TECHNICAL WRITING FOR SOCIAL SCIENTISTS

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This chapter is concerned with the basic unit of writing, the sentence. It is also concerned with the punctuation of sentences and the organization of sentences into a logical unit, the paragraph.

It is in the sentence that accuracy is achieved—in the selection of the right word and the arrangement of these right words (syntax). The problems of sentence structure lead inevitably to a consideration of punctuation, since punctuation functions in a sentence much as do road signs on the highway. Without proper punctuation, the sentence cannot attain the precision demanded in technical writing. Finally, it is in the paragraph that accurate sentences are organized to promote meaning. This is achieved in paragraph continuity which presents ideas in their proper sequence.

—The Sentence

What is a sentence? Students in grammar school memorize such definitions of sentences as: A sentence is a group of words that make up a complete thought—a definition that would be more helpful if it said something about how big a group of words or gave some definition of what is meant by a thought, complete or incomplete. As the definition stands, it can also apply to a paragraph, a chapter, or a volume. Another definition frequently learned is: A sentence is a group of words having a subject and a predicate—a definition of some use to anyone
who knows what subjects and predicates are, but does not know what a sentence is.

A problem with definitions of sentences is that most of them are designed to be used on sentences that are already produced and awaiting analysis. Our purpose is somewhat different. We are looking for a definition useful to the writer who faces the problem of taking a body of material and transmitting it into sentences.

For our purposes a sentence can be defined as: A kind of verbal equation used to show a relationship that exists in the universe whether or not anyone talks or writes about it.

Thus, if a small white dog walks behind a bay mare and she does not like small white dogs, a rather violent action is likely to happen. That action might result in a sentence about the relationship of the things involved, which are:

A horse
A dog
An act of kicking
The degree of force of the action

The writer might choose the dog as the subject:

*The dog was kicked by the horse forcibly.*

Or the act of kicking might be the subject:

*Kicking was the action which was performed forcibly by the horse upon the dog.*

Or it might be the degree of force:

*Considerable force was expended upon the dog by the horse in the kicking of the former by the latter.*

Or the horse might be the subject:

*The horse kicked the dog forcibly.*

Of course, the last sentence is the clearest. But why? The answer lies back in our definition: A sentence is a kind of verbal equation used to show a relationship that exists in the universe whether or not anyone talks or writes about it. And we may now add: The sentence is likely to be clearest when the grammatical relationship matches the physical relationship. In our barnyard drama the physical actor was the horse. In the clearest sentence she became the grammatical actor or subject of the sentence. Her action in the physical world became the action part of the sentence, the verb. The recipient of the physical action, the dog, became the grammatical recipient or direct object. And the degree of the action, forcibly, became a modifier of the verb.

Usually, the tortured, unclear sentence is one that violates the advice that the grammatical relationship should match the physical relationship. In this sentence:

*For the settlement, troubles of a serious nature were had from the first due to the Navaho Indians and their unfriendliness,*

the writer has chosen the wrong subject for his sentence. In short, he has failed to find the “horse,” that is, the thing that is the actor and that should be the grammatical subject. If he started with the “Indians,” he would produce something like:

*The Navaho Indians were unfriendly from the first, and this caused serious trouble for the settlement.*

Clearly this is an improvement, but starting with the “un-
friendliness” would produce an even better focused sentence:

From the first, the unfriendliness of the Navaho Indians caused serious trouble for the settlement.

Such wrong choices of subject may result in such confusion as:

In terms of the individual with his relationship to the group, one result that may occur if the individual is unable to make an identification is alienation.

If the “horse” is seen to be “alienation,” then:

Alienation may result from the individual’s inability to feel that he is part of the group.

The sentences shown so far have been what grammarians call the SVO or Subject-Verb-Object pattern, or the pattern of actor-action-recipient. A similar pattern eliminates the recipient:

S V
The horse kicked.

or

S
Despite their tremendous power, all glaciers, V
alpine or continental, move slowly.

The third pattern, rather than showing the action of one thing on another, shows instead some kind of equivalency:

The boy is a student.

This is essentially an equation of:

X = X'

We are showing that, within this situation, boy is the equivalent of student.

The verb for such a sentence is called a linking or copulative verb, and it nearly always shows some equivalency, though sometimes with the added dimension of time:

X =

By the end of the ’20s the Freudian theory had X'
become the dominant doctrine for all psychological interpretation.

Sometimes the verb may seem to equate a thing with a quality, as it does when a predicate adjective is used:

The house is white

But the situation is ultimately just a shorter way of saying:

X = X'

This house is (a) white (house).

Such sentences may often be eliminated simply by putting the adjective in front of the noun, when the noun occurs in the previous or following sentence:

The white house stands on top of the hill.

The SVO, SV, and X = X' patterns are used in nearly all English sentences.

What little is known of the ways we compose sentences in our minds is largely conjecture, but what probably happens is that we perceive the situation and then choose one of the basic sentence equations to fit it. Then we plug in the integers. A failure (a tangled or awkward sentence) may result from choosing the wrong equation.
or from using the wrong integer, or from both. In speech, such failures are not surprising when we may produce ten sentences a minute, but failures should occur less often in writing, since writing can be produced more deliberately. Still, the language is flexible enough to allow a speaker or writer partially to extricate himself even if he starts the sentence with a wrong choice, though the result is often not completely satisfactory. A better answer, in writing at least, is to go back and recast the sentence, consciously checking to see if the equation is the best one for the material and if each of the integers—particularly the subject—is the best choice.

—More Complicated Patterns

Writing, of course, consists of more than simple, short sentences. The demands of variety, coherence, and emphasis require more sophisticated sentence patterns. How to form these more sophisticated sentences is our next concern.

A small child might relate an event in her life like this:

Aunt Ellen and I went to the zoo. And we saw some monkeys and they were funny and I had some ice cream and I saw the elephants and I was scared and they were big and I fed them some of my peanuts. And we went to the zoo on the bus and I had an orangeade and we saw the giraffes and I swung on the swings and the lions looked mean and we came home in a taxi and I got sick.

Here the child has connected the basic sentence patterns together with the most elementary of connectives—**and**. Under the circumstances the connection is hardly better than none at all. At best, **and** can show such simple relationships as coexistence or a sequential time pattern, but the little girl’s narrative does not even allow the reader to understand the time sequence, since she has plainly altered the order of events (doubtless without realizing it).

Connectives of various kinds allow the writer to show rather complex and subtle relationships between what are initially separate thoughts. Besides coexistence, these connectives can show that one idea is the result of another; that two ideas are wholly or partially contradictory; that one idea came about before, during, or after another; or that apparent disagreements between two ideas are only an illusion. Examine what connectives can do to the zoo narrative:

When Aunt Ellen and I went to the zoo, we went on the bus. After arriving, we saw the elephants, but since they were big, I was scared. Nevertheless, I fed them some of my peanuts. Next we saw the monkeys and they were funny. Then I had some ice cream. After that we saw the giraffes. Before I swung on the swings, I had an orangeade. As a result, I got sick. Therefore we came home in a taxi.

Of course no small child talks like this. The child does not make the connections between sentence elements because the child does not see the connections between the ideas or events from which the sentences are drawn. Recognition of such relationships as cause and effect, sequence, contradiction, special placement, etc., is the first essential to connecting thoughts. After such recognition, addition of the connective words to show the same relationships is nearly a mechanical process. The following list of words for continuity and transition suggests some of the possibilities for connecting sentence elements.
The first step in organizing the data is to write a comprehensive outline that will reflect the purpose of the paper. This chapter will discuss the structure of this outline and review a general social science framework for the outlining of a report.

It is not uncommon to find a scientist, faced with a report and, perhaps, a deadline, wanting to "get on with the writing." If you succumb to this temptation, the writing of the report can develop into a long and laborious experience. To write without an outline is to chance a time-consuming and frustrating project; to proceed with an outline saves time and reduces frustration.

—Preliminary Steps

Before he undertakes the writing of the comprehensive outline, the knowledgeable social scientist usually goes over his data a final time to secure a thorough understanding of the total situation studied. The importance of this final review—particularly in major writing projects—cannot be overstressed. As Pearson states, "The classification of facts, the recognition of their sequence and relative significance is the function of science." A final review of data aids in this function.

Of course the type of study undertaken will determine what the data yield, but as a second step you should
ask yourself some central questions during this final review. Young suggests the following:

1. What are the most significant social situations which these facts reveal?
2. What are the outstanding similarities and differences displayed by them?
3. What social processes do these facts reveal?
4. What sequences are manifested by them?
5. What causal relationships are revealed by these situations?
6. What systematic conclusions may be drawn from them?
7. What new hypotheses can be formulated?

At this point, too, the writer should consider the audience for which the report is intended and consider the purpose of the report. (These questions have been dealt with extensively in Chapter II.) We feel that failure to consider audience and purpose is a primary cause of poor writing. Attention to these questions cannot be overemphasized.

For reports of major research, answers to the seven questions about the consequences of data are particularly valuable, but the questions of the intended reader and the purpose of the report will be important to both major and minor projects. Evaluations of the consequences of data and the questions of reader and purpose are necessary preliminaries to constructing the outline.

—Constructing the Outline

It will be recalled that in the previous chapter on defining the problem, you were reminded that if you really understand the problem you are investigating, you have in that understanding the direction necessary for the efficient organization of your report. Now you are ready to supplement that understanding with (1) the additional insights you have gained from the research experience to this point, (2) the comprehension gained from the total review of your data, and (3) the additional direction gained from the consideration of reader and purpose. In sum, you are ready to write your detailed outline.

A word of caution: The outline is flexible. Indeed, any writer should regard it as a tentative plan that he can change whenever there is a need or advantage in changing it.

—Types of Outlines

The most commonly used types are the key-word outline, the sentence outline, and the topic outline.

The purpose and length of the report will very often suggest the type of outline to make. For reports that have only a few divisions, or for reports that are only a few pages in length, it is useful to employ the key-word outline, an outline style in which a word or phrase is used for both major and minor divisions. In this type of outline, the key word recalls to the writer the information he wants to present to his readers. Experience suggests that the key-word outline is better suited to the behavioral science disciplines than the social sciences as a whole.

The following is an example of a key-word outline.

I. Social characteristics
   A. Age
   B. Sex
   C. Occupation
   D. Income
II. Residence
   A. North
   B. South
   C. East
   D. West

Such a key-word outline is easy to prepare and easy for a writer to follow. It serves as a useful reminder of the relationship between already known pieces of information and as a taxonomic framework, particularly for rather concrete and such obvious ideas as simple existence.

But the key-word outline cannot make clear subtle and fine distinctions, either quantitatively or qualitatively. When such subtle and highly abstract relationships must be shown, the sentence outline is preferable.

In the sentence outline, all divisions of any rank are expressed in a complete sentence. A compromise between the key-word outline and the sentence outline in both form and function is the topic outline, which uses titles, clauses or phrases.

For most subjects in the social sciences the sentence outline is probably best and is the one we would usually recommend. Its strength lies in the fact that to write a heading as a complete thought requires that you eliminate any fuzziness in your thinking, resulting in greater clarity in the outline. Plainly, when you have completed a sentence outline you are a good deal closer to having the report written than you are when you have completed only a key-word or topic outline.

We do not recommend mixing outline types, since such mixing usually means a shift in thought processes or method or completeness of treatment—and the effect might come through into the finished paper. Obviously, the types should not be mixed at any one level of the outline, though there might be justification for having roman numeral headings as sentences and capital letters as topics (or vice versa).

Certainly, if you consider using a mixed outline and your outline is to be seen by a reader or supervisor, you must recognize that many scholars regard a mixed outline as some kind of hermaphrodite to be avoided at all cost.

The following is an example of the sentence outline.

I. Anthropologists tell us much about initiatory rites and ceremonies which accompany passage from one social state to another. These social states include passing from childhood to adulthood, from virginity to marriage, and from life to death.

A. The purpose of all such rites is twofold. One purpose is to prepare the individual for the new way he should act. The second purpose is to instruct the members of the individual's social community in the new way they must act toward him.

B. There are three phases in all rites of passage: (1) separation rites, (2) incorporation rites, and (3) transition rites.

1. Rites of separation are prominent in funeral ceremonies.
2. Rites of incorporation are prominent in marriage ceremonies.
3. Rites of transition are prominent in ceremonies at birth.

C. Often all three rites of passage are used in the same ceremony.

1. A newborn baby may be separated from its mother or family.
2. A newborn baby may be incorporated into the family or clan or tribe.
3. A newborn baby may be transmitted through baptism, or some other such ceremony, from a biological organism to a social being.

II. Differences in rites of passage ceremonies can be noted by contrasting a primitive society with a modern society.

—Problems in Outline Construction

Occasionally a problem will arise in outline construction when you unwittingly change the arrangement on which the outline is formed. In making the outline, be conscious of the arrangement you are using—time, space, or group—so that you maintain a consistent pattern. The following is an example of an inconsistent pattern of headings.

Settlement of the Far West
I. Period before 1830 [Time]
II. The Mormons [Group]
III. Oregon Territory [Space]

An example of a single principle of arrangement would be:

Settlement of the Far West

| Time          | Group       | Space
|---------------|-------------|------|
| I. Period before 1830 | I. The Mountain Men | I. The Northwest
| II. Period from 1830 to 1880 | II. The Oregon Settlers | II. California
| III. Period from 1880 to 1912 | III. The Mormons | III. The Great Basin
|               | IV. The Forty-niners | |

Two other principles of outlining that occasionally prove troublesome are (1) the mixing of coordinate and subordinate headings and (2) the lack of adequate subdivisions for a heading.

One of the prime reasons for using an outline is that it forces you to clarify your own thinking about the subject. This clarity is reflected in the placement of the major and minor topics in proper relationship to one another. This consistency of minor points supporting major points and major points in logical relationship to one another is what gives the paper its continuity. The following is an example of mixing coordinate and subordinate headings, thus destroying the continuity.

Settlement of the Far West
I. Period before 1830
II. Period from 1830 to 1880
III. The Mormons in the Great Basin

An example of a proper arrangement of coordinate and subordinate headings would be:

Settlement of the Far West
I. Period before 1830
II. Period from 1830 to 1880
   A. The Mormons in the Great Basin
   B. The California Gold Rush

Since the outline is essentially a system of division, each heading level must be divided into at least two parts. If there is a I, there must be a II; if there is an A, there must be a B; if there is a I, there must be a 2, and so on until each division has two or more coordinate parts.

Illogical

Settlement of the Far West
I. Period before 1830
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(If there is no other period to be discussed, the heading should simply read, “Settlement of the Far West before 1830.”)

Logical

Settlement of the Far West

I. Period before 1830
   A. The Early Explorers
   B. The Mountain Men

II. Period from 1830 to 1880
   A. The Period before the Transcontinental Railroad
   B. The Period after the Transcontinental Railroad

—Framework for Social Science Outlines

In the social sciences, technical reports are written within a common framework. This framework corresponds closely to that of the research itself. For a report that may run several hundred pages, such as a thesis or dissertation, or for a report that is only a few pages in length, the framework does not change; the difference is in the amount of detail only. Thus all chapters in a thesis or all sections in a term paper can be grouped under three categories:

I. The Problem
   II. The Methodology
   III. The Results and Conclusions

In reviewing this general approach, Westley notes:

There is a . . . logic for the journal article’s structure: begin with the problem [I.], then present your attack on the problem [II.], then present your results [III.], then discuss them in the light of the problem you have presented, then summarize. In studies employing a behavioral methodology this order is almost invariably followed, using major headings such as Hypothesis, Procedures, Results, Discussion, and Summary. For historical and legal investigations, the wording may be different but the logic is essentially the same. Instead of setting apart sections of the report as above, often the writer merely numbers major segments of his report.

This framework, then, with three general sections, is the standard format for papers in the social sciences. It is a format that allows for tailoring according to the specific needs of the technical paper, whether large or small. Kerlinger provides the following detailed subdivisions that could be ordered within this general format for the reporting of a major piece of research.

I. The Problem
   A. Introduction to the Problem
   B. Place in Social Theory
   C. Hypotheses
   D. Definitions
   E. Review of Literature

II. The Methodology
   A. The sample and sampling procedures
   B. The testing of hypotheses
   C. Measurement of variables
   D. Methods of statistical analysis
   E. Pretesting

III. The Results and Conclusions
   A. Results
   B. Interpretation
   C. Implications
   D. Conclusions

Note that this is not an outline; it is a topic format from which a sentence outline will be written.

We would make some last practical suggestions on outline procedure.
1. Make a one-page outline first.
2. Revise the outline form as needed throughout the whole research procedure.
3. Make the final outline as detailed as possible. Complete it at least to the stage of a heading per paragraph of final report.
4. Since an outline as detailed as the one suggested above (3) is going to be lengthy, at least for a major report, it will be helpful to make it on paper large enough to include the whole outline on a single sheet. We like to use a newsprint roll-end obtained from a printing shop and a marking pen for a large outline. Such an outline may cover the whole wall or floor of the workroom, but it allows seeing all the parts together and allows proportioning of items to their proper importance. It also allows the writer to place his note cards, charts, tables, and illustrations directly on the outline. From this to the first draft is a very simple step.

—Summary

The outline is the vehicle that organizes the data into a unified and coherent whole reflecting the paper’s purpose. Faulty outlining results in an inadequate report.

Three pitfalls of outlining that should be given special concern are (1) an inconsistent pattern of headings, (2) the mixing of coordinate and subordinate headings, and (3) a heading that stands alone. In the social sciences the outline is usually prepared from a format of three major sections: the problem, the methodology, and the results and conclusions. This standard format is one that allows for tailoring—within the three major sections—to the specific needs of the paper. In writing the detailed outline, you have the choice of three general types of outline styles: key-word outlines, sentence outlines, and topic outlines. All things considered, sentence outlines are probably best suited to most social science topics.