CHAPTER 4

METHODOLOGY AND SYSTEM OF DESCRIPTION

4.1 Description of data

The data used in the study consists of twenty-four articles drawn from twenty-four issues of two journals, *The British Journal of Surgery* (BJS) and *Annals of Surgery* (AS) published in the year 1993. Both these journals appear monthly and consider for publication original articles in the field of surgery. They are renowned journals in the United Kingdom and the United States respectively, devoted to the surgical sciences. They were selected for that particular reason and also because they are directed at an audience of a particular discipline. Both these journals subscribe to the policy of uniform requirements which were established by an agreement among a number of editors of clinical journals in the United Kingdom and United States. All the articles met the criteria of them being the first that appeared in an issue signifying that they are an important contribution to the surgical field and that they are well written. Only two journals were chosen to minimize differences due to varying stylistic prescriptions among
journals, so that the functional organization and consistent features in all the sections could be more accurately determined. Short communications, case reports and letters to the editor were not chosen because they have different objectives and use a different format from that of the research article.

With regard to subject matter, the articles fall mainly into the following types:

1. those which are based on clinical trials, where for example, patients were given different treatment for a medical condition. These are of two types: surgical management of diseases and evaluation of new methods of treatment.

2. those based on epidemiological studies, where patients were reviewed with the help of medical records and interviews, but no actual clinical trial takes place

3. those based on experimental work, where for example, animals like rats were used

4. those based on investigations on the scientific basis of surgery

The format of the article is generally found to be as follows:

62
1. An abstract set at the beginning

2. An Introduction where the writer informs
   the readers about the subject of his paper,
   the scope of his research, the literature
   reviewed and the aim and purpose of the study.

3. The Methods in which the procedures followed
   and materials used are described and
   patients involved included.

4. The Results whereby the findings in the study
   are given.

5. The Discussion which often interprets the
   findings described in the previous
   section, explains the methods, shows how
   the findings relate to previous work in the
   same area, some evaluation and conclusion.

4.2 Methodology

Whereas past studies have focussed primarily
on the linguistic features of academic texts or the
'moves' or discourse organization found in them, this
study is a blend of the two: linguistic features and
organization of the text. Both aspects of text analysis
are considered to be important, hence almost equal
attention is paid to the them.

The descriptive system is based on a hierar-
chical arrangement of units identified in terms of
rhetorical functions. The ranks of the system will be
worked downwards, in the following order: article,
section, move, linguistic features.

A specialist informant was consulted regularly to gain access to technical and medical information that would otherwise have been unattainable without medical knowledge. The specialist informant was found to be helpful in the explanation of medical terms used. To obtain a spectrum of opinion, a questionnaire on the sections present in medical research articles was also given to ten professors at the medical faculty of the University of Malaya (A sample of the questionnaire is included in the appendix). In general, their replies were found to be consistent with some of the findings in this research.

4.2.1 The article

This rank represents the highest level of discourse organization identified in the data used. Each article is a complete written linguistic interaction intended for a specialized audience. Each article consists of almost uniform sections—Abstract, Introduction, Methods, Results and Discussion.

4.2.2 The sections

The Abstract is a condensation of the article and each statement corresponds to the Introduction, Methods, Results and Discussion. Structured abstracts consist of a format which consists of five statements.
The Introduction introduces the readers to the subject content of the article, the Methods to the methodology used, the Results informs the readers of the findings and the Discussion provides the writer's interpretation of the results. These sections themselves often consist of subsections, especially the Methods and Results sections, with different headings which inform the readers what each section is about. The sections also vary in length depending on how much information the writer wishes to include and are determined by rhetorical functions.

4.2.3 The moves

The term 'move' used here will be the same as that used by Swales in his analysis of Introductions. It has been defined by McKinlay (1983) as 'a semantic unit which is related to the writer's purpose' (Coulthard, 1986:131). It may consist of a single sentence or more but is usually not more than a paragraph long. The moves can be considered as the schematic structures of a genre. The term 'schematic structure' has been defined by Martin as 'the positive contribution genre makes to a text; a way of getting from A to B in the way a given culture accomplishes whatever the genre in question is functioning to do in that culture' (1985:251).

A text is recognized as an example of a particular genre when it can be divided into functional constituents. The functional constituents must fulfil a
function relative to the whole. Each section in an article is made up of these constituents which shall be called 'moves', which vary in length from one clause to several clauses. It can be seen that each section contains obligatory and optional moves and that particular features of language are found under each move.

4.2.4 The linguistic features

Although identifying the moves or schematic structures of a genre is an important and major part of genre analysis, it is insufficient without an analysis of the realizations of each move because it is through language that genres get realized. Texts of different genres will reveal different lexicogrammatical choices according to the different purposes that they want to achieve. These texts will have different words and structures in them, for example, a text from a textbook on Biology will have a different schematic structure and lexicogrammatical features—word and structures from a text from a novel. In addition, since each genre is made up of a number of stages which are related functionally, then it should be revealed that different stages have different lexicogrammatical choices. Writers select the lexicogrammatical features that are suitable for each move to convey the meaning of a move. Some features are preferred over others depending on the move that is found, for example, in the description of patients,
writers may prefer to use the active voice and past
tense, and in introducing his study, he may wish to use
the present tense and the personal pronoun 'we'. It can
be expected that different moves then will have differ-
ent clusterings of patterns or different words and
structures.

4.3 The Discourse Framework

For a study of how medical surgical articles
function as discourse, twenty-four articles are examined
and a framework suitable for the data of an academic
nature is required. Swales' moves analysis, involving
the examination of communicative functions, is employed
in the analysis of all the sections in the articles and
new moves are created based on the data examined. His
model which is not only descriptively powerful but also
applicable to practical situations has influenced this
study. The categories that are given have meaning only
for the kind of discourse that we are dealing with here
rather than for language use in general.

In attempting to describe serious medical
journal articles, a framework that allows us to differ-
entiate between these articles and other nonmedical
articles and nonserious articles is needed. Articles may
differ in terms of informational content, interactional
features or logical structures. The framework chosen
must be able to differentiate the genre chosen from all
others. A descriptive system that will parallel that of
in systemic linguistics and it is done so that the experiential, interpersonal and textual meanings of the text can be conveyed.

Systemic analysis seeks to demonstrate that texts are typically making not just one, but a number of meanings simultaneously (Eggins, 1994:11). Firstly, the text is making experiential meaning, which means that the text is about something. Secondly, the text also has interpersonal meaning. This means that the writer's role relationship with the reader and the writer's attitude towards the subject matter are expressed in the text. In the case of the medical articles examined, the writers are writing to others in the same language community and offering information that might be of interest and use to them. His role as a fellow specialist with an objective view to his findings is conveyed in the interpersonal meaning of the text. Thirdly, a text also makes textual meaning. Textual meaning refers to the way a text is organized as a piece of writing.

The lexicogrammatical analysis of a text is important in understanding how language is able to make these three types of meaning simultaneously. As Halliday points out, grammatical description is essential to text analysis. 'A discourse analysis that is not based on grammar is not an analysis at all, but simply a running commentary on a text' (Halliday, 1985/1994:xvii/i).

The number of clauses is used as a measure of syntactic complexity. A clause in this analysis refers
to a main clause or a subordinate clause that is attached to it or embedded within it. The lexicogrammatical features are tracked through the moves that are present in the different sections of the articles. Frequency counts were made with respect to the distribution of mood, transitivity and theme in each of the five sections, Abstracts, Introduction, Methods, Results and Discussion. The findings were converted into per cent total mood, transitivity and theme. This is done to determine whether in the same genre of medical writing, the lexicogrammatical features can vary from one rhetorical section of the article to another, and that differences are interpretable in terms of communicative purpose and subject matter. It identifies sections where certain structures may be concentrated, as in the case of passives, which occur mostly in the Methods section. Writing involves constrained choice which is determined by the social interaction in a particular context. By examining the linguistic choices that are made in written discourse, we will be able to know what constitutes good writing in that context.

As stated above, the language has been analyzed for the following: Mood, Transitivity and Theme. Each of them will be discussed here. The descriptive apparatus used draws heavily on the classificatory parts of Halliday's Systemic model; the relevant theoretical constructs have been discussed in Chapter Two ad the
descriptive categories will be given here to provide some orientation for the detailed description in Chapters Five to Nine.

4.4.1 The Principles of Grammatical Analysis

Before an analysis on Mood, Transitivity and Theme is carried out, a look at the organization of the lexico-grammar is necessary. There are a number of different kinds of units and these units are related to each other through constituency which means that smaller units make up bigger units and that bigger units are made up of smaller units. This type of analysis is called a ranked constituent analysis. It is considered constituent because units at each level are made up of one or more units at the level below. It is considered ranked because it has been organized in terms of biggest to smallest.

In order to establish the rank-scale for the lexico-grammar, language has to be looked at as content. A text has to be seen as a piece of meaning and the different sized units in the text examined. An example is given below.

(Percutaneous intra-arterial thrombolysis) (is) (now) (well established) (for the treatment of acute leg ischaemia). (However), (complete clot lysis) (may take) (many hours) /(and so) (the technique) (is) (of little use) /(when the limb is ischaemic) /(to the extent)
(that immediate intervention is required to save it). (The treatment of choice) (in such circumstances) (remains) (thromboembolectomy using a balloon catheter). (Unfortunately), (this procedure) (fails) (to reperfuse the leg) (in a significant proportion of cases), /(a failure that results in amputation or death). (One reason for this) (is) (incomplete clearance of thrombus); (studies of intraoperative arteriography) (have shown) (this) (to occur) (in up to 30 per cent of patients). (A logical solution to this problem) (is) (to combine surgical embolectomy with intraoperative thrombolysis). (The aim of this prospective study) (was) (to see /whether intraoperative streptokinase could lyse thrombus remaining after thromboembolectomy)

The above text can be divided into a number of sentence parts called clauses, indicated by the slash (/). Each clause can be further subdivided into groups of words, sometimes separated by commas, which we refer to as phrases or groups. Phrases or groups are collections of words which function in a similar way in the clause: for example, a nominal group consists of noun-like words, a verbal group contains the verb elements, a prepositional group realizes meanings about place, time, manner, etc. The phrases and groups are shown within brackets in the above text.

In the description of the structures that are
in a text, the technique of minimal bracketing or bracketing according to the rank scale is used. Since the clause is considered the highest unit of grammatical analysis, it has to be analyzed in terms of its constituents. Minimal bracketing means functional bracketing - bracketing together only those sequences that have some function relative to a larger unit.

(Percutaneous intra-arterial thrombolysis) (is) (now)
(well established) (for the treatment of acute leg ischaemia).

The above example 'for the treatment of acute leg ischaemia' shows that sometimes a prepositional phrase can operate within a nominal group, to postmodify or qualify a head noun. Post-modifying prepositional phrases are not constituents at the first rank of the clause, but at the next rank down which is the rank of phrase or group. The bracketing must thus capture that they are functioning within a unit at the rank of phrase/group, and not within the unit at clause rank.

This means that in dividing a clause into its constituents, a decision has to be made as to when a particular phrase or group is operating at the clause rank, and when it is operating at the phrase/group rank. Eggins suggests three tests that can be used:
1) movability: 'if an element is a clause rank constituent, it is likely to be independently movable'
(Eggins, 1994:134). For example, in a clause like

The treatment of choice in such circumstances remains thromboembolectomy using a balloon catheter.

the phrase 'in such circumstances' can be moved to a different position in the clause as in the following examples illustrates.

The treatment of choice remains thromboembolectomy using a balloon catheter in such circumstances.
In such circumstances the treatment of choice remains thromboembolectomy using a balloon catheter.

When a phrase or group is not a constituent at clause rank but at group/phrase rank, it is not generally independently movable. For example the prepositional phrase 'of choice' in the examples above is not operating at clause rank since it cannot be moved to another position.

2) substitution: 'elements which are acting together as a single clause constituent should be reducible to a single substituted item' (Eggins, 1994:134). For example, for a nominal group a pronoun can be substituted for it and for a verbal group, a single lexical verb can be substituted. For example, the nominal group 'the treatment of choice' can be substituted for the pronoun 'it', indicating the the nominal group is 'the treatment of choice' and not 'the treatment' only.

3) probe questions: 'constituents at clause rank will
"answer" to a range of probe questions' (Eggins, 1994:134). Nominal groups answer to "Who?" or "What?" probes. Verbal groups answer to "What happened?". Prepositional phrases and adverbial elements respond to a variety of circumstantial probes: when, why, how, with whom?

The treatment of choice in such circumstances remains thromboembolectomy using a balloon catheter.

For example, the probe: What is the treatment of choice? would give the answer: Thromboembolectomy. The probe: What is thromboembolectomy using a balloon catheter? would give the answer: The treatment of choice.

4.4.1.1 Embedding or rank shift

The clause constituent may be a complex structure in itself. Consider the following sentence:

The percentage rise in middle cerebral blood flow velocity, measured by transcranial Doppler ultrasonography, occurring during breath-holding was divided by the time of breath-holding.

The nominal group in the above example appears to be a very long one, 'The percentage rise in middle cerebral blood flow velocity, measured by transcranial Doppler ultrasonography, occurring during breath-holding'. Within this nominal group is another clause. This is a more complex form of embedding or rank shift. This is a unit of one rank (phrase/group) being
made up of a unit of the rank above (clause). Embedded clauses (clauses functioning at group/phrase rank) occur commonly in the post-modifying position in nominal groups, where they function to specify more information about the head noun 'the percentage rise'. Embedding is a way of boosting the content of a clause, by exploiting the clause's potential to recycle through the ranks (Eggins, 1994: 136-137).

4.4.1.2 Embedding and the clause complex

Examples of the following demonstrate clause complexes in the sentences.

This suggests that haemodynamic factors may be important.

In this series, right-sided pheochromocytomas were larger than left-sided pheochromocytomas, although the difference was not statistically significant.

The above two sentences are examples of clause complexes: they involve two clauses, with each having its own internal constituent structure. According to systemic linguistics, clauses in such a sequence are not in a constituent relationship, which means that neither clause is a part of the other clause, but they are in a logical relationship. Each clause in the above examples is in an inter-dependency relationship with the other.
4.4.1.3 Labelling

A descriptive technique used here is that of labelling. There are two types of labelling, formal and functional. 'Formal labelling involves classifying an item in terms of its class membership, what it is on its own, whereas functional labelling involves classifying an item in terms of its role, what it does in relation to the whole' (Eggins, 1994:138). Formal and functional labels are present for grammatical constituents at each grammatical rank.

Examples of form/class labels are provided below.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Form/class labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>clause rank</td>
<td>subordinate clause, relative clause,</td>
</tr>
<tr>
<td></td>
<td>dependent clause, finite, non-finite</td>
</tr>
<tr>
<td>group rank</td>
<td>prepositional phrase, nominal group</td>
</tr>
<tr>
<td>word rank</td>
<td>verbal group</td>
</tr>
<tr>
<td></td>
<td>noun, adjective, adverb</td>
</tr>
</tbody>
</table>

Class labels enable us to see which grammatical class an individual item belongs to. Function labels, on the other hand, show us what grammatical function an item is performing relative to the whole. The purpose of functional labelling is to provide a means of interpreting grammatical structure, in such a way as to relate any given instance to the system of the language.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Function labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>clause rank</td>
<td>main clause, qualifying clause,</td>
</tr>
<tr>
<td></td>
<td>projected clause</td>
</tr>
<tr>
<td>group rank</td>
<td>subject, finite, actor, complement</td>
</tr>
<tr>
<td>word rank</td>
<td>deictic, classifier, head, modifier</td>
</tr>
</tbody>
</table>

Class and function labels do not always have a one-to-one correspondence between them. Items of the same class can perform different functions, and the same functions can be performed by items of different classes. For example:

Carotid endarterectomy reduces the risk of stroke in patients with a symptomatic carotid artery stenosis of >70 per cent diameter.

The different functional roles of Subject (carotid endarterectomy) and Complement (the risk of stroke) are both filled by items of the same class (nominal groups). Thus, a description that can label grammatical items at each rank for both class and function is important. In this study, of the various units of the rank scale, focus will be on the clause and the description of the structure of the clause, the reason being that 'the clause is generally recognized to be the pivotal unit of grammatical meaning, and also because patterns which can be identified for the clause have
are: neither, two, all, some and each. If there is no Deictic element, the nominal group is non-specific.

(2) Numerative

The Numerative element indicates some numerical feature of the subset: either quantity or order, either exact or inexact. Examples are: one, two, several, more, first, second, preceding, subsequent.

(3) Epithet

The Epithet indicates some quality of the subset, for example, long, serious, slow.

(4) Classifier

The Classifier indicates a particular subclass of the thing in question: for example, wooden house, stone house.

The classes of word that typically realize the above functions are as follows:

Deictic- determiner, Deictic- adjective, Numerative- numeral, Epithet- adjective, Classifier- noun or adjective, Thing- noun

(5) Qualifier

The Qualifier is a phrase or clause which follows the Thing. The Qualifier is of a rank higher than or at least equivalent to that of a nominal group; they would
not be constituents of a nominal group. Like the other elements of the nominal group, the Qualifier also has the function of characterizing the Thing, as can be seen in the example below.

A similar clinical syndrome (due to infections with group A streptococci) was suggested in 1983.

(6) Thing

The Thing is the semantic core of the nominal group. It may be a common noun or (personal) pronoun. Examples are: thrombolysis, catheter, solution.

Verbal group

The verbal group is the constituent that functions as Finite plus Predicator in the mood structure, and as Process in the transitivity structure. Examples are: fails, have shown, will reduce.

The verbal group begins with the Finite, which relates the process to the 'speaker -now' through tense and modality. The verbal group ends with the Event, which is the verbal equivalent of the Thing.

Phrasal verbs

Phrasal verbs are lexical verbs which consist of more than just the verb word itself. They are of three types:

(i) verb + adverb, eg. look out 'retrieve'
(ii) verb + preposition, eg. look for 'seek'  
(iii) verb + adverb + preposition, eg. look out for  
If the prepositional phrase is a circumstantial element it should be able to be thematized.

Adverbial group

The adverbial group includes an adverb as 
Head, which may or may not be accompanied by modifying 
elements. Premodifiers are grammatical items like 'not' 
and 'rather' as in 'more clearly'. Postmodification of 
the adverbial group is of one type only which is com-
parison. As in the nominal group, postmodifiers may be 
embedded clauses or embedded prepositional phrases. 
Examples are:

much more clearly (than you would have expected) 
as early (as ten o'clock)

Conjunction group

Conjunctions have the function of linking, 
binding and continuative and they also form word groups 
by modification. Examples of the former are 'and', 'so' 
and 'however' and of the latter 'even if', 'not until' 
and 'if only'.

Prepositional group

Prepositions like conjunctions form groups by 
modification, for example, 'right behind', 'all along',

82
'not without'. A distinction has to be made between a prepositional group and a prepositional phrase. A prepositional group has a Modifier -Head structure expanded from and functionally equivalent to a preposition. A prepositional phrase is not an expansion of anything but is a clause-like structure in which the Process/Predicate function is performed by a preposition and not by a verb.

**Prepositional phrase**

A prepositional phrase consists of a preposition plus a nominal group. Examples are: in patients, from the carotid lesion, in reflux esophagitis. A prepositional phrase occurs either (i) as Adjunct in a clause, for example, 'There were a total of 31 patients in the three groups' or (ii) as Qualifier in a nominal group, for example, 'The degree of carotid stenosis in the two groups was similar'.

4.4.2 Mood Analysis

When we look at the meaning of the clause as exchange, the grammatical system we are concerned with is that of Mood. The clause is organized as an interactive event involving speaker or writer and audience. The mood systems are primarily concerned with the differences between declaratives, interrogatives and imperatives and the grammatical structures that realize these.
speech functions. A correlation exists between the semantic choice of speech function and the grammatical structure which is typically chosen to realize it. For example, if a statement is made, then a declarative clause would be used, and if a question is asked, an interrogative would be used. In the articles examined, the declarative is the form which is used.

In carrying out a Mood analysis, the functionally labelled constituents have to be identified and the structures that they realize determined. The Mood structure of the clause is the organization of the functional constituents of the clause. It consists of the Mood and the Residue. The Mood includes the Subject and the Finite.

4.4.2.1 The Subject

The Subject is a nominal group and it may be a single word or a lengthy noun phrase or a clause. It provides the person or thing in whom is vested the success or failure of the proposition (Halliday, 1985/1994: 76).

4.4.2.2 The Finite

The Finite is always the first of the verbal elements present in a clause. It carries either tense or modality.

He (S) was (F) reading (P) a book (C).
The rest of the Mood structure of the clause is the Residue component. It can contain a number of functional elements, a Predicator 'reading', one or more Complements 'a book' and any number of Adjuncts.

4.4.2.3 The Predicator

The Predicator is the lexical part of the verbal group, occurring after the Finite, if a Finite is present. If a clause has only a single verbal constituent, then there is a fusion of the elements, Finite and Predicator as in the following example.

He came(F/P) to the house.
The Finite and lexical verb are 'fused' into a single word 'came'.

4.4.2.4 The Complement

A Complement can be defined as 'a non-essential participant in the clause, a participant somehow effected by the main argument of the proposition' (Eggins, 1994:163). It can become the Subject through passivization of the clause and is typically realized by a nominal group. A sub-class of the Complement is the attributive complement, where the Complement is realized by an adjectival element such as 'good' or 'important'.

4.4.2.5 Adjuncts

Adjuncts are elements which add additional
information to the clause. They consist of either adverbial or prepositional elements and do not have the potential of becoming Subject. An example of an adjunct is 'in the container' as in the following example.

It was stored in the container (Adjunct).

There are three different classes of Adjuncts: those which add experiential meaning, those which add interpersonal meaning and those which add textual meaning.

1. Experiential adjuncts

Adjuncts which add experiential content to the clause are circumstantial adjuncts. They are found in the Residue. These adjuncts may refer to time, place, manner, matter, cause, agent and accompaniment. They are usually expressed by either prepositional phrases or by an adverb of time, manner, place and others. The underlined phrases in the following examples are instances of adjuncts.

It has increased since June.

He went there with James.

The book was written by Archer.

2. Interpersonal adjuncts

Adjuncts which add interpersonal meaning are modal adjuncts which consist of four types: Mood Adjuncts, Polarity Adjuncts, Comment Adjuncts and Vocative Adjuncts. These are found in the Mood.

Mood Adjuncts consist of the following:

86
expressions of probability eg. perhaps, probably;
expressions of usuality eg. usually, sometimes;
expressions of intensification or minimization
for eg. absolutely, really, just;
expressions of presumption eg. evidently,
obviously;
expressions of inclination eg. happily, willingly

Polarity Adjuncts are either 'yes' or 'no'
replacing an ellipsed clause.

Comment Adjuncts are identified by Halliday
(1985:50) as the following:

admission eg. frankly;
assertion eg. honestly, really;
how desirable: luckily, hopefully;
how constant: tentatively, provisionally;
how valid: broadly speaking, generally;
how sensible: understandably, wisely;
how expected: as expected, amazingly.

Comment Adjuncts express attitude and evaluation.

Vocative Adjuncts are names of the next
speaker which are used to directly address the person
named as the following example illustrates.

It was not done like that, John.
3. Textual adjuncts

There are two types of Textual Adjuncts: Conjunctive Adjuncts and Continuity Adjuncts.

Conjunctive Adjuncts are expressed by conjunctions and function to provide links between one clause and another, as in the following example.

However, this was not the case.

In the analysis of data, the term 'Conjunctive Adjunct' will be used to cover both conjunctive adjuncts and conjunctions.

Continuity Adjuncts are found in casual speech and they indicate that the speaker will be saying more, as in the following example.

Well, what do you want?

The above is a description of the structural elements in the organization of the clause.

4.4.3 Transitivity Analysis

While the Mood structure of the clause realizes interpersonal meaning, the system of Transitivity realizes the experiential meaning. Transitivity accounts for the various participants in the process (Halliday, 1967). The adverbial systems which are included in the analysis deal with the circumstances, conditions and so on of the process. Transitivity is thus concerned with types of process. Differences in process type are what
is meant by differences in transitivity. Not only do the differences in process types have to be described, but also the associated differences in functional participant roles, and the possible selection of circumstances. When analyzing transitivity structure in a clause, three aspects of the clause are examined: process choice realized in the verbal group of the clause, the participants selected realized in the nominal groups, and the selection of circumstantial meaning realized by adverbial groups and prepositional phrases. The different types of processes and their participant roles are given below.

4.4.3.1 Material processes

These are processes of doing, about some action. The participants are realized by nominal groups. They are underlined in the examples given below.

He went home.

We gave the money to them.

The participants of a Material process clause are the Actor, the one who performs the action; the Goal, the participant at who the process is directed (it maps onto the Complement in the Mood analysis) or the Range, a continuation of the process; the Beneficiary, the participant who benefits from the process. Examples of the participants are given below.

89
1. They bought a book.
   They(Actor) bought (Process:material) a book(Goal).

2. The book was bought by them.
   The book(Goal) was bought(Process:material) by them(Actor).

3. They played tennis.
   They(Actor) played(Process:material) tennis(Range).

4. I gave a book to Mary.
   I(Actor) gave(Process:material) a book(Goal) to Mary(Beneficiary).

4.4.3.2 Mental processes

These are processes which encode meanings of thinking and feeling. They consist of three types:

- cognition (verbs of thinking, knowing, understanding), for example, 'I know that';
- affection (verbs of liking, fearing), for example, 'She loves going out';
- perception (verbs of seeing, hearing), for example, 'He saw it happen'.

The participant who thinks, feels or perceives in a mental process is known as the Senser. The second participant in a mental process is the Phenomenon. The following are some examples.

1. I know the story.
I(Senser) know(Process:mental) the story (Phenomenon).

2. She felt the stone hitting her.
   She(Senser) felt(Process:mental) the stone hitting her(Phenomenon).

3. I heard the noise.
   I(Senser) heard(Process:mental) the noise (Phenomenon).

4.4.3.3. Behavioural processes

These processes are processes of physiological and psychological behaviour. There is usually only one participant, the Behaver, usually a conscious being. If there is another participant, it is the Phenomenon. These processes often occur with Circumstantial elements. Examples of this process are given below.

1. He frowned at the thought.
   He(Behaver) frowned(Process:behavioural) at the thought(Circumstance).

2. He stared into space.
   He(Behaver) stared(Process:behavioural) into space(Circumstance).

3. She tasted the cake.
   She(Behaver) tasted(Process:behavioural) the cake (Phenomenon).

91
4.4.3.4 Verbal processes

These are processes of saying. A verbal process usually consists of three participants, the Sayer, the Receiver and the Verbiage. The Sayer is the participant responsible for the verbal process and it does not have to be a conscious participant; it could be anything that puts out a signal. The Receiver is the participant who gets the message, to whom the process is directed. The Verbiage is a nominalization expressing some kind of verbal behaviour. It is the message that is told or the information asked for. The following are examples of this process.

1. He told her the truth.
   He(Sayer) told(Process:verbal) her(Receiver)
   the truth(Verbiage).

2. She asked them if they could come along.
   She(Sayer) asked(Process:verbal) them(Receiver)
   if they could come along(Verbiage).

4.4.3.5. Existential processes

These indicate that something exists. They involve the use of the word 'there'. The verb that is found in an existential process is typically the verb 'be' and similar verbs like 'exist', and 'arise'. The obligatory participant in this process is the Existent. Circumstantial elements are often found in these processes. Examples are given below.

1. There is a house by the road.
There is (Process: Existential) a house (Existential) by the road (Circumstance).

2. There were some people.
   There were (Process: Existential) some people (Existent).

4.4.3.6 Relational processes

   Relational processes covers the many different ways in which "being" can be expressed in clauses. These consist of two types, attributive and identifying.

4.4.3.6.1 Attributive processes

   In these processes, the relationship is expressed by the verb 'be' or a similar verb. An Attribute is assigned to a participant known as the Carrier which is always realized by a noun or nominal group.

1. She is a wonderful hostess.

   She (Carrier) is (Process: relational) a wonderful hostess (Attribute).

   There is no passive form of this process. The Subject can never conflate with the role of Attribute, but will always conflate with the role of Carrier.

4.4.3.6.2 Identifying processes

   These processes define the identity of something. There are two participants involved, the Token
which is the thing that is being defined, and the Value, that which defines. Both of them are realized by nominal groups as in the following example.

1. You are the chosen one.

You(Token) are(Process:relational) the chosen one (Value).

All identifying clauses can be passivised.

4.4.4 Theme Analysis

In systemic grammar, 'theme' is both the general name for an array of syntactic functions or roles and the more specific name for the information focus of the clause. The theme 'is what is being talked about, the point of departure for the clause as a message; and the speaker has within limits the option of selecting any element in the clause as thematic' (Halliday, 1967:212).

The system of theme is concerned with how the clause is organized as a message. It divides the clause into two components, a Theme which is the point of departure for the message, and a Rheme, new information about the point of departure (Eggins, 1994:271). The choice of what is made the Theme in a clause contributes significantly to the communicative effect of the message. An example to illustrate Theme and Rheme is given below.

The difficult part about the job(Theme) is the travelling involved(Rheme).
There are three different types of elements that can be the Theme: topical elements, interpersonal elements and textual elements. When an element of the clause to which a transitivity function can be assigned occurs in first position in a clause, it is called the topical theme.

I gave the book to her.

I(Actor/topical Theme) gave(Pr:material)
the book (Goal) to her(Beneficiary).

The rule is that one clause must contain only one topical theme. The rest which follows is the rheme. If the first clause is a textual or interpersonal element and the second a topical one, then the first element is also considered part of the theme.

The four categories of the Modal Adjuncts, Mood, Polarity, Vocative and Comment and the Finite can be made the interpersonal theme.

1. Perhaps she will appear.
   Perhaps(Mood/interpersonal theme) she
   (Subject/topical theme) will(Finite) appear
   (Predicator/rheme).

2. Fortunately, the accident did not happen.
   Fortunately(Comment/interpersonal theme), the
   accident(Subject/topical theme) did not(Finite)
   happen(Predicator).
Textual elements can also occur in thematic position. The two main types of textual elements are Continuity Adjuncts and Conjunctive Adjuncts. Continuity Adjuncts are words in a dialogue which indicate that what the speaker is about to say is related to what the previous speaker has said.

Oh I was treated by the doctor.

Oh(Continuity/textual theme) I(Subject/topical theme) was(Finite) treated(Predicate) by the doctor (Circumstance).

 Conjunctive Adjuncts are elements which serve to link clauses or sentences together. They are textual themes which occur before the first topical theme in the clause.

However, he did not object.

However(Conjunctive/textual theme), he(Subject/topical) did not (Finite) object(Predicate).

An exception to the above rule that theme is always related to transitivity is that in existential clauses, 'there' is also considered a topical theme.

There was snow outside.

There(topical theme) was(Process:existential) snow (Existent) outside(Circumstance).
A theme can be either marked or unmarked. An unmarked theme is when the theme conflates with the mood structure constituent that typically occurs at the beginning.

1. I like mangoes.
   I(Theme/Subject) like mangoes.
2. Give me a ticket.
   Give(Theme/Predicate) me a ticket.

A marked theme is when the theme conflates with any other constituent, such as a circumstantial element.

In Germany, we went on a tour bus.

In Germany(Circumstance/Theme), we went on a tour bus.

In this study, what is made the theme by the writers are explored, how the choice of theme serves as the communicative point of departure for the rest of the clause, and how the distribution of theme indicates the discourse genre are examined.

The methodological framework that has been outlined in this chapter has been applied to all the sections of the medical articles which constitute the data in this research and the results are presented in
chapters five to nine.

The texts are analyzed according to the Keys presented below. The texts have been divided into clauses, with embedded clauses shown within brackets [ ].

Key:

S=Subject, F=Finite, P=Predicator, C=Complement

/Attributive Complement, C-S=Complement in Subject position

Ac=Circumstantial adjunct, Am=Mood adjunct,

Aco= Comment Adjunct, Aj=Conjunctive adjunct

/Conjunction

Transitivity process is in bold

Pm=material, Pr=relational, Pv=verbal,
Pmen=mental, Pe=existential

Theme is underlined