

Cohesion with Restrictive Post-modifiers in English: A Clause-relational Approach using Rank-shifted Paraphrase Semantics

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ABSTRACT

Based on earlier work which identifies many paraphrase possibilities for complex nominal groups in English, this paper extends clause-relational theory to account for complex semantic and cohesive elements within nominal groups and between them and the remainder of the sentence. Initially we examine restrictive post-modified nominals as themes of their sentences. For these we simply rank shift the nominals into clauses and add them to the rest of the sentence. When complex nominals occur at the end of the sentence, however, we have to re-start the analysis to construct the semantic and cohesive elements within the nominal groups before incorporating them into the full sentence. Even greater complexity is apparent for complex nominals that are semantically associated with other lexical items in the text. For these we have to construct the semantics of the associated nominals as cohesive side patterns of continuity, and then relate them to the grammar and cohesion of the sentence.

1. BACKGROUND, AIN AND APPROACH

The grammar of restrictive and defining post-modifying clauses in complex English nominal groups has been known for decades, and many grammars are available that explain their types and some of their combinations. It

is assumed here that readers are aware of this work. What have not been studied are the semantics of the post-modifications and the cohesion that exists within the nominals and between them and the remainder of the sentence.

Recent work (Jordan, 1994) identifies many ways we can paraphrase complex nominals in thematic and non-thematic positions, together with some of the changes in meaning and tone that accompany the paraphrases. This was presented as a workshop at the Universidad Complutense de Madrid during the International Systemic Workshop in August, 1993 and improved for publication as a result of the discussion. Related later work (Jordan, 1993 —published May, 1994) explains how experienced writers writing for mature audiences use complex nominal groups to achieve the desired register for their readers.

The aim in this present paper is to explain how the semantics and cohesion of restrictive post modifiers can be accounted for within an expanded clause-relational theory using paraphrase semantics. This involves: rank-shifting the restrictive modifiers into clausal status, recognising the types of clause relational connections in the expanded form, and then showing how the clause-relational system operates for the original text. This approach, which I use in two earlier works (1988a, 1988b), is based on Van Dijk's (1973) notion that any complex language structure can be understood by first examining how it operates in larger paraphrases, and then transferring the knowledge thus gained back into the original text.

The multi-example corpus for this work is from two main sources: *Scientific American*, a broadly-based American scientific magazine; and *Maclean's*, a Canadian weekly news magazine. The readers for both are well educated with some (but not an expert) knowledge of the topics discussed. Examples were also added from other sources as the work progressed.

2. CLAUSE-RELATIONAL BACKGROUND

Based on earlier work into «relational propositions» by Beekman and Callow (1974), clause relations is the study of the semantics of connection between any two or more cohesive elements in language. Notable branches of this study are called calculus by Longacre (1972) and «rhetorical structure theory» by Mann and Thompson (1986,1989). A much more detailed account of the field is given in Jordan 1992.

The approach and terminology used here derives from Winter's work (1974, 1982, 1992), in which he uses mediating questions between the semantic units to determine the type of relation present. Following the discussion and examples in Jordan 1988a and 1992, we will be using abbreviated clause-relational indicators to show the semantic connections.

Unlike other clause-relational work, however, we will be examining the

complex relations that occur within the clause and nominal group as well as between clauses and sentences. The overall aim is to demonstrate how even very complex restrictive post-modifiers in English nominals can be explained within a clause-relational framework. In doing so, we will of course also be extending that theory as a more powerful model for explaining textual cohesion.

The work begins with paraphrase clause-relational analyses of thematic complex nominals, based on the major paraphrase possibilities listed in Jordan 1993. This is followed by an account of the theoretical difficulties raised when the complex nominal is in sentence final position, or is embedded within grammatical units of the sentence. Further complications are addressed for nominals that are associated with lexical items or nominals that are already in the text. For these we have to account for the lexical continuity as well as the clause-relational connections and the relations within the nominals themselves.

3. BASIC PRINCIPLES AND THEMATIC NOMINALS

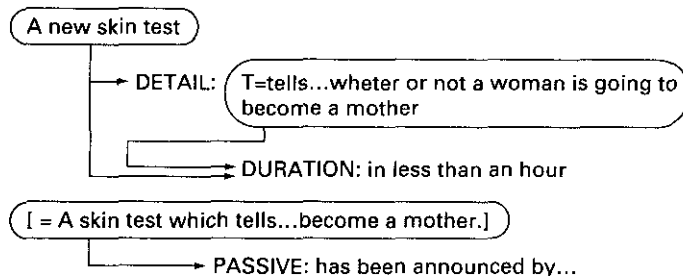
The use of rank-shifted paraphrases of complex nominals can be seen by analyzing relatively simple examples, especially those where the nominal is theme of the sentence, as in:

- (1) *A skin test which tells in less than an hour whether or not a woman is going to become a mother* has been announced by Dr. Frederick H. Falls, Dr. V. C. Freda and Dr. H. H. Cohen of the University of Illinois College of Medicine (*Scientific American*, Jun 91, p. 14).

The complex nominal group contains a restrictive relative clause dominated by *which*. It can be rank-shifted into a separate clause as:

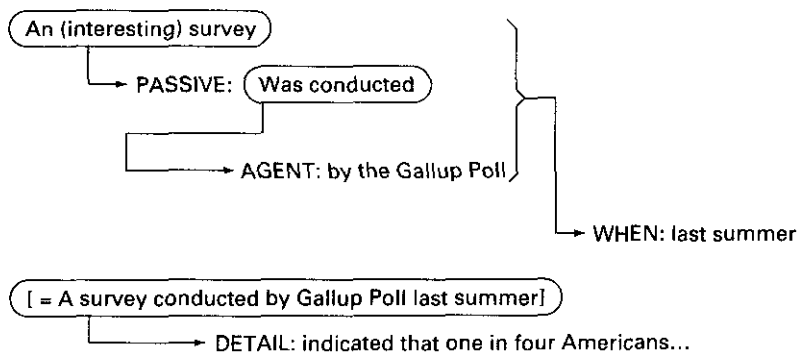
«A (new) skin test tells in less than an hour whether or not a woman is going to become a mother. It has been announced by...»

(The addition of the attributive adjective *new* is useful or necessary to support the complete thought for the sentence.) To analyze the semantic connections in this example, we first have to recognise the introduction of a new topic (*A new skin test*) followed by some **DETAIL** about it and the **DURATION** of its accomplishment. This whole complex nominal then enters into an agentive **PASSIVE** relationship with the predicate of the sentence. We can see the relationships within the nominal group and between it and the rest of the sentence by showing the paraphrase and the following text as:



That is, we can use the paraphrase to break the complex nominal down semantically so that we can use a consistent descriptive method for analyzing the meaning of the sentence both within the nominal and between the nominal and the rest of the sentence. Here is a similar example and analysis for a complex nominal containing an -ed clause. This time the thematic nominal is subject of the sentence.

- (2) *A survey conducted by the Gallup Poll last summer indicated that one in four Americans takes cues from the stars or believes in ghosts (Scientific American, Jun 91, p. 17).*



We can recognise the following mediating questions that identify the type of relations and what the relations are between:

PASSIVE: «What about the survey?»
AGENT: «Who conducted the survey?»
WHEN: «When was the survey conducted?»
DETAIL: «What are details of this survey?»

The braces and arrows indicate what is being entered into what relation with what. See Jordan 1992 for a much more detailed account of the method being used here.

The paraphrases, of course, do not mean exactly the same as the original in its context. They change the knownness/newness, presupposition, emphasis, style, tone and suitability for the level of readership. Indeed such paraphrases could make the text totally unsuitable for the intended readers, even insulting them by indicating something as «new» that they already know.

Such paraphrases may find some use in the creation of «plain language» for readers who need a simpler form of expression, but that is not a subject being analyzed here. We are simply using the paraphrases to enable us to determine the relations that exist within the sentence. An adequate paraphrase may involve use of existentials, sub-sets, types, or modal semantics, as shown by the following four examples and their analysis:

- (3) *The recent unconfirmed accounts of former Soviet leader Leonid Brezhnev's penchant for astrology* hardly surpass Nancy Reagan's famous astrological consultations (*Scientific American*, Jun 1991, p. 17).

[There have been unconfirmed accounts of Leonid Brezhnev's penchant for astrology. These hardly surpass...]

- (4) Even *Soviet citizens who are not really believers* distance themselves from the hated dogma of «scientific socialism» (*Scientific American*, Jun 91, p. 20).

[Some Soviet citizens are not really believers. Even these distance themselves...]

- (5) *Indeed the type of gamma-ray interference that has disrupted scientific missions* is uniquely produced by orbiting reactors... (*Scientific American*, Jun 91, p. 26).

[One type of gamma-ray interference has disrupted scientific missions. It is uniquely produced by orbiting reactors...]

- (6) *The ability of satellites to assure frequent, repetitive coverage of numerous targets over long periods, regardless of their location*, cannot be equaled by aerial reconnaissance (*Scientific American*, Jun 91, P11).

[Satellites can assure frequent...location. This cannot be equalled by...].

These and many other methods can be used to paraphrase the complex nominal into a separate sentence (see Jordan 1994).

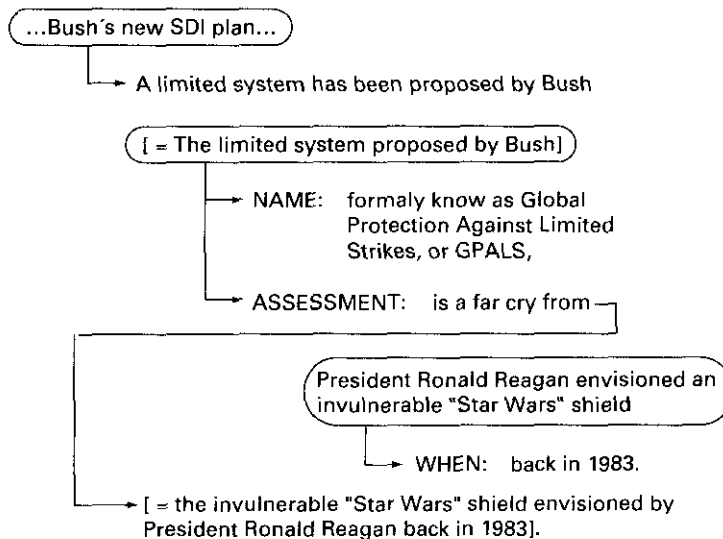
4. NEWLY INTRODUCED TOPICS WITHIN COMPLEX NOMINALS

So far we have dealt with complex nominals in thematic position. These are relatively simple to analyze because we can, through paraphrasing, separate the items of information being presented, and then analyze them in the order they appear in the text. We now need to turn our attention to non-the-

matic complex nominals which introduce new topics into the sentence. Here is an example in which a new topic is introduced in a final-position complex nominal to allow comparison:

- (7) More to the point, the critics argue that Bush's new SDI plan is subject to the same flaws as previous ones.... *The limited system proposed by Bush*, formally known as Global Protection Against Limited Strikes, or GPALS, is a far cry from *the invulnerable «Star Wars» shield envisioned by President Ronald Reagan back in 1983* (*Scientific American*, Jun 91, p. 26).

The first complex nominal is a synonym of *Bush's new SDI plan* mentioned earlier in the text, but the final nominal is being newly introduced at this point in the discourse. Thus we have to «start again», constructing a portion of text dealing with the Reagan plan, which we can then enter into the structure of the earlier discourse. Here is the analysis:



The approach being used here is the one we have to use when analyzing the structure of a large discourse in which two or more people, or topics, are first introduced separately, but are not connected until later in the story. Although readers might think «What has this got to do with the topic or the story?», we have learned as readers to be patient. First we are given (often quite detailed) information about the newly-introduced topic before that topic is connected with topics already introduced. (An excellent example of this is the introduction to the American film «Gumbball Rally», in which the

participants in a car rally are first introduced before there is any connection between them.)

That is, there are many instances in natural language in which newly-introduced nominals are not connected to already-introduced nominals until later in the discourse –for soap operas, it can take weeks! The analytical approach used here is simply an acceptance of this rather obvious fact, and a recognition of its application within the grammar of the nominal group as well as within the overall structure of a large discourse.

Here is an example where the paraphrase provides two items of detail about the last item of the compound head noun:

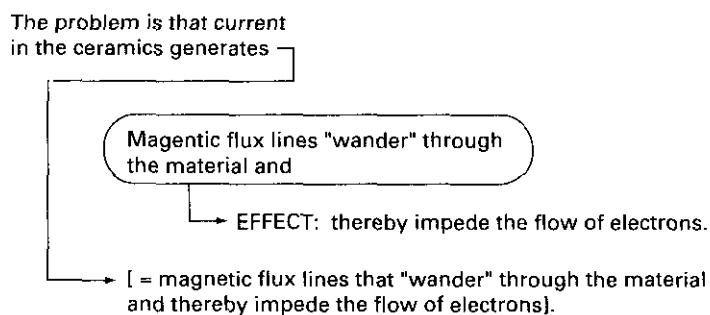
- (8) UNSHIELDED ORBITING REACTOR emits a cloud of electrons and positrons that spiral around the earth's magnetic field lines and create a temporary radiation belt (*Scientific American*, Jun 91, P45) [caption for illustration].

[A cloud of electrons and positrons spirals around... and creates a temporary radiation belt. These are emitted by the unshielded orbiting reactor.]

Clause-relational elements within the complex nominal can complicate the picture, as shown in:

- (9) The problem is that current in the ceramics generates *magnetic flux lines that «wander» through the material and thereby impede the flow of electrons* (*Scientific American*, Jun 91, p. 20).

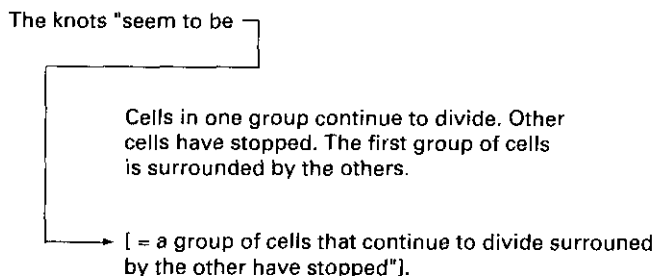
The newly-introduced paraphrase sentence contains subject ellipsis with a cause-effect relationship between the two co-ordinated parts. Here is the analysis:



Many other complications are possible within the newly-introduced topic of the final complex nominal. Here is an example where two types of a topic are introduced and related within the complex nominal:

- (10) The knots «seem to be a group of cells that continue to divide surrounded by other cells that have stopped» (*Scientific American*, Jun 91, p 24).

The paraphrase sentences involves introducing both types of cells and relating them before creating the complex nominal which is complement of the original sentence. The example is complicated further because it is the cells that divide and not the group, and the paraphrase has to indicate this. Here is the analysis:



Thus when the complex nominal group contains newly-introduced information, we have to discontinue the grammar of the main sentence, analyze the nominal group in terms of its paraphrase semantics, and then insert it into the sentence.

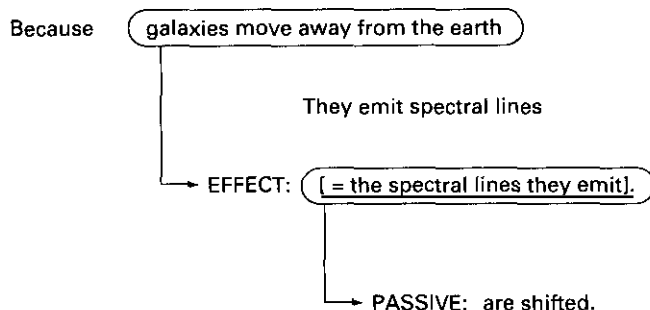
5. ASSOCIATED NOMINALS

Many complex nominals contain elements of anaphora that achieve cohesion between the nominal group and other nominals in the text, and we can recognise and describe them based on work by Christophersen (1939) and Hawkins (1978). Applications of the principles can be found in Jordan 1984 and later work.

Association means that the connection is clearly linguistically stated («triggered») or is recoverable («untriggered»), and not simply connected by general association of terms or by collocation. Thus for a trigger of *galaxies*, *their spectral lines* is pre-triggered, *the spectral lines of the galaxies* is post-triggered, and *the spectral lines* is untriggered. Post-triggering often occurs in the form of restrictive prepositional post-modifiers, but they do occur as relative clauses, as in:

- (11) Because galaxies move away from the earth, *the spectral lines that they emit* are shifted (*Scientific American*, Jun 91, p. 52).

This single sentence contains three separate propositions connected by CAUSE-EFFECT and PASSIVE relationships. The nominal group underlined can be perceived as a rank-shifted clause «They emit spectral lines». Thus we can analyze the nominal and clause relational connections of this sentence as:

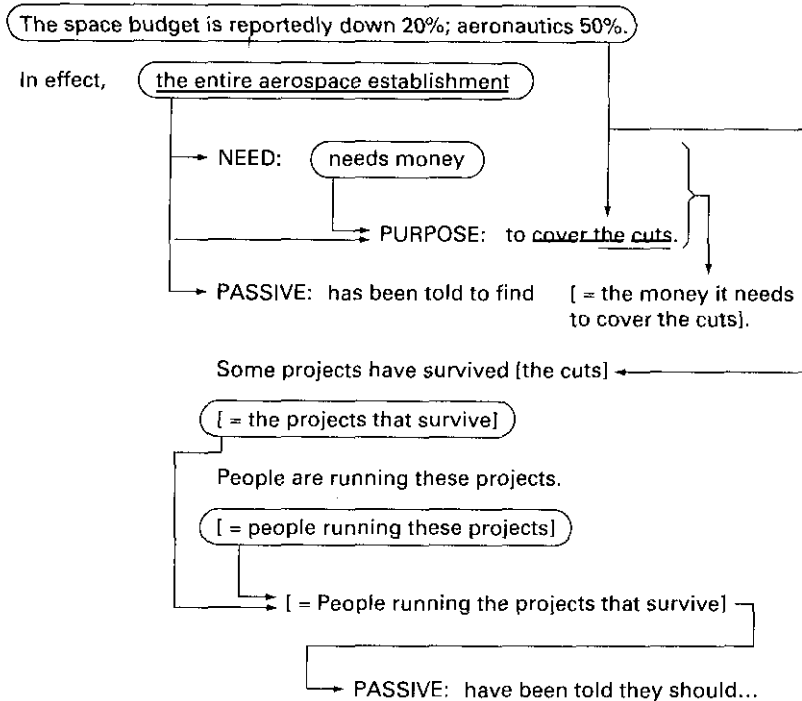


The same principles apply whether we are dealing with cohesion within or between clauses and sentences. Here is an example and analysis for a more complex example spanning three sentences and containing two complex associated nominals. An earlier sentence is included to show the lexical connections:

- (12) Once pampered and protected, the aeronautics and space programs of the Soviet Union are fighting for *every ruble, dollar, franc, and deutschmark they can get*. The space budget is reportedly down 20 %; aeronautics 50 %. In effect, the entire aerospace establishment has been told to find *the money it needs to cover the cuts*. *The people running the projects that survive* have been told... (Aerospace America, Jan 91, p. 27).

In this example, the first sentence contains a complex nominal which can be paraphrased by using a sub-set. The second sentence is re-entered by *the cuts* into the second complex nominal, which has a null-indicated relative clause and a purpose clause. This associated nominal is post-triggered in both the subject and purpose elements of its paraphrase sentence. The third complex nominal in this example is a two-stage association (the cuts –projects surviving them– people running the projects), and therefore has two paraphrase sentences. The first is a sub-set paraphrase with *the cuts* as implicit object and this first related sentence becomes the object of the second related sentence. The analysis for this text is:

...the aeronautics and space programs.

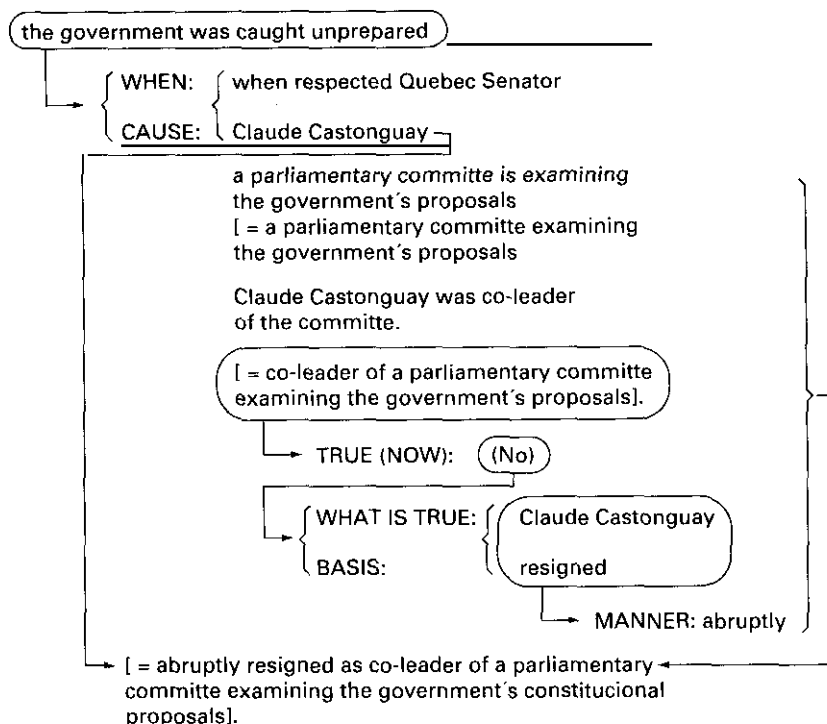


As the nominal *the money it needs to cover the cuts* is the object rather than the subject of the clause, we had to deal with the semantics of the nominal group separately (as in the previous section of this paper) before adding it to the grammar of the clause.

Example 13 contains a very complex association:

- (13) Even before Clark's shift, the government was caught unprepared when respected Quebec Senator Claude Castonguay resigned abruptly as *co-leader of a parliamentary committee examining the government's constitutional proposals*. (Macleans, Dec 9 91, p. 14).

The nominal underlined is a three-stage association (government→proposals→committee→co-leader) embedded within the grammar of the sentence. Because of this complexity, the analysis first deals with the semantics and cohesion of the association before returning to the main sentence. In the analysis that follows the ASSESSMENT of Claude Castonguay as *respected*, and the DETAILS about him (*Quebec Senator*) have been omitted for the sake of clarity:



In Example 13, we have a pre-triggered association *the government's constitutional proposals* as post-trigger for the broader associated nominal *a parliamentary committee examining the government's constitutional proposals*. This in turn becomes the post-trigger for the complex nominal underlined in the example cited. That is, the nominal group contains a complex chain of lexical cohesion connected with the subject of the sentence, as well as having connections with the subject of the subordinate clause.

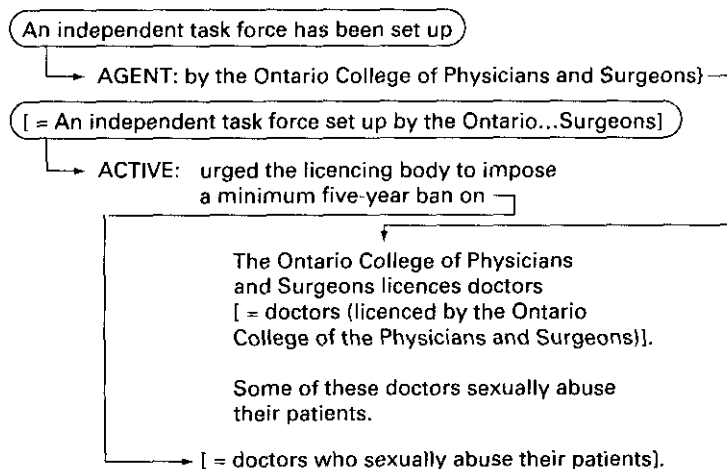
We now have to recognise within complex nominals a broader category of connection than the associations we have examined so far. This is illustrated by:

- (14) *An independent task force set up by the Ontario College of Physicians and Surgeons* urged the licencing body to impose a minimum five-year suspension on *doctors who sexually abuse their patients* (*Maclean's*, Dec 9 91, p. 15).

The first complex nominal containing the restrictive *-ed* clause with the irregular verb *set up* is easily handled, as are the synonym *the licencing body* and the use of a sub-set paraphrase for the final relative clause, and the pre-

triggered association *their patients*. The complication comes through the lexical connection between the doctors and their licencing body.

Clearly, although the final nominal is not an associated nominal as defined here, there is an implicit association between the doctors and their licencing body. This can be seen in the semantics of the item *doctors* in this context: it does not mean doctors in general, but only those in Ontario –those who come under the licensing jurisdiction of the College. The same of course applies for the whole final nominal. Thus we have to recognise a broader category of implicit semantic connection between some complex nominals and lexical items within the sentence. Here is the analysis:



Thus, as with Example 13, although there is anaphoric connection between elements of the nominal group and other lexis in the sentence, we have to start the analysis again to introduce the new nominal before completing the analysis of the sentence.

6. CONCLUSIONS

Post-modified nominal groups in writing for mature readers can contain extremely complex forms, which become easier to analyze when we have rank-shifted them into independent clauses. When we have done this, we can recognise the semantic relations between elements of the nominal group - and also between the nominal group and the rest of the sentence.

When the complex nominal is theme of the sentence, the analysis is relatively easy, as the relations unfold in the order they are presented in the text. When, however, the complex nominal appears later in the sentence, we may have to suspend the analysis until the semantic connections involving the newly-introduced items in the nominal have been dealt with. Only then can we relate these to the remainder of the sentence. This approach has valuable applications for the analysis of larger stretches of discourse in which the relations involving two or more topics (or protagonists) are dealt with separately before the topics are connected within the text.

For complex nominals lexically associated with other nominals already in the text, we have to show the connections as a side pattern of continuity before adding the nominals into the text. Although this is not, strictly speaking, starting the analysis again (as it has anaphoric connections), it uses a similar principle. Complex nominals containing vaguer elements of anaphora than true association can be regarded as transition examples between associations and new introductions.

The approach used to analyze and describe the complex relations in nominal groups is similar to that used by many linguists to explain the relations between larger parts of discourse. The contention here is that the same forms of textual cohesion apply at all levels of text structure. At higher levels in the text, the semantic propositions can be readily recognised because they are more clearly signalled and are not hidden within grammatical structures. However, these same propositions also occur within elements of the clause, and we must be able to analyze them.

Just as any grammar is lacking if it fails to account for matters beyond the clause, any theory of discourse structure is lacking if it fails to account for cohesion within the clause and nominal group.

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