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Thematic Development in texts

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Abstract

The concepts of Theme and Rheme, Given and New in Linguistics, and the notion of Focus in Computational Linguistics, have been the object of much research in both fields where different authors have used the terms sometimes interchangeably and with such ranges of overlap and confusion that make their study a hard task for the researcher. This deliverable is an attempt to clarify these notions by mapping out their functionalities and extracting their commonalities in such a way that they are useful for both the linguistic and the computational communities. In particular, the paper attempts to provide operational redefinitions for these notions and explores the constraints imposed by several contextual factors on the discourse phenomena.

Contents

1 Introduction

The Linguists' concepts of theme-rheme and given-new information, and the Computational Linguists' concept of focus of discourse, have been the object of much research in both fields. On a cursory reading these notions seem to address the same types of phenomena, but to date there has been relatively little cross-reading between Linguists and Computational Linguists on this matter and no attempt to create a single uniform account. In fact, a certain amount of confusion is experienced by anyone who starts reading the two sets of literature, since the terms are often ill-defined and used in contradictory ways.

The aim of this paper is to clarify these notions by mapping out their functionalities and extracting their commonalities, so that the linguistics and computational communities have a better understanding of these interrelated phenomena. This pursuit seems to us a step towards a fruitful cooperation between the two fields.

The major question we address is: are *theme-rheme, given-new,* and *focus of discourse* the same thing? In what ways are they related? How do they differ?
We begin by describing how these concepts have traditionally been defined in the literature.

2 Overview of terms and definitions

2.1 The notion of Focus in Linguistics

Let us start with the notion of *focus*. The term has been used for two different and opposite notions in Linguistics and in Artificial Intelligence (Hajicova, 1987, p. 311.) In Linguistics, the term was first introduced by Halliday (Halliday, 1967) and Chomsky (Chomsky, 1971) and later used by different linguists (Sgall, 1979, Sgall et al., 1973) to specify that part of the sentence that conveys some irrecoverable information predicating something about the "given", recoverable, contextually bound part, that is the *topic* of the sentence.

In generative grammar focus is connected with that information within the sentence which is deemed as "most valuable or relevant from the speaker's point of view" (Rochemont and Culicover, 1990, p. 18) and is systematically manifested in the form of pitch accent - assuming that the accent is the intonational nucleus of the sentence, or the position of greater phonological prominence. The focus of a sentence is predictable in terms of properties of the discourse and context where the sentence occurs and of the sentence itself. Thus, in a well-formed question-answer sequence, such as in Example (1) below, the focus will be that information requested in the question (Tom), and it will be, therefore, accented (shown by capital letters):

Example (1)

Q: Who loves Jane?

A: TOM loves Jane

This dichotomy of *topic-focus* was, like most pragmatic notions, largely ignored by American structuralists, with the exception of Charles Hockett (Hockett, 1958, p. 201), who spoke about the *topic* and the *comment* parts of a sentence. (see also Bloomfield, 1933) For Hockett, *topic* is what the speaker announces in a sentence, before proceeding to say something about it in the *comment.* Similarly, Jackendoff (1972, pp. 239-278) distinguished *presupposition* ("the information in the sentence that is assumed by the speaker to be shared by him and the hearer") from its complementary term *focus*, the latter determining stress assignment and consequently "pitch accent". The *topic* (*presupposition*) of a sentence would be roughly equivalent to *given* or recoverable information, while the term *focus* would refer to *new* information.

The consideration of focus as locus of the new information that a sentence conveys was further validated by Quirk and Halliday, who accorded a central role to intonation in the structuring of information. According to Quirk et al. (Quirk et al.1972, p. 94): "The focus, signalled by the intonation nucleus, indicates where the new information lies". For Halliday (Halliday, 1967) the information *focus* is where the main burden of the message lies, and this choice is realized by the assignment of prominence in the tone-unit. The focus of the information is that which is presumed to be *new*, and, in the unmarked case, this will be realized on the last, non-anaphorical lexical item in the tone group. For example, in (2) below, the item "LAND" is the information focus of the expression, and, thus, carries nuclear stress:

Example (2)

// in a / far-away / LAND//

Although this is the focus, it does not define the extent of the New, which will depend upon how much of the text repeats or renews what has been previously said or assumed (by the speaker) to be known by the listener.

2.2 The Theme/ Rheme Structure and the Given/New Distinctions

At this point we would like to relate the notions of Given/New information with the Theme/Rheme structure, since they have been treated jointly in the works of the Prague School of Linguistics, linking them with the idea of Communicative Dynamism. Mathesius (according to Firbas) defined Theme as a notion which included two types of information: a) information which is known or given in the situation, and b) information from which the speaker proceeds (Firbas, 1964, p. 268). Chafe (1970, p. 210-211) adopted a similar position to that of the Prague School, claiming that known or "old" information serves as a kind of starting point for the message.

To further complicate the issue, the notion of givenness has been defined in terms of different parameters: Predictability, Saliency (or consciousness), and Shared Knowledge (Prince, 1981). Most authors have defined givenness in one of these terms: Chafe (1976, p. 30) defined given information as "that knowledge which the speaker assumes to be in the hearer's consciousness at the time of the utterance". Haviland and Clark (1974), Clark and Haviland (1977) considered that givenness is equivalent to shared knowledge: given items are those entities that the speaker assumes the hearer "knows" or can infer. For Halliday (1967, 1985), however, givenness is defined in terms of predictability: a linguistic item will be given when the speaker assumes that the hearer can predict or could have predicted its occurrence at a particular position within a sentence.

In order to overcome this plethora of meanings for the same terms, Prince (1981) proposed to part altogether with the term "givenness" and to use the new term "assumed familiarity", thus building a taxonomy of different values of assumed familiarity depending on the linguistic forms; thus, entities in the discourse could be New, Inferrable or Evoked, depending on contextual and co-textual factors. A similar tendency was followed by Geluykens (1991), who also proposed to avoid the terms Given and New altogether, and to replace them by the notion of Recoverability, which is to be regarded as a gradient notion, rather than as a binary distinction. Recoverable information is "information which is derivable from the discourse record, i.e. from the context", while irrecoverable information is "information which is not thus derivable" (Geluykens, 1991, p. 145). The derivability can be either direct (when the information is explicitly present in the preceding clause, for instance) or more indirect (where certain inferences have to be made), as in Example (3) below.

Example (3)

I took a taxi to the airport this morning. The driver was a nice chap.

The referent *the driver* is not New, even though it is not actually present in the preceding context. This is because the fact that "taxis have drivers" can be considered part of the taxi "scenario" (Sanford and Garrod, 1981).

With respect to the traditional treatment of Givenness together with Theme, some linguists, such as Halliday (1967) and Quirk et al. (1972), established a distinction between these two notions: information from which the speaker proceeds, "which serves as the point of departure of the message" (Halliday, 1967, p. 12, 1985, p. 39) is called *theme* (also defined as "what the clause is going to be about") which, together with *rheme*, structures the clause as a message. Halliday claims that Theme in English is realized through initial position in the sentence, but that this is just a language-particular realization. For example, themes are underlined in the following sentences:

(a) <u>John</u> gave Mary a birthday present
(b) <u>Mary</u> has been given a birthday present by John
(c) <u>A birthday present</u> John gave to Mary

Independently from the structuring of the message into a Theme and a Rheme, Halliday studies the distribution of information as "a process of interaction between what is already known or predictable and what is new or unpredictable" (Halliday, 1985, p. 275). What is predictable is presented by the speaker as Given (or recoverable) and what is not predictable is presented as New (or not-recoverable). What is treated as recoverable may be so because it has been mentioned before, or because it is apparent in the communicative situation. The functions of Given and New are not the same as those of Theme and Rheme (Halliday, 1985, p. 278):

> The Theme is what I, the speaker, choose to take as my point of departure. The Given is what you, the listener, already know about or have accessible to you. Theme-Rheme is speaker-oriented, while Given-New is listener-oriented.

In spite of this distinction, Halliday recognizes a semantic correlation between information structure and thematic structure, such that, in most of the cases the speaker will choose the Theme from within what is Given, and locate the New within the Rheme. Divergent cases can be found, however, i.e., cases where the above correlation is reversed as in (4), where the Theme is New information whereas the material in the Rheme is Given; or cases where both the Theme and the Rheme of the message are Given, as in (5):

Example (4)

[No one has ever seen donkeys fly]

A young boy from Tenerife	recently	saw	one
Theme	Rheme		
New	Given		

Example (5)

[Bob helps Mary's brother a lot]

He	helps him too.
Theme	Rheme
Given	

As we can see, there is no single uniform account of these interrelated phenomena. We will try to offer in sections 3 and ff. operational redefinitions of the concepts above, in an attempt to integrate the findings in the research fields of Linguistics and Computational Linguistics and to make them useful for a theory of discourse structure. But before that, let us present the treatment of the notion of focus in Artificial Intelligence.

2.3 The notion of Focus in Artificial Intelligence

If we now turn to the field of Artificial Intelligence to see how these related notions have been dealt with, we will find that researchers concerned with the structure of discourse have used the term Focus to refer to that element of the sentence on which the discourse participants center their attention as the discourse unfolds (Sidner, 1983). Focusing is the active process on the part of the speaker and the listener by which they concentrate their attention on some subset of their knowledge. For example, in a sentence like "I got a really pretty turtle this weekend", the Focus would be the turtle, because it is very likely that the participants will continue to talk about it in the next sentences (Sidner, 1983, p. 116). In general, most of the work on focus describes it as a working construct for tracking discourse referents, for example for the resolution of anaphora, to aid the understanding of text for a particular task (Grosz and Sidner, 1985, Reichman, 1978, Reichman-Adar, 1984, Hobbs, 1979, Linde, 1979, Cohen, 1987, Carberry, 1983). In these approaches, focus appears as a constructive category, which, even though it is identifiable with a particular discourse referent, it arises in the context of a discourse.

In the following example, the *focus* of (7) - in the AI sense - refers to the computer, since the computer is one of the items 'just introduced' and the utterer of (6) focuses his/her attention on it. In terms of linguistic analysis, however, the pronoun 'it', referring to the computer, belongs to the *topic* or theme rather than to the *focus* of (7).

Example (6)

John switched off the computer

Example (7)

It had been on nearly all the day

The problem, as we will see in the course of this paper, lies in the identification of *topic* (defined as "what the sentence is about") with a sentence constituent, which, as long as we keep to typical declarative clauses in isolation, coincides with the Subject and appears in first initial position. However, it is our feeling - validated by other linguists (Brown and Yule, 1983, Schank, 1977) that sentences in isolation do not have topics per se. In example (6), is the sentence about John, about the computer, or about the switching of the computer? Without the following clause (7) which establishes the context of (6), it is delusive to assign a topic to (6). Therefore, in our view, the notion of "aboutness" captured by the intuitive notion of topic is only applicable in the wider context of a text in which a sentence is inserted. This requirement was also observed by Schank (Schank, 1977) who claimed that sentences out of context cannot be said to have a topic, because the topic arises only out of the interaction of adjacent sentences by the process of intersection. Therefore, once the notion of *topic* is removed from the domain of the sentence and redefined as a discourse category (the discourse topic) which describes what a text, or part of a text, is about, it appears to refer to the same intuitive notion captured by *focus* in computational linguistics.

2.4 Summary of terms and definitions

To summarize, it appears that the concepts of focus, given-new, theme-rheme and topic describe related, albeit different phenomena, since they are the result of different processes.

Focus in Artificial Intelligence is a constructive category, resulting from the process of content selection by which the discourse participants center their attention on some subpart of the information contained in the knowledge base. In Linguistics, however, focus is a sentence-level category, which captures contextually non-bound (irrecoverable) information predicating something about the "given", recoverable, contextually bound part, that is the *topic* or the *theme* of the sentence. Therefore, it is the result of the process of information distribution which reflects the speaker's estimates of the listener's familiarity with the subject matter.

Theme is that element from which the clause "departs", according to Halliday, and, as such, it is the result of a process by which the speaker presents his material from a particular perspective or point of view. Theme normally coincides with Given, but not necessarily, since they belong to two different types of structuring. However, in the Prague School treatment of the Theme-Rheme structure, thematic elements are those which carry the lowest degrees of communicative dynamism (i.e. which are 'given') and rhematic elements are those which carry the communication forward, thus conveying new information.

Topic has been traditionally treated as a category which refers to its recoverable, contextually-bound part of the sentence, distinguishing thus a dichotomy of topic and focus. However, as a discourse category, the notion of topic captures the same notion studied under the label of focus in computational linguistics. Table 1 below summarizes these points:

Table 1: Summary of terms and definitions

COMPUTATIONAL LINGUISTICS	LINGUISTICS	DEFINITION
Focus	Topic	recoverable information
	Theme1	perspectival departure
	Theme2 (= Given)	low communicative dynamism
	Focus	irrecoverable information

3 Towards operational redefinitions of Focus and Theme

An interesting question now arises. Why is it that Computational Linguists have found it necessary for their work to define and use the notion of Focus, while Linguists have used varied terms for several interrelated phenomena?

A partial answer to this question lies in the level of description on which researchers have grounded their definitions. The definitions provided in linguistics for notions such as Theme, Given, Topic, and Focus always apply on the level of the sentence, in spite of the attempts to resort to context to identify some of the notions. By contrast, the notion of Focus in

Artificial Intelligence has always been a discourse category, 'a computational account of one of the ways speakers structure communication over several clauses in a discourse.' (Sidner, 1983, p.127).

In view of this difficulty, we propose to offer operational redefinitions of the concepts above, in an attempt to integrate the findings in both research fields and make them useful for a theory of discourse structure. In order to do so, we will adopt a discourse perspective which will allow us to extract their functionalities from their behaviour in real texts. We start the discussion with the treatment of focus and focus progression in Artificial Intelligence.

3.1 Focus and focus-shift rules

Probably the main reason that Focus has been studied in Computational Linguistics is because one cannot simply string together sentences arbitrarily and expect smooth text flow. Therefore, some research efforts in AI with respect to focus have concentrated upon the design of a set of rules which dictate the legal or permissible focus moves during text generation. These so-called focus-shift rules are a reflection of the speaker's preferences in the presentation of information to ensure coherent discourse.

Thus, McKeown (1985, p.67) worked with three graded notions: (a) the immediate focus of a sentence (current focus, CF), (b) the potential focus list (PFL), which includes the elements of the sentence that are potential candidates for a change in focus, and (c) a focus stack (a stack of past immediate foci). She then described the following three focus shift rules:

1. change focus to member of previous PFL if possible
2. maintain focus if possible
3. return to topic of previous discussion; more precisely, choose the CF from the focus stack

Together, these rules specify (to some level of detail, and with unknown correctness at this time) the patterns of focus shift one encounters in paragraphs of simple English. They are necessary for smooth text flow, like example (8) below:

Example (8)
John is a new graduate student.
New graduate students typically have a rough first semester.

> John is taking four courses: introduction to programming, graphics, analysis of algorithms, and hardware.
> Graphics is the most interesting one.
> John lives at Graduate Towers.

In this example, where the current focus is *John* and *new graduate students* is a member of the potential focus list, McKeown's claims the preference to switch to a topic of the potential focus list and which has just been introduced (*graduate students*), instead of remaining on the same topic (*John*). If the speaker has to say something about new graduate students and does not take the chance to do it immediately after having introduced the topic in the first sentence, then he will have to go to the trouble of reintroducing the topic at a later point.

These rules, however, do not offer sufficient guidance for all situations. In the examples below, although the discourse focuses on a single entity (the balloon), the speaker may want to convey information about several of its properties, which cannot simply be presented in any order. In order to ensure smooth text flow, claims McKeown, the speaker will group together properties that are in some way related to each other, making (9) more connected than (10):

Example (9)

> The balloon was red and white striped. It had a silver circle at the top to reflect heat. Because this balloon was designed to carry men, it had to be large. In fact, it was larger than any balloon John had ever seen.

Example (10)

> The balloon was red and white striped. Because this balloon was designed to carry men, it had to be large. It had a silver circle at the top to reflect heat. In fact, it was larger than any balloon John had ever seen.

This example is used again by McCoy and Cheng (1990, p. 112) to argue in favour of the use of different categories of focus nodes which causes the highlighting of a particular set of knowledge base entities, thus constraining what can be said next as the discourse progresses. Figure 1 below illustrates these categories and their focus-shift candidates.

Figure 1: Focus shift candidates for selected node types
(McCoy and Cheng, 1990)

NODE TYPE	FOCUS SHIFT CANDIDATES
OBJECT	attributes of the object, actions the object plays a prominent role in
ATTRIBUTE	objects which have the attribute, more specific attribute
SETTING	objects involved in the setting actions which typically occur in the setting
ACTION	actor, object, etc. of the action -any participant role
EVENT	action which can be grouped together into the event

In the example above, the first focus node would be an object node (the balloon) to which a set of attribute nodes are subordinate. From this node, the discourse moves to discuss the physical attributes of the balloon, and this causes the appearance of an attribute focus node (color and shape of the balloon). The expectation would be that the next attributes that are mentioned would probably be a "subclass" of this inferred attribute, thus favouring version (9) over (10) since it follows a recognised pattern of inferencing. That is, given a specific concept in focus, the listener's expectation would be that the next sentence would continue to add information that is semantically related to the previous one. Concepts cannot simply follow one another without some logical-semantic relationship; they have to be connected via recognisable patterns of inference. Thus, for example, if the concept in question is an attribute (say, an adjective), the expectation would be that the next attributes that are mentioned would be a "subclass" of the one in focus. If the concept in focus is an event, the expectation would be that further actions, or parts of the action, will be given next, as in (11) below, where a "super action" such as "caring for the egg" might be postulated as the event focus node from which the individual events in each of the clauses are derived (foci are underlined in the subsequent sentences).

Example (11)

The little boy carried the egg home with him. He placed the egg in the incubator so it would keep warm. Every day, the boy turned the egg over as gently as a mother duck. Finally, after 28 days of waiting and watching, the boy heard something peeping and pecking inside the egg.

3.1.1 Towards a discourse notion of focus

In an attempt to handle all of the different kinds of focusing phenomena in the literature and to propose a theory of discourse focus which will allow a generation system to generate texts which establish and shift focus of attention in a way that is understandable to the user, McCoy and Cheng introduced the notion of a *discourse focus tree* as a mechanism for controlling focus shifts in discourse (McCoy and Cheng, 1990). Their hypothesis is that a focus tree is constructed and traversed by the participants as the discourse progresses, one node being visited at a time. Each node in the tree is something which is being talked about in the discourse and points to an entity from the knowledge base. The type of the currently visited node - *object, attribute, setting, action*, and *event* - determines what entities from the knowledge base are in focus, and generates expectations about what may be said next in a discourse, which must generally come from the highlighted set of knowledge. A change in the focus of attention corresponds to changing the currently visited node.

It is important to point out that the construction of the discourse focus tree is a joint enterprise undertaken by the discourse participants. That is, while the speaker adds or changes the currently visited node, the hearer must try and make appropriate changes in his/her model of the tree based on what has been said. Therefore, the determination of the focus of attention at any given point in the discourse, and the specification as to where the focus may progress to, requires a process of inferencing on the part of the participants. For instance, if the discourse focusses on an object, it may next progress to talk about attributes of that object. This progression would cause an attribute node to be grown in the tree.

For this reason, and in an attempt to integrate this notion of focus with the one proposed in Linguistics, we propose the following provisional definition[1]:

DEF: Focus is the locus, within each message, of principal inferential effort. It is that/those concept(s) on which the speaker wants the hearer to spend the most thought.

[1] The definitions of Focus and Theme presented in this paper were originally proposed in Lavid & Hovy (1993). Focus, Theme, Given and Other Dangerous Things. Working Paper.

The speaker determines the focus at a given point in discourse by identifying the concept(s) contained in it which are most central to the mental processing (the inferences) required by the listener to understand the message, and to follow a coherent progression of information. (Of course, the speaker has to take into account what information has already appeared in the discourse, and also his or her overall communicative intentions.) By signalling these central concepts as the focus, the speaker is saying: "Concentrate your thoughts around this. This is where I want your thinking to start".

If the focus at the beginning of a discourse is encoded as a sentential theme, its progression tends to capture the progression of new information portions, which are normally encoded in the rhemes of the successive sentences. For example, let us take examples (9) and (10) mentioned by McKeown (McKeown, 1985), in which a balloon is being described. The balloon is the object focus node in both examples at the beginning of the discourse, since it generates expectations about what may be said next: attributes of the object which usually occur as a subordinate of an object node. Each of these attributes would get an attribute node in the tree. In example (9) we could postulate "physical attributes" as a superclass attribute node, which can be inferred via bottom up inference from the discourse. If the conversation is centered on the "color" or on the "design" of the balloon, thae expectation would be that the next attributes that are mentioned would probably be a "subclass" of this inferred attribute. In example (9) attributes of the balloon classifiable under "color" and "design" are mentioned first. Therefore, the expectation is that further physical attributes of the balloon which fall under this classification are mentioned next to ensure coherent discourse and not to jump to a different set of physical attributes like "size" to later return and talk about "design" again. So, if another physical attribute subclassifiable under "size" is mentioned, it would be placed as sibling in the tree as a subordinate of "size", not of "design". The resulting tree is shown in fig. 2.

3.2 Theme and thematic progression

The aim of this section is twofold: first, to provide an operational redefinition of the notion of theme as a discourse category on the basis of text analysis; second, to present and assess the notion of thematic progression as proposed by the Prague School of Linguistics in the light of its contribution to the development of information in discourse.

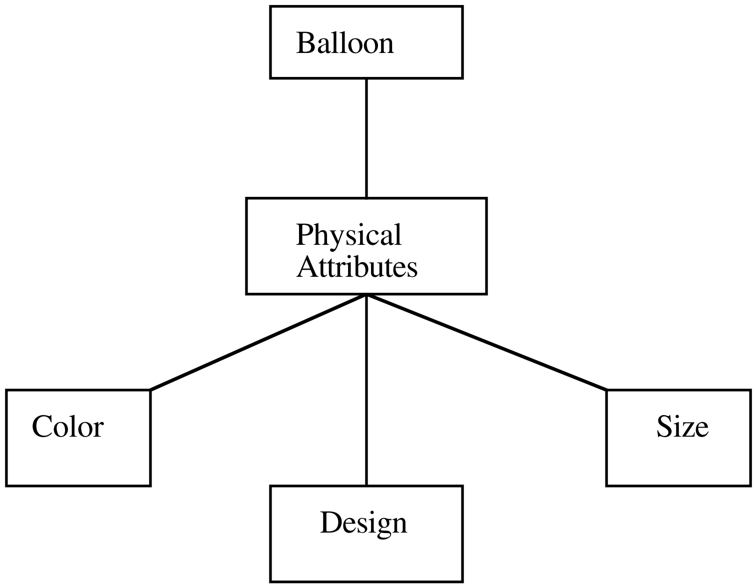


Figure 2: Suggested focus tree for example (9)

3.2.1 Towards a discourse notion of Theme

As we have seen above, the notion of theme was traditionally treated together with givenness by the Prague School, who linked them with the idea of Communicative Dynamism. Halliday (Halliday, 1967, 1985) and Quirk et al. (Quirk et al., 1972) advocated for a separation of these notions, and, accordingly, Theme was defined by Halliday as that "element which serves as point of departure of the message; that with which the clause is concerned" (Halliday, 1985, p. 39). This double-sided definition is, in our view, the origin of the confusion with other related notions such as topic and focus in the AI sense. For, as has been recently pointed out, the point of departure of the message is not necessarily what that message is about.[2] In the first place, the notion of "aboutness" is artificial if applied to sentences in isolation, as explained above. Secondly, even if we admitted the existence of some clausal element(s) as those about which is being talked about, the parallel identification of theme with the initial element of the clause as a realization of the notion of "point of departure" - as proposed by Halliday - would lead us to accept that elements such as "well", "frankly", or "Mr. Jones" in (12) below are what the message is about.

Example (12)

[2] See Angela Downing (1991). An alternative approach to theme: a systemic-functional perspective. *Word* 42 (2): 119-143, for a useful discussion on this subject.

Well,	frankly,	Mr. Jones,	in Rome	I	had a really great time
THEME	....				RHEME.................
Textual	....	Interpersonal	....	Ideational	

Neither the textual nor the interpersonal themes are even remotely concerned with the definition of theme as what the clause is about. Even the ideational theme (in Rome), in this case, an adjunct, cannot be considered as what the clause is about.

We think that this difficulty might be overcome by positing two different levels of analysis:

1) *the grammatical level of analysis*: We find useful to retain Halliday's 'multiple themes' at the sentence level, since they capture the idea that the speaker's selection of a point of departure for his/her message is metafunctionally organized into textual, interpersonal, and ideational options. The usual order is textual-interpersonal-ideational, as shown in (12). Besides, using the Hallidayan approach to theme is in tune with the treatment given to this notion in the currently existing Nigel grammar, an important grammatical resource for our project.[3]

From the three possible types of grammatical themes, only the ideational element -also called the 'topical theme'- is essential, according to Halliday, and all that follows it constitutes the rheme. However, as has been recently pointed out (Downing, 1991), the problem lies in identifying the first ideational clause constituent, which may be an Adjunct, with the topical theme. The solution is to preserve the notion of 'topical theme' as a sentential element -usually encoded as a nominal argument in the sentence (Givón, 1984)- which refers to participants or entities in the discourse, as one of the possible ideational themes of the clause. In the following, we will use the term topical theme in this last sense.

2) *the discourse level of analysis*: While, in general, the grammatical function of theme is to provide the "local context for interpretation" of the material presented in the clause (Matthiessen, 1992, p. 61, Nigel: textual semantics documentation, p. 35), clauses occur at some point in an unfolding discourse and, accordingly, have a certain discourse history. As Matthiessen puts it: "while the clause often distils its own past ... it does provide material for a number of possible futures" (Matthiessen, 1992, p. 61). This suggests that the function of theme is not restricted to the grammatical level of analysis, but that theme fulfills other roles in the structuring and development of discourse. These discourse roles are precisely the ones we

[3] See Lexicogrammatical Cartograhy: English Systems, p. 449-498 of the Grammar Documentation

are interested in for our project. We have identified two main functions fulfilled by theme in discourse: a) a **bridging** function; b) a **guiding** function.

a) a **bridging** function: Even if discourse is internally structured in a non-linear fashion, its manifestation on the textual surface proceeds linearly. Accordingly, when having to process a text, we proceed left-to-right attaching new information pieces to other pieces which have already been introduced. In this process, theme fulfills a bridging function by acting as the bridge or attachment point which connects material which has already been introduced to material which comes later as the discourse unfolds.

b) a **guiding** function: At the same time, theme fulfills a guiding function in the addressee's journey through the series of new information portions. In creating a text, writers tend to use strategies to steer their text along a specific line or frame. These lines of textual development can be considered as specific text structuring orientations which the writer uses, in view of the communicative goal, to achieve a maximally profitable text organization. They are like maps used by the writer to show the reader a destination and to suggest to him/her a route throughout the text. Textual developments appear in the literature as, e.g., *text strategies* (Enkvist 1985, 1987a; 1987b, 1987c), *framing strategies* (Witte and Cherry 1986, p. 130ff), *rhetorical designs* (Nash, 1980), *orientations* of various kinds (Givon 1984, p.245; Grimes, 1975; Longacre, 1983, p. 7-8) or as *text-strategic continuities* (Virtanen, 1992). In the following, we will illustrate through text analysis some of these lines of development or *chaining strategies* [4] which frame texts along global patterns of organization and which offer writers the possibility of dealing predictively with a piece of text. Chaining strategies include temporal and spatial developments, general to specific, sequential, through-argument or counter-argument patterns, rhetorical patterns centering around participants, or points of contrast, enumeration, elaboration, etc.

The textual role of theme in these developments is to act as a signpost for the reader, as a guide along a specific line of development selected by the writer. These lines of development (chaining strategies) find their linguistic realization in a series of linguistic markers on the surface structure, theme being one of the most important ones.

Let us now illustrate these two functions of theme with some examples: The first text is an extract from a tourist brochure on the city of Bern. The text is steered along a **temporal**

[4] We propose the term *chaining strategy* following the 'chaining principle' outlined in (Rothkegel and Villiger, 1993), which represents a specific type of connecting text parts on the basis of global coherence, and which refers to the same type of textual phenomenon outlined above and studied by different authors in the literature. The term global is used here to refer to a level of textual organization which accounts for text segmentation beyond the mere linking of two successive sentences in discourse.

line which manifests itself on the textual surface through a chain of temporal expressions that creates cohesion in the text. The temporal chaining strategy consists of eight temporal scopes which make reference to different points along a temporal line of development. These temporal scopes tend to be signalled by marked temporal themes (underlined in the text). However, the temporal chaining strategy is independent from its linguistic realization by temporal themes: sometimes it is implicit, or it is realized by a temporal expression in rhematic position. The former happens in the last clause of the passage (*Berne was declared a World Landmark by the United Nations and was given the title of "Europe's Most Beautiful Floral City*) where a new temporal scope is implicit and has to be inferred by the reference to the United Nations. The latter happens in the first clause of the passage (*Berne was founded in 1191 by Berchtold V. Duke of Zähringen, for strategic reasons and enlarged by stages (Clock Tower before 1218, Prison Tower 1256, St. Christopher' s Tower 1344*) where the temporal reference which starts the first temporal scope in the passage (*in 1191*) appears in rhematic position.

Example (13)

BERN

> Berne was founded in 1191 by Berchtold V. Duke of Zähringen, for strategic reasons and enlarged by stages (Clock Tower before 1218, Prison Tower 1256, St. Christopher' s Tower 1344). <u>In 1353</u> Berne joined the Swiss Confederation. <u>After the fire of 1405</u>, which almost completely destroyed the wooden-built town, the houses were rebuilt of sandstone. The medieval structure of the city originating from that time has remained unchanged up to the present day. <u>From the 14th to the 16th century</u>, Berne reached the zenith of its power by enlarging its territory and gaining great political influence. <u>In 1798</u> Napoleon' s troops invaded berne and thus the collapse of the Ancien Régime was witnessed. <u>In 1834</u> Berne became a university town and <u>in 1848</u> the Federal Capital of Switzerland as well as the capital of the Canton of Berne (second largest Swiss canton). Berne was declared a World Landmark by the United Nations and was given the title of "Europe's Most Beautiful Floral City" .
>
> (Touristic Brochure printed in Switzerland in 1989)

The bridging function of theme is also apparent in this text, where each theme serves as the attachment point which connects each preceding message to a following one thus acting as a bridge between different information pieces from the discourse. This bridging function of theme tends to be fulfilled by all the themes which make up a discourse; however, the guiding function of theme is only fulfilled by those themes which signal a specific chaining strategy which structures the text along a global line of development. This is why themes like *here*, *man-made lakes*, etc. are not underlined in the text, since they do not mark a new temporal scope which develops the temporal chaining strategy. However, they do have a bridging function within the temporal scope in which they are inserted: they connect information which has already been introduced to new incoming incoming material.

Consider now a descriptive passage of the variety of attractions within a hour's drive of Cardiff. The passage is steered along a **spatial line**, which consists of nine spatial scopes which capture the movement from one point to another in space. This chaining strategy is what Grimes calls a <u>trajectory</u> : "a moving sequence of spatial setting through which a participant travels" (Grimes 1975, p.103-105). The spatial chaining strategy tends to be signalled by marked locative themes (underlined in the text) to mark the reference to a new point in a spatial line:

Example (14)

TOURING FROM CARDIFF

Here we shall concentrate on the fascinating variety of attractions within a hour' s drive of Cardiff -- too numerous to list in full so we offer you a sample:

<u>Immediately to the NORTH of Cardiff</u> lie the industrial valleys of South Wales made famous throughout the world by films such as How green was my valley. Here small working communities lie hemmed in by green hills. Here the archeology of the industrial revolution abounds in vivid contrast to the breath-taking natural beauty you enjoy when negotiating the steep winding roads that go "over the top" from one valley to the next, such as the road over the Rhigos, from Maerdy to Aberdare. <u>Beyond the valleys</u> lie the mountains of the Brecon Beacons National Park. Here the sheep predominate. Man-made lakes that supply water to the population of South East Wales lie between the mountains. Stopping in the car park at Storey Arms one can relax and enjoy the beautiful surroundings or, more energetically, follow the footpath to the top of 2,907 ft high Penyfan. Visit the mountain centre at Libanus or the interpretive centre in the Garwnant Forest, for an insight into the wildlife of the area.

<u>Immediate to the WEST of Cardiff</u> lies the Vale of Glamorgan with its villages, leafy lanes, farmland and heritage coastline. Seaside resorts start just beyond the city boundary with the Edwardian-style resort of Penarth, complete with pebble beach and pier. <u>A few miles west</u> lies the livelier type of resort, Barry Island, with all the joys of the pleasure park and a wide, sandy beach. <u>And beyond</u> lie

more beaches-Fontygary, Llantwit Major, Southerndown, Ogmore. In the Vale of Glamorgan you will find a variety of seaside catering for most tastes. Behind those beaches lie unspoilt country with historic villages and delightful pubs. Well within the hour' s drive lies Porthcawl another lively resort complete with funfair.

Just about that hour' s drive away to the west lie some of Britain' s loveliest coastline, the Gower Peninsula, with its wide sandy beaches and great headlands.

To the EAST we have the beautiful wooded Wye Valley, with the remains of a famous abbey on the banks of the river at Tintern, the Roman remains of Caerleon, Caerwent, Raglan Castle, Monmouth and the Forest of Dean.

j

(The Cardiff Guide, Cardiff City Council)

Example (15) below displays the same chaining strategy: the writer takes the reader on an imaginary tour within the space to be described, guiding him from one spot to another in order to see a number of sights:

Example (15)

Another popular street of the Eixample is the Rambla de Catalunya. One can have a drink in the shade of the lime trees on the terraces along the pleasant central promenade. On either side are fine shops, shopping centres, art galleries. There are various Modernist buildings, notably Casa Serra, by Puig i Cadafalch, which is now the Diputació de Barcelona. Not far off, on Carrer d'Aragó, is a fine building by Domenech i Montaner, formerly the offices of the publishers Montaner y Simón, and now the home of the Fundació Tapies which is devoted to contemporary art. Beyond it stands the neomedieval building by Elies Rogent belonging to the University of Barcelona. Further along is the long, wide Avinguda Diagonal, which cuts obliquely across the city from Pedralbes to the Placa de les Glories Catalanes. At the western, basically residential end are the modern University Campus and the Palau Pedralbes.

As in example (14), the spatial chaining strategy tends to be signalled by a chain of marked locative themes (underlined) which appear each time a new point in space is mentioned in the text.

A frequent chaining strategy found in expository and in descriptive texts is that of **characterization**. This strategy is typically signalled by topical themes which make reference to the object (or parts of the object) being described -in the case of description of objects or people, or to the concept or generic object being analysed - in the case of expository texts. Example (16) below illustrates this strategy in a text describing a person:

Example (16)

(Chris Morley, Concorde Captain).

He is one of the original seven British Airways Concorde pilots, and only the week before he has taken Mr. Callaghan to Washington to meet President Carter. He is Central Casting´s idea of a senior airline captain, 47, glamorously grey, firm of jaw, calm of voice, with a lean athletic build and a mien of command and reassurance. He earns more than 16,000 a year which still puts him low in the league in comparison with foreign captains. He has four children, a pretty wife, a spacious house, and an 11-year-old Renault 16, which he now gets into drive to Heathrow.

The themes signalling the characterization strategy are underlined in the text. As shown, not all the themes in this text signal that chaining strategy. The theme of the second clause is a marked temporal theme which does not signal the characterization strategy.

Another frequent chaining strategy found in **instructional** texts is what we call a **sequential chaining strategy**. This strategy consists of a chain of steps presented in sequence. This strategy tends to be realized on the textual surface by marked process themes, but not always and not exclusively: for example, the sequential strategy in example (17) below consists of seven steps all of which are signalled by a temporal theme (1, 2, 3, 4, 5, 6, 7); five are also signalled by a process theme (*press, set, set, set, adjust*), and two of them have selected two goals as clausal themes (*to playback the tape through your amplifier; to stop the tape at any position on the tape*). Within each of the steps it is possible to encounter substeps marked by process themes (*insert, close*) on a more local level of analysis.

Example (17)

PLAYBACK

1. Press the STOP/SELECT button and insert the recorded cassette into its compartment and close the cassette compartment lid.
2. Set the selector switch to the TAPE position.
3. Set the MODE switch to the proper position.
4. Set the MODE switch to the proper position.
5. Adjust the VOLUME and TONE controls for your desired sound.
6. To playback the tape through your amplifier, connect optional REC/PB cord from the REC/PB socket of its unit to your amplifier. The output power is fixed regardless of VOLUME position.
7. To stop the tape at any position on the tape, press the STOP/EJECT button. When the tape is wound completely, the PLAY button will be released automatically.

(The Portable Cassette Recorder with Radio Instruction Manual Sanyo M9 930 K, Sanyo Electric Co. Ltd. Japan, 6.)

The sequential strategy is signalled most of the times by the selection of temporal themes and process themes simultaneously (underlined in the text) whenever a new step in the procedure has to be performed. Substeps in each of the subsequent steps tend also to be signalled by process themes in most texts. In some occasions, however, goals of the actions reflecting different steps are thematized, as in steps 6 and 7 above.

In the light of the analysis above, we propose, therefore, the following discourse characterization of theme (Lavid & Hovy, 1993):

DEF: Theme is that element that informs the listener as discourse unfolds how to relate the incoming information to what is already known, providing the attachment point to new information pieces from the discourse. More specifically, theme acts as a signpost for the reader of a specific text structuring strategy or orientation.

This definition of theme explains why Theme usually co-occurs with Given, and why it is the "point of departure" of the clause: in providing the attachment point to new information pieces from the discourse, it fulfills a bridging function connecting material which has already been introduced to other information which the sender presents as new to the receiver. Moreover, Theme also fulfills a guiding function in discourse by signalling the chaining strategy selected by the writer to organize his text. These strategies include temporal and spatial developments, general to specific, characterization, sequential, or points of contrast, enumeration, through- or counter-argument patterns, to name a few.

3.2.2 The Progression of Theme

At this point, and having illustrated through text analysis the functions of theme in discourse, we introduce now the phenomenon of thematic progression, as proposed by the Prague School of Linguistics. By Thematic Progression Danes referred to "the choice and ordering of utterance themes, their mutual concatenation and hierarchy, as well as their relationship to the hyperthemes of the superior text units (such as paragraph, chapter ...) to the whole of text, and to the situation" (Danes, 1974, p. 114). Here the conception of theme is not just restricted to "the point of departure" but also "as the opening element of the sentence that links up the utterance with the context and the situation, selecting from several possible connections one that becomes the starting point, from which the entire further utterance unfolds and in regard to which it is oriented" (Danes, 1974, p. 112). This definition emphasizes the criterion of givenness and recoverability of information in the determination of utterance theme: the amount of information from the preceding text which is deemed recoverable in the utterance is designated as theme, irrespective of its position in the structural configuration of the utterance (i.e. whether at initial or end positions).

Danes identified three main patterns in which themes may occur in text :

1. SIMPLE LINEAR THEMATIC PROGRESSION

In this pattern each rheme becomes the theme of the next utterance. It is represented as in Figure 3 below:

Figure 3: Danes Simple Linear TP Pattern

T_1 --------> R_1

T_2 ---------> R_2

T_3 --------> R_3

Danes illustrates this progression type with example (18) below, where the theme of the second sentence (*he*) recovers information from the rheme of the first (*Sir Alexander Fleming*):

> (18) The first of the antibiotics was discovered by Sir Alexander Fleming in 1928. He was busy at the time investigating a certain species of germ which is responsible for boils and other troubles.

2. THEMATIC PROGRESSION WITH A CONTINUOUS (CONSTANT) THEME

In this pattern the same theme appears in sequence in a series of utterances, though not necessarily making use of identical wordings, as represented in Figure 4 below:

Figure 4: Danes Constant TP Pattern

T_1--------> R_1
T_1--------> R_2
T_1 --------> R_3

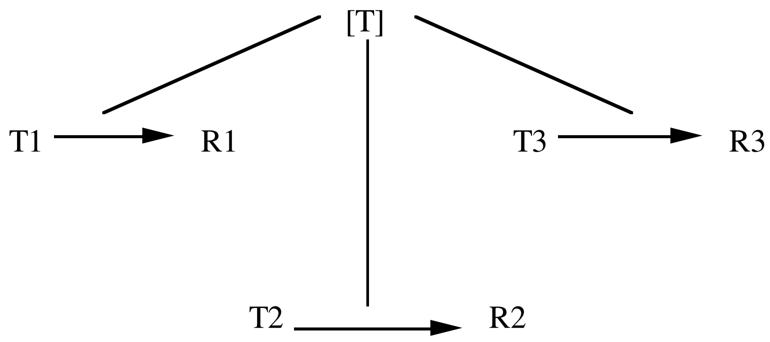
He illustrates the constant TP pattern with example (19) below:

> (19) The Rousseauist especially feels an inner kinship with Prometheus and other Titans. He is fascinated by any form of insurgency ... He must show an elementary energy in his explosion against the established order and at the same time a boundless sympathy for the victims of it. Further the Roussauist is ever ready to discover beauty of soul in anyone who is under the reprobation of society.

3. THEMATIC PROGRESSION WITH DERIVED THEMES

This is the pattern in which "the particular utterance themes are derived from a "hypertheme" (of a paragraph, or other text section) in which "the choice of the derived utterance themes will be controlled by various special (mostly extralinguistic) usage of the presentation of subject matter". It is represented thus:

Figure 5: Danes TP with a Derived Theme



He exemplifies the TP pattern (TP with Derived Theme) using the short text below:

> (20) New Jersey is flat along the coast and southern portion; the north-western region is mountainous. The coastal climate is mild, but there is considerable cold in the mountain areas during the winter months. Summers are fairly hot. The leading industrial production includes chemicals, processed food, coal, petroleum, metals and electrical equipment. The most important cities are Newark, Jersey city, Paterson, Trenton, Camden. Vacation districts include Asbury Park, Lakewood, Cape May and others.

A moment's reflection will shed light as to what researchers in Artificial Intelligence and Linguistics have been aiming at. Whereas in AI the emphasis has been laid on providing guidelines as to how to construct coherent text and how to track participants in discourse, in Linguistics research has concentrated on describing the ways in which information progresses from one sentence to the next in texts. As we have seen, recent research on focus (McCoy and Cheng, 1990) aims at determining **what** can be said next, i.e., at investigating the conceptual nature of the material selected for information development, whereas thematic progression patterns describe **how** to present the information linearly from one sentence to the next. This is why both mechanisms are necessary and complementary to ensure text cohesion.

As shown above, thematic progression patterns operate on a local level of analysis, that is, from one sentence to the next in a discourse. However, when dealing with the global structure of discourse, manifested by the chaining strategy displayed by the writer which tends to be signalled by a chain of semantically related themes (locative, temporal, etc.), thematic progression patterns do not provide an adequate operational mechanism. By contrast, the analysis of those themes in texts which may signal a chaining strategy provides the discourse analyst with a powerful tool of linguistic description from the discourse point of view. For that reason, we restrict our analysis to the factors that may be responsible for the selection of those themes which act as markers of a chaining strategy, in the hope that the results of this analysis will shed more light on global aspects of discourse structure and information distribution than the study of local thematic progression patterns.

3.3 Summary

As studied sections 3.1 and 3.2 above, the disparity in the treatment of related phenomena such as Theme, Given, Topic and Focus in Artificial Intelligence and in Linguistics stems from the level of description on which researchers have grounded their definitions. In Linguistics, the definitions for Topic, Theme, Given and Focus apply basically on the level of the sentence, whereas in Artificial Intelligence the notion of Focus has always been a discourse category, without much attention being paid to its grammatical realization.

In an attempt to integrate the findings in both research fields and make them useful for a theory of discourse structure, we have presented operational redefinitions of these notions, adopting a discourse perspective which allows us to extract their functionalities from their behaviour in real texts. Accordingly, we have redefined these notions as follows:

> **FOCUS**: Focus is the locus, within each message of principal inferential effort. It is that/those concept(s) on which the speaker wants the hearer to spend the most thought.

The locus of principal inferential effort is the concept(s) which are most central to the mental processing (the inferences) required by the listener to understand the message and to follow a coherent progression of information.

> **CHAINING STRATEGY:** Chaining strategies are devices used by the writer to steer his/her text along a specific line of development with the purpose of achieving a maximally profitable text organization, in view of the discourse purpose and the subject matter.

Chaining strategies are like maps to show the reader a destination and to suggest to him/her a route throughout the text. Chaining strategies include temporal and spatial developments, general to specific, characterization, through- or counter-argument patterns, among others.

> **THEME**: Theme is that element that informs the listener as discourse unfolds how to relate the incoming information to what is already known, providing the attachment point to new information pieces from the discourse. More specifically, theme acts as a signpost for the reader of a specific text structuring or chaining strategy.

Theme is, therefore, a multifunctional phenomenon which plays several roles on different levels of analysis. On the grammatical level, theme is the "point of departure" of the clause. On the discourse level, theme fulfills at least two main functions: a) a bridging function, acting as an attachment point to new information pieces from the discourse; b) a guiding function, acting as a signpost for the reader of a specific chaining strategy.

4 Towards a specification of contextual constraints

Having, we hope, clarified to some degree the notions of Theme and Focus, and outlined redefinitions based on their functions in discourse, we turn next to one of the most interesting aspect of these notions for our project: their behaviour in specific contexts of use.

The question is: how does the context constrain the deployment of these two resources? In other words, which factors favour the selection of themes, focus nodes and focus-shift candidates in discourse? We start with the discussion of themes and chaining strategies.

4.1 Theme and chaining strategies

With regard to the selection of discourse themes acting as markers of a chaining strategy, it is our feeling that these chaining strategies or methods of development are dependent on the interaction of several factors of the communicative situation, whose influence has only been vaguely hinted at, but not explicitly formalized. Among these factors, we propose at least two: *discourse purpose* and *subject-matter*.

Following Virtanen (Virtanen, 1992), we separate discourse purposes (narration, argumentation, instruction, etc.) which give rise to 'discourse types', from 'text types', a term reserved for a parallel set of similar categories, but on a level closer to the actual texts. Text types are connected with the choices of textualization, thus being definable with the aid of concrete linguistic features on the textual surface (see Lavid, 1993). It is frequent that the discourse type and the text type agree: narrative discourse makes use of the narrative text type, and so forth. However, there are instances where the superordinate discourse type is not realized through the corresponding text type: narratives can be used for argumentation, or descriptions for instruction. In the presentation of the factors which constrain the selection of theme and focus in discourse, we present examples where the discourse type (and discourse purpose) is congruently realized by the corresponding text type. As suggested in Lavid (1993), whenever a specific discourse purpose - and its congruent text type- is selected, different values from the features of the field, tenor and mode networks are prespecified. That is, if the text's discourse purpose is descriptive, the semantic resources activated will be different from the ones activated if the purpose is narrative or procedural. For example, descriptive texts typically select relational or existential processes from the field network to encode phenomenon-registering sentences; by contrast, narrative texts tend to select material and punctual processes to encode action-recording sentences. With respect to tenor, procedural texts will typically select directive speech acts, whereas descriptive or narrative texts will select informative ones.

As we will see in the examples below, the choice of a specific discourse purpose and a subject-matter also determine the selection of specific chaining strategies to steer the text along different lines of development. For example, texts whose purpose is to present a reasonable detached account of concepts or facts (i.e., **expository** texts) tend to use chaining strategies such as **characterization**, **exemplification**, **compare and contrast**, etc. to realize that overall purpose. These chaining strategies are frequently signalled in the textual surface by specific linguistic markers, especially by specific thematic selection options: for instance, if the chaining strategy is characterization , unmarked topical themes referring to the concept being defined will be likely to be selected, as in example (21) below, where the different references to a whole class of birds (drongos) and their characteristics constitute a characterization chain, signalled in most occasions by the selection of unmarked topical themes (underlined in the text):

Example (21)

> <u>DRONGO</u>, family name DIRCRUDIDAE, any of 20 species of Olf World woodland birds (order Passeriformes), often with forked tails. <u>Drongos</u> frequently attack much bigger birds (e.g. hawks and crows) that might hurt their eggs or young; innocuous birds (such as doves and orioles) nest near drongos and thereby gain protection.
>
> <u>Most drongos</u> are 18 to 63,5 centimetres (7 to 25 inches) long and glossy black, sometimes with white on the head or underparts (sexes alike); <u>the eyes</u>, in most, are fiery red. <u>Some</u> are crested or have head plumes, <u>and the tail</u> is usually long and forked, with out-turned corners. <u>The tail of the South-east Asian racket-tailed drongo</u> (dicrurus paradiseus) bears 30 cm (12-in) "wires", outer feathers that are unbranched for most of their length and carry rather large vanes at the ends.
>
> <u>Drongos</u> range from Africa to central Asia, Australia, and western Pacific islands, inhabiting forest, open country, and gardens. <u>They</u> feed like flycatchers or shrikes, taking large insects and termites. <u>Their voices</u> are lound mixtures of

harsh and sweet sounds; some species, like the racket-tail, are good mimics. The nest is a flimsy basket that seems too small for the brooding bird.

(Drongo. The Encyclopaedia Britannica. Micropedia, vol. 4. 445. 1991)

If the discourse purpose is **descriptive**, one may find different chaining strategies depending on the subject-matter of the text. Thus, if it describes the relation of one place or feature to another in a scenery, the writer will probably steer his text along spatial lines (spatial chaining strategy) and will choose marked locative themes to signal that spatial organization of place features with respect to each other, or to a central place of observation, as illustrated in examples (14) and (15) above. If, however, the description centers around the description of objects (places, people), the chaining strategy will probably be characterization, and the themes selected to signal that strategy will probably be unmarked topical, referring to the object, as in example (16) above:

This strategy is typical of texts describing objects or people; as we saw above, this strategy is also frequent when the discourse purpose is expository . Although the same strategy is common to both expository and descriptive texts, the difference lies in the subject-matter: expository texts tend to deal with whole classes of concepts or objects, whereas descriptive texts deal with individual ones.

If the discourse purpose is to narrate events including the participants involved in them (**narrative**), the writer will probably use a **temporal chaining strategy** realized in the text by a number of temporal expressions among which marked temporal themes will be the most frequent ones. Biographies, chronicles, and stories, among other genres tend to rely on this kind of orientation on a global level, as illustrated in example (13) above.

If the discourse purpose is to instruct the reader on how to do something (**instructive** texts), the text will center on the presentation of a series of steps in a procedure, and will use a chaining strategy based on the presentation of actions in a temporal sequence. This **sequential strategy** will be reflected in the selection of processes as marked themes of their sentences. Marked temporal themes may come also to the surface when there is a need to mention the chronological order in which the different steps of a task must be performed. Example (17) above, an instructional section from an instruction manual, illustrates this.

If the discourse purpose is to persuade the reader of the truth of some facts (**argumentative**), there are two main basic chaining strategies: a) the **through-argument** pattern, where the writer presents a claim (thesis) and provides evidence (substantiation) for it; b) the **counter-argument** pattern, where the writer presents a thesis-antithesis structure, with the aim of presenting a balanced, unprejudiced view of things.

Example (22), an extract from Bertrand Russell's A History of Western Philosophy, illustrates the through-argument pattern:

Example (22)

The intellectual life of the nineteenth century was more complex than that of any previous age. This was due to several causes. First: the area concerned was larger than ever before; America and Russia made important contributions, and Europe became more aware than formerly of Indian philosophies, both ancient and modern. Second: science, which had been a chief source of novelty since the seventeenth century, made new conquests, especially in geology, biology, and organic chemistry. Third, machine production profoundly altered the social structure, and gave men a new conception of their powers in relation to the physical environment. Fourth: a profound revolt, both philosophical and political, against traditional systems of thought, in politics, and in economics, gave rise to attacks upon many beliefs and institutions that had hitherto been regarded as unassailable.

(From A History of Western Philosophy , 1945. George Allen and Unwin Ltd.)

In this text, the through-argument strategy consists of a thesis (*The intellectual life of the nineteenth century was more complex than that of any previous age*) substantiated by a series of arguments. Each time a new argument is introduced, it tends to be signalled by conjunctive themes like *first*, *second*, *third* and *fourth* (underlined in the text) which bring out the evidences in favour of the thesis presented in the first sentence.

Example (23) below illustrates the counter-argument pattern, where the writer presents a balanced view with the intention of giving real weight to a discursive counterpoise and of inviting the synthesis of conflicting claims in argument. The first sentence provides the thesis, the second one opposes to it, and the third one opposes the second one again. Each of these opposing arguments is introduced by the conjunctive themes *on the other hand* and *against these considerations* (underlined in the text), which act as signals of a genuine way to explore alternative paths and to provide an unprejudiced account of the claim presented in the first paragraph.

Example (23)

To be able to drive is undoubtedly a useful accomplishment, and the ownership of a car is for many people a fact of life that reaches beyond convenience into sheer necessity. On the other hand, all possessions are a burden, and a car may rank among the heaviest. It is expensive to maintain, it makes the owner a prey to vandals, thieves and pedestrian acquaintances, and it exposes him to the risk of accident. Against these considerations he has to weigh the privilege of travelling in door-to-door comfort, the freedom of deciding when he will travel, the value of time saved, and (if he cares for such things) the pride and joy of property. (W. Nash, 1980. *Designs in Prose*. Longman, p. 15)

To summarize, discourse purpose and subject-matter are two main contextual factors from the communicative situation which constrain the chaining strategy available to the writer to steer his text along specific lines of development. Some of the main chaining strategies identified so far include characterization, spatial, temporal, participant, sequential, through- or counter-argument patterns. Each of these strategies is realized in the textual surface by a series of linguistic expressions, frequently by themes. Themes, therefore, act a signposts for the reader of the specific chaining strategy selected by the writer in view of the discourse purpose and the subject-matter, thus playing an important role in the structuring and development of discourse.

We summarize in table 2 below the main chaining strategies identified so far together with the most frequent thematic selection options associated with them.

Table 2: Chaining strategies and thematic selection

CHAINING STRATEGY	THEMATIC SELECTION
Characterization	Topical
Spatial	Location
Temporal	Time
Sequential	Time Process
Through- or counter-argument	Conjunctive

4.2 Focus and Focus progression

With respect to *focus selection* and *progression*, there are no studies linking contextual factors with the choice of a specific focus node. Focus progression is constrained on purely inferential grounds. Focus selection is taken for granted at the beginning of a discourse, and from there the inferential mechanism proceeds by expanding the currently visited node, or one of its previously unexpanded children, or a new expansion of its ancestors. For example, if the currently visited node are the physical attributes of the balloon in Example (10), the most reasonable expectation is that the next sentence continues talking about that, and not that it jumps to change focus to return to the same one later.

However, this mechanism does not explain the preference of one focus node type over another at the beginning of a discourse. The question is: why should we focus on an object, or an action, or an event in the first place?

It is our feeling that factors such as the *discourse purpose* and the *subject-matter*, among others, contribute to the focus selection process.

For example, if the discourse purpose is descriptive, centering on a place or location, then object focus nodes and/or attribute focus nodes are the most likely focus candidates for information development. If, the purpose is procedural, then an action focus node is the most likely candidate. If the purpose is narrative, centering around a participant or group of them and their actions, the most likely focus nodes will be object and action nodes; event nodes will also be possible, if the participant is the same throughout, and his actions can be grouped under a higher level "abstract action", as in example (14) above.

At this point, it is important to point out that the discourse focus may be grammatically encoded as a sentential 'topical theme' in many occasions. In example (9) and (16) above, the foci are the balloon and the captain, respectively, at the beginning of the discourse. These are grammatically realized by 'topical' themes in the first sentences. As the discourse progresses, the focusing mechanism centers around a group of properties of these objects, causing attribute nodes to be the next focus candidates.

The categories of focus nodes proposed by McCoy and Cheng do not capture all the necessary focusing possibilities according to the contextual factors studied above. Therefore, we propose to add a further focus node type, the "fact" focus node, which accounts for the kind of focusing that argumentative texts exhibit. These texts do not center purely on objects, or events, but focus on whole propositions which the author presents as true facts and which are further opposed or substantiated in the text to convince the reader of their validity. Example (22), for instance, focuses on the proposition: "The intellectual life of the nineteenth century was more complex than that of any previous age", which the author presents as the thesis to be believed by the reader. In order to do so, he provides evidence or substantiation in the form of several causes which are presented in a sequential order: "the area concerned was larger than ever before", "science made new conquests", "machine production profoundly altered the social structure", and, finally, "a profound revolt gave rise to attacks upon many beliefs and institutions that had hitherto been regarded as unassailable". The text, then, focuses on the initial thesis and the focus-shift candidates are the evidences provided by the writer.

4.3 A preliminary specification of contextual factors

In order to put together the contextual factors which we have indentified so far and which constrain the deployment of the phenomena studied above, we provisionally propose to present them here in a preformal specification form. Figure 7 (at the end of the document) illustrates graphically the way in which different factors from the context -*discourse purpose* and *subject-matter*-- constrain the selection of specific options from the different phenomena presented above: *chaining strategies, theme selection, focus nodes* and *focus shift-candidates* .

For example, if the discourse purpose is narrative and the subject-matter centers around events, then the more likely chaining strategy chosen by the writer to structure his/her text would be a temporal one; this strategy will be probably signalled in most occasions by the selection of marked temporal themes; the more likely focus node will be an event focus node which captures a series of related actions as focus-shift candidates as the discourse progresses.

Let us briefly illustrate the ideas explained above by analysing a real text. Example (13) above, reproduced below, is an extract from a tourist brochure narrating the historical and socio-political development of Bern:

BERN

> Berne was founded in 1191 by Berchtold V. Duke of Zähringen, for strategic reasons and enlarged by stages (Clock Tower before 1218, Prison Tower 1256, St. Christopher' s Tower 1344). In 1353 Berne joined the Swiss Confederation. After the fire of 1405, which almost completely destroyed the wooden-built town, the houses were rebuilt of sandstone. The medieval structure of the city originating from that time has remained unchanged up to the present day. From the 14th to the 16th century, Berne reached the zenith of its power by enlarging its territory and gaining great political influence. In 1798 Napoleon' s troops invaded berne and thus the collapse of the Ancien Régime was witnessed. In 1834 Berne became a university town and in 1848 the Federal Capital of Switzerland as well as the capital of the Canton of Berne (second largest Swiss canton). Berne was declared a World Landmark by the United Nations and was given the title of "Europe's Most Beautiful Floral City" .
>
> (Touristic Brochure printed in Switzerland in 1989)

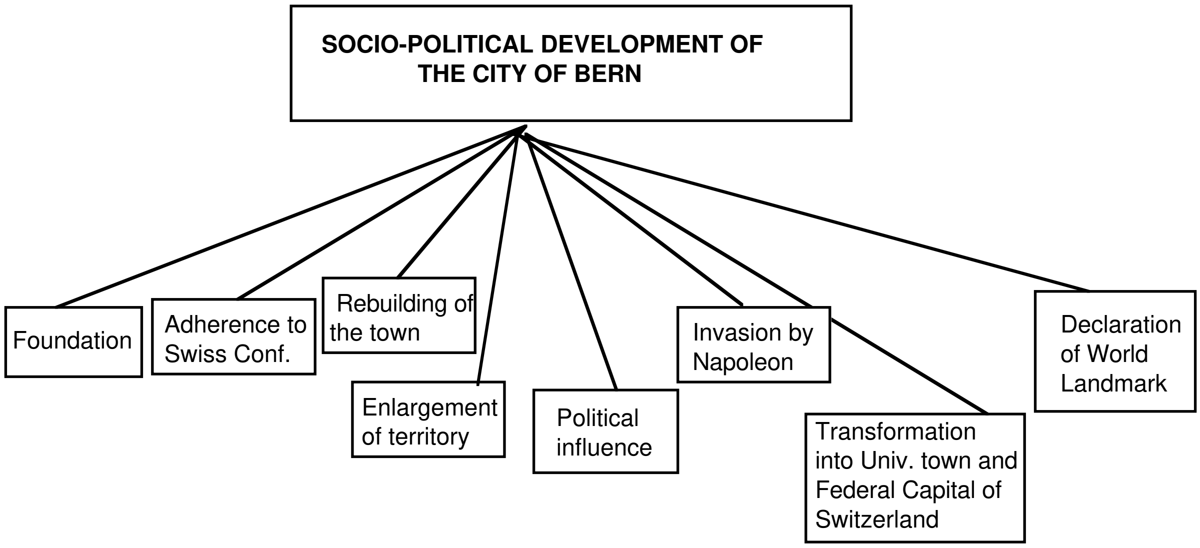
We can identify the following factors which constrain the selection of a specific chaining strategy, focus node and focus-shift candidates:
- *Discourse purpose*: the function of this text is to narrate a series of actions related to the history of the city of Bern.
- *Subject matter*: the historical and socio-political development of the city of Bern.

According to these features, we can predict from Figure 7: a) a particular chaining strategy, which would be signalled, among other markers, by the selection of certain themes; b) a specific category of focus nodes. We consider each one of them:

- *Chaining strategy:* temporal. The text is steered along a temporal line of development which consists of eight temporal scopes - each time a new point in time is introduced in the text, we have a new temporal scope-. Six of the eight temporal scopes are explicitly signalled by a temporal theme (*In 1353, after the fire of 1405, from the XIVth to the XVIth centure, in 1798, in 1834, in 1848*). The remaining two temporal scopes, one at the beginning of the text (*Berne was founded in 1191*) and the other at the end (*Berne was declared World Landmark by the United Nations and was given the title of "Europe's most beautiful floral city*) are not signalled by marked temporal themes; the first temporal scope is signalled by a temporal adjunct (*in 1191*) in rhematic position, whereas the last temporal one is not explicitly signalled in the textual surface but has to be inferred from the reference to the United Nations.
- *Theme selection* : the themes selected to signal the temporal strategy are also temporal.
- *Focus node and focus-shift candidates:* an event focus node (the socio-political development of the city of Bern) can be inferred as the "superaction" in the sense that it captures what is common about a sequence of actions where Berne is the participant involved. Focus-shift candidates are the actions themselves (*Berne was founded in 1191; Berne joined the Swiss Confederation; its houses were rebuilt of sandstone; its medieval structure remained unchanged; Berne reached the zenith of its power; Napoleon's troops invaded Berne; Berne became a University town; Berne became the Federal Capital of Switzerland; Berne was declared a World Landmark*).

The focus tree that we provisionally propose for the above text is represented in Figure 6 below:

Figure 6: Focus tree for example (13)



5 Conclusion

In this paper we have argued for the need to clarify the terminological cocktail which dominates the study of related concepts such as Theme/Rheme, Given/New, Topic and Focus. More specifically, we have concentrated on the ways in which the disciplines of Linguistics and Artificial Intelligence have concentrated on the same underlying problem: the information communication problem, but provided unequal results which need to be integrated in order to be made operational for a unified theory of discourse structure. In particular, the paper has attempted to provide operational redefinitions for these notions and explored the constraints imposed by several contextual factors on the discourse phenomena.

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