruments as questionnaires and open-ended essay questions and trained LSA system before and after reading the individual texts. The results showed that learning was greatest for the texts which were neither too easy nor too difficult. The results of the knowledge tests also demonstrated significantly high correlations. Therefore, the researchers concluded that all the instruments were gauging the same thing. Furthermore, LSA as a knowledge assessment tool proved to measure the participants’ knowledge as well as the questionnaire and open-
ended essay questions did, and it correlated significantly with human graders—almost as well as the human graders correlated among themselves. The results also revealed that the more overlap there is between the students’ background knowledge and the content of a text, the more the students will learn from that text. Therefore, the selected text must not only have enough links to the students’ prior knowledge but also contain enough new information to be learned.

2.6.2. Topical structure analysis (TSA)

The concept of topical structure was developed by Lautamatti (1978) from the works of Prague School linguists like Mathesius who believed that the topics of sentences in a text can be identified in relation to a hypertheme which may or may not be clearly stated, and each sentence in turn consists of two parts: a theme (or topic) that which the whole sentence is about and enunciation (rheme or comment) which is what is said about the theme. The sentence topics are units of meaning that are hierarchically organized in a text and semantically contribute to the development of the discourse topic. According to this model, the degree of existing semantic relationships of sentence topic and discourse topic can determine the integration and the internal coherence of the text. These relationships can be studied by looking at sequences of sentences and examining how the topics in the sentences develop throughout the text to build meaning progressively (Connor, 1987).

**Topical progression patterns**

Considering the position and the distribution of topics in successive sentences, Lautamatti distinguishes three different patterns of topical progression in a text: parallel progression, sequential progression, and extended parallel progression (Nunan, 1994).

**Parallel progression**

Parallel progression refers to texts in which consecutive sentences have the same topic, or its semantic equivalence. In this type of topical progression, the topic usually rests in the subject position of the sentences. For instance, in the following sentences, John is the topic of all the sentences below:

John came home late last night. He was very tired, so he went straight to bed. He fell asleep right away.
Parallel progression leads to more locally coherent texts, i.e. the more parallel progressions there are, the more locally coherent the text is. This suggests the text has the same entity as its main focus and sticks to it throughout.

Sequential progression

In sequential progression, the predicate part (comment) of the sentence usually provides the topic of the next sentence. In this type of progression the topic of one sentence is semantically different from the next one. As an example, the following two sentences have two different topical subjects. The topic of the first sentence is “the team” and that of the second sentence is “His (John’s) last moment goal”.

The whole team is indebted to John. His (John’s) last moment goal saved them from an imminent defeat.

Extended parallel progression

Extended parallel progression refers to a topic that is reintroduced after it has been interrupted by a sentence in sequential progression. In the following example, the topical subject of the first sentence is “the whole team” which is in the meantime the grammatical subject. The second sentence takes its topical subject from the theme (comment) of the first sentence, “John”. The third sentence has reintroduced the topic of the first sentence as its topic; therefore, in the second sentence there is sequential progression and in the third sentence there is extended parallel progression.

The whole team is indebted to John. His (John’s) last moment goal saved them from an imminent defeat. Now the team has a good chance of winning the cup again.

The first step in determining the topic of a sentence is asking the question “what is the sentence about?” However, the answer to this question is not always easy. One has to use a certain amount of intuition. Collecting data from two groups of native and non-native students of English who had been asked to identify the topics of some sentences, Nunan (1994) discovered that though the notion of topic is essentially a psychological construct, the choice of the preferred topic largely depends on such reader-based factors as background knowledge and the linguistic factors such as the appositional nature of a given sentence, where two competing NPs are synonyms. This can be problematic.
The problem can be overcome in two ways. First, statistically speaking, the majority of topical subjects coincide with the grammatical subjects in a text. The second guide is proposed by Huddleston (cited in Hoenisch, 2009) and that is an initial as for device. Beginning a sentence with as for phrase can disambiguate the topic and isolate it from other noun phrases competing to become the topic. For instance, in the following sentence Queensland has been separated from other noun phrases such as the sea and year. It has been made the explicit topic of the sentence.

In Queensland one can swim in the sea all year round.
As for Queensland, one can swim in the sea all year round.

There are certain cases where the grammatical subjects do not coincide with the topical subjects such as dummy subjects, clefts, anticipatory it, and expressions like, I think, I believe, etc.

There seems to be a serious problem here.
It was John who broke the cup.
I think the other driver was responsible for the accident.

Subject like nobody, anybody, etc. could rarely have anything to be regarded as topical subject.

Nobody liked his behavior.

Despite all the facts about the notion of topic and the difficulty associated with the identification of it, the resulting problem must be overcome. After all, it is the writer who prefers which noun phrase should be the topic of the next sentence, and which entity in the previous sentence needs more elaborations in the next sentence. For the evaluation of the coherence of the students’ essays, for research or revision purposes, the teacher or the researcher can seek the cooperation of another expert. This will minimize the subjectivity of topic identification.

For a text to be topically coherent, research findings indicate that a well-written text contains a proportionate number of parallel, sequential, and extended parallel progressions. The text that contains too many parallel progressions suffers as much as the text that contains too many sequential progressions. Too many parallel progressions signify that the text is locally and superficially coherent and that it does not deal sufficiently with different aspects of the topic of the essay. On the other hand, a text with
Too many sequential progressions will lead to the introduction of unnecessary information about the topic. Schneider and Connor (1991) used a sample of essays written for the TOEFL’s Test of Written English (TWE) and found that topical structure analysis is highly correlated with readers’ judgments of writing quality. The results of the study showed that high-rated essays contained a high proportion of sequential progression and an extended parallel progression which helps to pull the essay back to its main theme. In another study, Hoenisch (2009), analyzed a sample of published newspaper editorials and discovered that the texts contained a high proportion of sequential progression and extended parallel progression. These researchers put this proportion at around 60 to 80 percent of sequential progression.

Topical structure analysis has been found to be a promising teaching strategy and a research method (Hoenisch, 2009; Dumanig, 2009; Todd, et al. 2007; Carreon, 2006; Almaden, 2006; Chiu, 2004; Simpson, 2004; Rogers, 2004; Connor, 1987; Connor and Farmer, 1985; Witte, 1983a, 1983b). Research studies have shown that teaching topical structure analysis to students can help them improve the quality of their essays. For example, Chiu (2004) demonstrated that topical structure analysis could be used to help and motivate students to improve their writing ability. Connor and Farmer, (1990) found that using topical structure analysis, as a revision strategy, had a positive effect on the clarity of focus of the final texts. After analyzing the paragraphs written by a group of Filipino students, Almaden (2006) found that the students, compared with the native speakers of English, did not use a proportionate number of progressions. Therefore, she recommended the teaching of the topical structure analysis to students so that they could live up to native standards.

Numerous other studies have been conducted within the Contrastive rhetoric framework. For example, comparing journal articles written in English and Spanish. Simpson (2000) discovered that English paragraphs enjoyed more internal coherence represented by sequential and parallel progressions than Spanish paragraphs. In another study, Simpson (2004) discovered that Spanish young children use similar amounts of topical repetition in their English and Spanish writings probably due to their young age. Dumanig et al. (2009), found similar patterns of topical progression in Filipino and
American newspaper editorials. Fakhri (1995) found no differences between Arabic and English texts in their topical progression patterns.

2.7. Conclusion

This chapter was wholly dedicated to the concept of coherence and its counterpart cohesion and the major role they play in the structure of text and understanding and comprehension of discourse. Researchers from different fields of pure and applied linguistics, psychology, and education have investigated it from different perspectives including linguistic, textual, pragmatic, cognitive, and psychological which have received the lion’s share of research and investigation and brought about fruitful results for mainstream language teaching in general and composition instruction in particular.

Banking on Halliday and Hasan’s model, a lot of research has gone into the concept of cohesion. Earlier studies dealt with the superficial grammatical features that bind strings of words, clauses and sentences together and make them a cohesive text. Some other studies questioned the adequacy of these devices claiming that they are not sufficient to make a text cohere. These researchers claim that reader’s background knowledge and the text content and schemata play a much more important role in making a text coherent than the superficial textual clues (Carrel, 1982).

Later studies sought to extend cohesion to coherence and make a distinction between these two concepts. Textually speaking, cohesion operates on superficial and sentential level. In other words, cohesion is what relates one part of a text to another part of the same text through some cohesive ties such as Halliday and Hasan’s five types of cohesive devices in English and in the lexico-grammatical system of the language. They are reference, substitution, ellipsis, conjunction, and lexical cohesion. Of these devices, reference, substitution, and ellipsis are grammatical; conjunction is mainly grammatical but sometimes involves lexical selection; and lexical cohesion is lexical. Grosz, Joshi, and Weinstein (1995) talk about two kinds of coherence: local coherence, which can be similar to cohesion, and global coherence. The former refers to the ways in which individual sentences bind together to form larger discourse segments. It depends on such things as the syntactic structure of an utterance, ellipsis, and the use of pronominal referring expressions, and the latter refers to the ways in which the larger segments of discourse are
linked to one another. It depends on such things as the function of a discourse, its subject matter and rhetorical schema. The interrelationship of the contiguous discourse segments which are linked by some kind of cohesive ties are bound by some kind of coherence relations. These relations determine the overall coherence of the discourse. There is no consensus over the number and the types of these relations.

Therefore, various models of coherence and coherence relations have been proposed by scholars working in different fields of linguistics. Some of these models rely on textual clues to explain the semantic relations that hold between text segments (e.g., de Beaugrand and Dressler, Grime's model, Martin's relations model). However, some others relate coherence to understanding and comprehension of text and discourse and maintain that readers are responsible for establishing coherence. Relying on their background information and world knowledge along with the text base clues, the readers make inferences to bridge the possible semantic gaps between discourse segments and make sense of the text (e.g., Causal Network model; Construction-Integration Model; The Landscape model). Computational theories were also introduced to model coherence relations. These models are useful in devising text-analysis and text-generation programs (e.g., Hobb’s Taxonomy of Relations; Grosz and Sidner’s theory of relations; Centering Theory; Thompson and Mann’s relations theory).

Cohesion and coherence features of written discourse are treated differently by native and non-native speakers in their compositions. These differences rise from different sources: cultural and thought patterns, linguistic and educational backgrounds, writing styles and writer’s perceptions of coherence and cohesion (Jin, 1998). It seems that among others, educational, cultural and thought pattern differences play the most important role. For instance, Eastern and Western cultures and thought patterns are said to shape the organization of L2 composition and paragraph development and other features of L2 writing such as discourse coherence and cohesion features (Kaplan, 1966). An awareness of these differences can have useful implications for L2 composition classes. The teachers of writing in both L1 and L2 will consider the structure of discourse above the sentence level in certain languages as well as the differences in the structure of discourse across languages. In light of this knowledge, the L2 writers will come to this understanding that if they want to write clearly and comprehensibly, the teacher should teach them the
writing conventions of L2 and how to enter a meaningful interaction and agreement with the readers. To this end, they must have a clear intent to write and the reader must be able to understand the writer’s intent and show an interest in the subject. Moreover, the writer must have enough knowledge about the culture-bound writing conventions of the L2 and show proper concern for the surface of the text—he must observe the rules of spelling, paragraphing, indentation, hyphenation, etc.