THE READER OVER YOUR SHOULDER – SOME LINGUISTIC BACKGROUND

MICHAEL P. JORDAN
QUEEN'S UNIVERSITY AT KINGSTON

AIM

A truism of technical communication is the edict that the writer should always consider the needs of readers – as if the reader were peering over the writer's shoulders. We are well aware of the general importance of reader knowledge on vocabulary, on the order in which we present known and then new information, and on the early process decisions regarding the document's purpose. What are less known, however, are the effects of reader knowledge on many structures and signals in language use, on grammatical choices (e.g. subordination [1]), and even on selections of the articles and basic clause patterns.

This paper addresses the first of these areas of study, concentrating on the "known-new" structure of languages as signalled in English. Examples of technical writing are used for this readership, of course, but the principles apply equally as well in all forms of writing and speech – and in other languages.

The aim here, however, is to do more than merely present results of applied research in "known-new" structures in technical writing (known!). The wider aim is to demonstrate how we might proceed from vague (though undoubtedly useful) impressionistic edicts about our subject, to scientifically–repeatable results and conclusions--and how we can thus build a sound linguistically-based theory of effective communication and the related surface structures and signals in language.

INTRODUCTION

The linguistic significance of information previously included or "given" in the text was first identified by Prague School Structuralists – primarily as Mathesius's 1939 "given-new" notion of functional sentence perspective in which the given or known information acts as the base to which the writer adds new information [2]. This concept has been refined more recently by Chafe [3], Dahl [4], Winter [5] and others. The sub-division by these workers of "given" into "known because previously verbalized in this document" (given) and "previously known by readers" (known) is an important distinction for this paper.

Most linguistic research has concentrated on the semantic relationships of parts of sentences to previous parts of the text, particularly the "theme" (or start) of a new sentence being taken from the previous sentence and being connected to the following "rheme" in the new sentence. The "known-new" structure in clauses and sentences has received less attention, in spite of its more obvious usefulness to practitioners and teachers of effective writing. This paper seeks to remedy that deficiency.

Discussed here are the needs for an methods of re-using material previously discussed in the text, and of using information readers already know. Analysis of the "known-new" relation and related signalling is followed by discussion of a special branch of subordination – that dealing with the addition of information. This leads us to examine the "known-new" meanings of the related complex co-ordinating conjunctions.

RE-ENTERING GIVEN MATERIAL

It would be a mistake to think that once information has been given in a text, it should not be mentioned again. That is usually so of course, but there are many occasions when writers need to refer to material already established (or previously "given") in the text. There are two requirements for re-entering given material in a formal technical document. First it is signaled as being given earlier to prevent the reader thinking "You've already

said that" and feeling the writing is thus unnecessarily verbose. Secondly the given material should not simply be a repetition with no other new information; instead (as explained in Winter's [5] analysis of repetition and replacement) it needs to be elaborated, refined, or used as the basis for new information to follow. These requirements are met in the following example. The previously-given purpose of a document is re-entered as the basis for a description of the structure of the text:

> (1) As initially stated, it is my purpose to classify and enumerate a few of the problems encountered in manufacturing and to suggest a few solutions. There are three general classifications of problems: psychological, technical, and economic. Although there is considerable overlapping of all three areas, I will discuss the problems under these headings.
> (Standard Engineering, Feb 75, p7)

The knownness of the purpose is signaled by As initially stated dominating the first sentence. In the second sentence the problems are divided into three classes, and this classification is stated as the basis for the document structure in the third sentence. Especially for large documents it is often useful to relate material being discussed with information given earlier in the text. The origin of the material in the document can be made specific by heading reference if required (one of the uses of headings) and numbering systems of course.

ENTERING GENERALLY KNOWN INFORMATION

Just as writers often need to re-enter information previously given in the text, they also often need to include information that is new to the document but which is nevertheless known to many readers of the text. Again it is signaled in some way, this time to prevent the reader over the shoulder thinking "Why are you telling me that – I already know it." There are many ways of signaling knownness to readers – some overt, and others quite subtle. Perhaps the clearest signal of knownness is It is well known.

(2) It is well known that "significance" tests for the above parameters are not nearly as clearcut as they are in the case of models which are linear in parameters. Nevertheless, approximate tests can be employed (see Draper and Smith, 1967; Mandel 1969, 1971).
(Transportation Research, Feb 75, p16)

The writer includes a well-known fact to readers in case they feel the whole discussion of the tests to follow is of little use, and also that they know more about the subject than the writer. The knownness is signaled by It is well known, and Nevertheless is used to indicate the more favorable statement to follow. When, of course, something really is well known to readers, signals such as It is well known, of course and obviously are quite appropriate. When, however, some readers may not know the information, some substantiation may be necessary:

(3) It is well known, c.f., Soneys and Van Dyck [4] and Green and Guerrero-Alvarez [21], that the crater formed by a single spark is a symmetrical segment, which tends to a half-sphere with increasing pulse duration.
(Journal of Heat Transfer, Nov 75, p577)

In this example the known information appears after that, and the preceding references provide substantiation for readers who need it.

Words such as obviously and of course should not of course be used in an attempt to convince readers that they should know something or that something is obvious when it is not. Such practice, called "credibility by insistence" [6], only discredits the writer in the eyes of discerning readers. However, something may be obvious to some readers and not to others, and the writer often has a difficult decision: to signal as "known" some information which may not be known by some readers, or to omit a signal and risk some readers feeling they are being told the obvious. Here is a clear use of Obviously to indicate information which, while being obvious, still needs to be included.

(4) In each of these categories, individuals or teams of professionals are eligible to enter although work performed by or for AISI and its

member companies or their subsidiaries does not qualify. Obviously, work by members of the awards jury is not eligible either.
(Steelways ASIS, Jan/Feb 69, p8)

Yes it is obvious, but it does need to be stated.

In addition to the signals already mentioned [sorry!], other typical signals of knownness are Doubtless, Without question, Naturally, Clearly and As you know. The language bully might use We all know that or even Anyone with any common sense recognizes that. When signals such as It is true that, Obviously, Of course and Granted are used to introduce information which appears contrary to the writer's point of view or thesis, this will be followed by a rebuttal usually signaled by but or however. This thesis-concession-rebuttal structure is explained more fully elsewhere [7]. We here examine the structure and signaling of simpler structures by studying examples of the use of obviously ... but which are not included with concession and rebuttal:

(5) Obviously the complex and irregular geometries could not be avoided entirely in actual experiments, but these effects were minimized by averaging many experimental data.
(Journal of Applied Mechanics, Jan 75, p271)

During tests on indentations of monkey brains, scientists perceived anomalies in certain locations and sought to avoid them. The clause dominated by Obviously acknowledges the known (to readers) futility of expecting total avoidance, and this experimental difficulty is seen to be reduced by the averaging mentioned in the final clause. Transition between the accepted difficulty and its reduction is indicated by but. Although similar in signaling, the next example indicates a known deficiency followed by a new positive statement about a product.

(6) Alumina ceramics in excess of 96% are usually formulated with submicron or fine crystal reactive aluminas. These are obviously more expensive, but because of their ability to be fired at lower temperatures than standard raw materials, they produce extremely smooth, as-fired surfaces, high mechanical strength and excellent electrical properties.
(Material Engineering, Jun 76, p51)

For both these examples, the known information is signaled by obviously, the front position giving it slightly more prominence that the embedded position. The known material in both cases is a difficulty or defect, and this is followed by information mitigating the problem. This wide understanding of the relations involved here allows us to recognize concession-rebuttal as a special form of the "known problem – mitigation" relation.

THE "KNOWN-NEW" RELATION

Although known information can be included in the text as the initial part of many relations, it can enter into a special relation by virtue of its knownness to readers rather than by virtue of the type of information it contains. That is, the knownness of some information can be "contrasted" with new information to follow:

> (7) By now, everyone is probably well aware that coronary heart disease is today's biggest single killer. And hand in hand with this goes the knowledge that the use of polyunsaturated fats instead of saturated fats, is considered one of the easy preventive measures against heart disease.
>
> But did you know that one of the polyunsaturates, or essential fatty acids (whichever you care to call them), is also known as vitamin F? (Here's Health, Jul 76, p133)

This is a typical start of an informal technical article, and structures such as this largely explain the very common use of But or However at the start of one of the first few sentences of a large number of general articles and even formal texts. The reader obviously wishes to establish known information as the basis for the new information to follow, as this approach provides background information within which readers interpret the message of the text. The signals of knownness and newness of the information are very clear, transition between the two types of information being indicated by But. The "known" signal is seen to extend into the second sentence as well as the first by the use of And hand in hand with and the knowledge. Here is a similar example, this time with split known information and an overt

statement of newness.

> (8) These arguments have been successful, as we all know, in influencing the government to mandate standards for products. They have been so successful that there are today some 280 government agencies mandating and enforcing standards. Regulation by government is nothing new, but the recent very rapid profileration of mandatory standards of kinds is new.
> (Standards Engineering, Feb 75, p7)

Use of as we all know and is nothing new signal the knownness of the first and third sentences as the basis for the new statement which introduces the main discussion of the text. The second sentence is probably not known to most readers and is not signaled as such. Transition between the known and new information in the final sentence is again signaled by but.

Subordinating Known Material With Additional Signaling

An important means of indicating that material is – or should be – known to readers is to include it as a subordinate clause at the front of a sentence [8]. These clauses are dominated by such subordinators as Because, Since, Despite, Although, Besides, In addition to, and Apart from. The subordinate clause in the next example is used in conjunction with an additional signal (obvious) to mark the knownness of the initial part of the sentence.

> (9) Is there a solution to this problem? Yes. Put some earnings into a Registered Retirement Savings Plan. Besides the obvious retirement benefits there is a significant income tax advantage.
> (Ontario Digest, Jan 77, p4)

This example introduces information that is not given in the text but is clearly obvious given the readers' knowledge of Registered Retirement Savings Plans. Clear signaling of subordinated information given earlier in the text is illustrated below.

(10) In addition to the already mentioned dependence on the reliability of the assembly operators, increased labour costs and a higher incidence of operator fatigue in series production result.
(Fastening, Jan 78, p55)

Use of already mentioned indicates "givenness" to reinforce the meaning of subordination.

More on Subordination

Subordination is used to re-enter any previous portion of the text, whether or not that portion immediately precedes its re-entry [9]. In the next example, information two sentences before the subordinate clause is re-entered with the use of the subordinator Besides.

(11) Called Daytuff, the plastic is cast from nylon 6. Compared to many other corrosion resistance plastics, it features good mechanical properties including a minimum tensile strength of 11,000 psi (76 MPa). The material replaces ceramics as a shield for bearings and bearing surfaces, applications where the brittleness of a ceramic requires careful handling during installation and removal. Besides being tough, the nylon is so rigid that it is unbendable in thickness of 0.37 in. or (9.4mm) or more.
(Materials Engineering, Jun 76, p37)

The feature of toughness is a restatement of the main clause (it features ... 76 MPa) of the second sentence. It is subordinated as it is now known to readers; the use of "The nylon is tough" as a separate sentence would have given it undue emphasis and sounded odd to readers as they will know it is tough from the data just given. The following example contains three items of known information, two of which are in subordinate clauses.

(12) If lights were used, they very likely might be housed within a Monitoring Panel or even the same Switch Panel that actuates the opening's security device. Besides knowing if the door is opened or not, switches may also be built into an Electric Strike or Lock which

would indicate that the bolt is properly projected, adding even another step in the degree of security surveillance. Naturally, no one could sit for hours doing nothing but watching lights, so generally, in addition to actuating a light, the switch would also sound a buzzer at the Monitoring Panel or if no central station existed it would actuate an Audible Alarm.
(Specification Associate, Jul/Aug 76, p31)

This text is explaining the use of security systems, and the information in the subordinate clause dominated by Besides is obvious as it can be gleaned from earlier discussion. In the next sentence, Naturally signals the knownness of the information in the main clause. Further known information is included in the subordinate clause dominated by in addition to; it is clear that this is known material as the whole discussion is about lights being used, as indicated at the start of the first sentence.

A further rather obvious subordinator of known information is the overt signal Given, which has a clear meaning of information previously known or given in the text.

(13) Fig. 2 shows the long term strength gain characteristics of fly ash concrete due to the pozzolanic reaction. This is an important characteristic that should be utilized more often for high strength concrete designs based on 56 or 90 day strength, since the loading in the major columns usually does not reach their dead load maximum for extended periods well beyond 56 or 90 days.

Given the short term high strength producing characteristics of fly ash concrete, together with these inherent long term strength gain properties, the unanimous seminar agreement to use fly ash whenever possible for high strength concrete is understandable.
(Engineering Digest, Sep 83, p23)

The first paragraph discusses the long term strength, and this is coupled with the given short term high strength to form the basis of the unanimous assessment [10].

As Well As...

The subordinator As well as leads us into other techniques of indicating knownness, introduced by:

> (14) Any direct electrical coupling from input to output impedances, can cause a 'breakthrough' signal to arrive before the main surface-wave signal. As well as causing the degradation already mentioned, this signal, since it is unfiltered, can limit stopband levels, and fill in traps (minima in the frequency response).
> (Electronics and Power, May 77, p391)

The knownness of the degradation is indicated by already mentioned, and the knownness of the fact that it is caused by the signal is indicated by As well as.

Even when there is no other signal of knownness besides as well as, the part immediately following as well as is seen to be known information. In an equipment catalog, for example, readers will expect equipment to be discussed and this is therefore known information and needs to be signaled as such:

> (15) Catalog Describes Computer Systems
> As illustrated, 22-page color catalog describes the complete line of Processor Technology Corp. computers, computer systems, peripheral equipment and software.
>
> Applications as well as equipment are discussed, while a centrefold chart reveals the computer applied in the home, for education, as a laboratory monitor and as a legal aid.
> (Water and Pollution Control, Dec 77, p26)

The title and first paragraph tell readers that equipment is discussed, and so this information is included after as well as to signal its knownness. The order of the information is important. It would be wrong to write "Equipment as well as applications are discussed," as this would indicate that the discussion of equipment is new information and discussion of

applications is known. It is easy to remember this by knowing the statement "They expect us to be accountants as well as engineers" as coming from an engineer complaining about the complexity of travel expense forms. In contrast "They expect us to be engineers as well as accountants" would be from an accountant having to program her own computer software. In both cases the expected, or known, part follows as well as and the unexpected part precedes it.

Often the use of as well as is an important indicator of knownness and newness for readers who may not be totally familiar with the topic. Based solely on our understanding of the meaning of as well as, we can determine what is usual and what is not in the following example:

> (16) Engineering studies related to a permanent replacement of the existing timber trestle were undertaken in 1975. In these studies the possibility of replacement by a bridge structure as well as by culverts and fill on a revised alignment, was investigated. Preliminary cost estimates indicated that the culvert-and-fill concept would be a practical and more economical alternative to a bridge.
> (Engineering Digest, Jan 78, p27)

Even for readers with no knowledge of this subject, the use of culverts and fill is recognized as the obvious, usual or previously-stated technique being considered here, and a bridge is recognized as a new or more radical idea. A comparison of the two methods follows in the third sentence.

"Not only ... but also"

The use of not only ... but (also) (as well) can in many respects be seen as the opposite to as well as. As an example, our frustrated engineer could have stated "They not only expect me to be an engineer, but an accountant as well." Although not only is the form found most frequently in this structure, not just and not simply are also used. Here is an example of not simply ... but... as well.

> (17) Steak house gourmands insist that meat eating is "natural" and nutritionally sound. So it is, but the emphasis on lean flesh is almost

without precedent among humans or animals. Meat's nutritional significance is not simply as a source of the protein that steak abundantly supplies, but of many other things as well. Lions evidently eat their prey's viscera and gut contents before turning to the boring old fillet and rump. And veterinarian John E. Cooper now reports in the Veterinary Record (vol. 97, P307) that tame birds of prey that feed on the most succulent flesh, rapidly keel over with bone disease.
(New Scientist, 6 Nov 75, p317)

The meat's nutritional significance is known or given and many other things is the important new information substantiated in the following two sentences.

The knownness of the information following not only in the following example can be determined by the difference in contrasting conditions. Although the necessary negatives make this difficult to comprehend immediately, its structure and signaling repay close study.

(18) Where cleavage is parallel to the axial plane of a cylindrical fold in bedding, the bedding to cleavage intersection (δ-lineation of de Sitter) is parallel to the fold axis. However, where the cleavage is not strictly parallel to the axial plane, not only will the δ-lineations not be parallel to the fold axis, but they will not lie in the axial plane, which, by definition (Fleuty, 1964, P464) must contain the fold axis.
(Geological Survey of American Bulletin, Jul 74, p1057)

The writer is telling readers what is known or expected, and what is new information. Here is a very clear example of the meaning of not only ... also.

(19) Not only did the design team design the device, it also set up two systems to monitor the production plant.
(Electronics and Power, May 77, p363)

Obviously it would be inappropriate to use a separate sentence for the statement that the design team designed the device. As readers would expect that to be true, it is known information which needs to be signaled as such. The following example uses not only ... but, another of the many variations of this signaling system.

(20) At the awards dinner in March, leaders from the fields of education, industry and the design professions will join with steelmen to pay tribute not only to the award winners, but to all the architects, designers, engineers and artists who create the products, structures and works of art we use and enjoy, yet so often take for granted.
(Steelways, American Association of Iron and Steel, Jan/Feb 69, p9)

Readers would naturally expect tribute to be paid to award winners at an awards dinner, and so this is signaled as known information by not only ... but. Here is an example of not only ... but also being used with as well as to indicate two known elements in the same sentence.

(21) The dam at the Itaipu project site amounts to an increase in height of 46 percent over the Spanish dam, and because of this, its design was analyzed not only by conventional methods but also by two and three-dimensional finite element methods, as well as by structural model tests.
(Mechanical Engineer, Nov 82, p24)

The knownness of the information after not only is signalled by conventional as well as not only; by structural model tests is also indicated as an expected method of analysis, this time by as well as. The less-expected method of analysis comes after the but also.

Summary and Conclusions

This paper shows the many language faces of the "known-new" structure in technical English. As well as the established principles of theme-rheme connection between sentences, we can also recognize overt signals of knownness and givennness – and their use in signalling definable relations between two or more sentences. These same semantic notions are seen to have important counterparts in confirming known and new information between both subordinated and co-ordinated clauses.

We have also seen that it may be possible to make some impressionistic principles of effective communication more concrete and

demonstrable through a detailed study of actual language use. We should no longer be content to teach generalities, when more definite and concrete evidence for rules of good writing are available. More importantly, perhaps, we should be motivated to question the general rules through analyses of language use, and to build a sound understanding of language structure and signalling that refines the traditional teaching of our subject.

REFERENCES

1. "Structures Logiques de la Rédaction Technique", (Systems of Logic in Technical Writing), M.P. Jordan, bilingual, Technostyle, 4(3), 1985.
2. "Functional Sentence Perspective and the Organization of the Text", F. Daneš in Papers on Sentence Perspective, (F. Danes ed.), The Hague: Mouton, 1974.
3. "Language and Consciousness", W.L. Chafe, Language, 50, 1974.
4. "What is New Information?", O. Dahl, Reports on Text Linguistics: Approaches to Word Order, (N.E. Enkvist and V. Kahanen eds.), Abo: Meddelanden fran Stiftelsens för Abo Akademi Forskningstitut, 8, 1976.
5. "Replacement as a Function of Repetition", E.O. Winter, Ph.D. Thesis, University of London, England, Ref. 1295, 1974.
6. "As a Matter of Fact", M.P. Jordan, J. Business Communication, 15(2), 1978 (Reprinted in J. Ont. Council of Teachers of English, 4(1), 1978.
7. "The Principal Semantics of the Nominals This and That", M.P. Jordan, Ph.D. Thesis, CNAA/Hatfield/Birmingham, 1978.
8. Towards a Contextual Grammar of English, E.O. Winter, London: Allen and Unwin, 1982.
9. Fundamentals of Technical Description, J.P. Jordan, Malabar, Fla: Krieger, 1984.
10. "The Language of Evaluation", M.P. Jordan, Technostyle, 6(2), 1987.