guidelines for document designers

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With new introduction by
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INTRODUCTION (Fall 2014)

Introducing *Guidelines for Document Designers*

Guidelines for Document Designers is a short, practical, evidence-based handbook for writers and editors who develop functional communications.

Why republish an old document?

Guidelines first appeared in 1981, long before the Internet and social media, even before the personal computer. But good writing is good writing.

Over the years, so many people have found *Guidelines* useful – for themselves, for their subject matter experts, for their new hires – that they have begged me for new copies when their much used ones fell apart. It's clearly time to make the book available again and to a larger audience.

What's special about *Guidelines for Document Designers*?

Each guideline comes with

- a brief introduction to the concept behind the guideline
- a more detailed explanation with annotated examples
- related guidelines (how the guidelines support or sometimes contradict each other)
- qualifications (when you might want to *not* apply the guideline)
- the research evidence (*Guidelines* may have been the first handbook on clear writing to summarize and cite the evidence for its recommendations.)

Is it really still relevant?

Of the 25 guidelines, 24 are still valid.

Technology has caused just a few changes.

The original guideline on type size recommended "Use 8 to 10 point type for text." That guideline assumed that what you wrote would be professionally printed. Today, so much appears on screen or comes from an inkjet or laser printer that the guideline would be "Use at least 12 point type for text."

The guideline "Use highlighting techniques, but don't overuse them" is still a good principle. However, in *Guidelines*, we described underlining as one of the useful highlighting techniques. Today, we would not do that. Today, underlining indicates a web link, and many people carry over that association even to paper documents. Use bold. Use color. Don't combine too many techniques at once.

Are these guidelines all I need to create successful communications?

No.

The guidelines in this handbook help you

- organize
- write
- design
- use illustrations, tables, charts, and graphs

However, you must put them into a broader **process** that starts before you select and use the guidelines.

Plan first. Successful communication starts with planning:

- Purposes (What do you want to achieve through the communication?)
- Readers / users / site visitors (With whom are you conversing in this communication? What do they know? Not know? How busy are they? What else should you keep in mind about them?)
- Technology (How will they get this communication? On paper? On screen? Through mail? Email? Social media? Website? Should you be writing at all? Would a phone call be better?)
- Use (Will they really read it from start to finish? Will they delve into it to find specific information – get in, grab what they need, and get out? Will they skim and scan?)
- Messages (*Guidelines*, page 9: “It is very difficult for any writer to write clearly if the policy or message the writer is supposed to convey is not clear.”)
- Readers’ questions (Every functional document is part of a conversation. What do your readers / users / site visitors want and need to know?)

Choose the best guidelines for the plan. Guidelines are not rules. Applying them takes judgment, and *Guidelines for Document Designers* tries to help you with that judgment.

For example, “Use the active voice” is one of the guidelines, as it is in every handbook of clear writing. But knowing when the passive voice might be more appropriate is just as important as preferring the active voice. (See the section on *Qualifications* with each guideline.)

Test, test, test. What really matters with any communication is how well it meets your purposes by helping people get the information they need. After applying the guidelines, you should have people from your target audiences try out your draft. Then, you should revise based on what you learn.

You communicate successfully only when the people who must or should use what you wrote can

- find what they need,
- understand what they find, and
- act appropriately on that understanding.

Who wrote *Guidelines*?

Guidelines for Document Designers was one of the deliverables from the federally-funded Document Design Project that ran from 1978 to 1981. I directed that project at the American Institutes for Research in Washington, DC.

In collaboration with the Department of English and the Department of Psychology at Carnegie Mellon University and with the design firm, Siegel+Gale, we were charged with

- gathering relevant research to improve functional communications
- doing new studies to fill gaps in the research
- helping government agencies create model documents
- developing new academic programs and curricula

Daniel Felker, PhD in Instructional Technology, led the work on *Guidelines.*

Frances Pickering was a research assistant with the project.

Veda Charrow, Melissa Holland, and I, all PhDs in Linguistics, were responsible for most of the content in *Guidelines*.

When we wrote *Guidelines,* we tried to practice what we were preaching. If I were writing *Guidelines* from scratch today, I would do more: I would edit many of the passive sentences into active ones, use even more personal pronouns, be even more careful of big words, etc.

Despite some of the infelicities of its 1980s style, however, I hope you find *Guidelines for Document Designers* as useful as so many others have.

I thank the American Medical Writers Association (AMWA) for making *Guidelines* web ready and publishing it for members on the AMWA website.

I thank Tom Lang for suggesting that we do this and encouraging both AMWA and me to make it happen.

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INTRODUCTION (1981)

What Are Document Design Guidelines?

This book presents twenty-five principles that can make the documents you write easier to read and understand. There is a guideline for each of these document design principles. Each guideline describes the principle, explains it, gives examples of it, offers some common sense advice about it, and summarizes some of the research that has been done on it.

Only some of the principles we give in these guidelines concern writing and how to make sentences clear to readers. We have also included principles that will help your readers find information in a document, that will help you make the pages visually distinct and attractive, and that will help you present numbers and quantitative information so they can be easily understood.

Why Did We Select These Guidelines?

We chose the document design principles in these guidelines for two reasons. First, experienced document designers widely agree that the principles in this book do influence the clarity of prose. Indeed, all of the principles we have selected are included in at least several writing and design manuals aimed at practitioners. Second, all of the principles in these guidelines have been examined in research studies to see how they affect the comprehension of information.

Our ultimate purpose in writing the **Guidelines** is to improve the quality of public documents by making them clearer for the people who use them. Public documents are critical because they frequently affect our well-being in many ways. Examples are insurance policies, loan agreements, government rules and regulations, income tax instructions and forms, product warranties, job application blanks, and apartment leases, among countless others. The specific aim of the **Guidelines** is to help the people who write these kinds of public documents, or who supervise their production, to create documents that are clear and understandable.

Who Can Benefit from These Guidelines?

We expect that the **Guidelines** will be most useful to people who write a lot in their jobs, but who are not trained writers. We assume that most of our readers will be professionals who work in business, government, law, medicine, or related fields. Most will be well-educated, with a college degree, and sometimes an advanced degree in their specialty. From our experience in offering workshops over the last three years, we know that most of our readers will have had a formal academic course in writing, but that this was probably a number of years ago. We expect that our readers are articulate speakers of English who already write adequately in their work. However, most didn't ever expect they would write as much as they do, and they would like to write better.

How Should You Use These Guidelines?

The **Guidelines** are intended to help you as you write and develop documents at work. The **Guidelines** are specifically designed as a desk reference—to be used while you are writing and to be kept next to your dictionary and thesaurus.

The **Guidelines** do not cover everything there is to know about writing and designing public documents. We have selected 25 important principles to present because we believe that if you follow the **Guidelines** you will be able to write well-organized and comprehensible documents and because we want to keep this book to a reasonable and useful size. We do not intend the **Guidelines** to substitute for an academic course in writing or to replace in-service writing workshops and training seminars, books on grammar or writing style, or a manual that was developed specifically for your organization, company, or agency. The **Guidelines**, however, can supplement all of these other writing aids.

Moreover, the guidelines can be used by themselves. We have tried to make each guideline self-explanatory. We have tried to eliminate any need for you to refer to another book or manual in order to apply any of the principles in this book. We also have deliberately avoided the textbook approach.

- We do not give grammar lessons.
- We avoid exhortations about "do's" and "don'ts."
- We do not explain a principle or illustrate how to apply it by using grammatical terms that most of us have long forgotten.
- We do not ask you to use principles that are "good things to do"—but vague (e.g., "Avoid a succession of loose sentences"; "Be coherent").
- We do try to explain and illustrate the principles by stressing "how to do it" and "what does it look like."

Two Other Points About the Guidelines

One point you should know about concerns research. Each guideline has a section called "What the Research Says." This section is for readers who may be curious about the research support for a particular document design principle and for those who want to learn more about the research. The research we have cited is representative, not exhaustive. Most principles have more related research than what we've cited. In order to give any interested reader easy access to the more extensive list of research that has been done on a particular principle, we have included citations of research reviews.

The second point concerns the examples we've inserted in the **Guidelines:** In many of the guidelines, particularly those that involve writing, we give examples of "poor" and "better" uses of a principle. When we rewrite a "poor" example, we usually change only the feature we are discussing in order to show very clearly how you "fix" the problem. We have deliberately not fixed all of the problems that could be addressed in our rewrites because we might obscure the very feature we are describing. In an actual document, you would, of course, want to apply all the relevant guidelines at once.

How Are the Guidelines Organized?

This book is organized into three sections.

Chapter I, **Introduction**, the part that you are now reading, is an overview of the book.

Chapter ll, the actual guidelines, presents 25 principles for making documents easier to read and understand. This chapter is further subdivided into four sections:

- principles for organizing text
- principles for writing sentences
- typographic principles
- graphic principles

Chapter III, **Document Design Research**, is a bibliography of the empirical research that is related to the principles. The research citations are listed by specific document design principle.

Where Should You Begin?

The guidelines in this book come into play only when you are ready to organize and write your first draft. Before you get to that stage, you should have done a careful analysis of your task, your purpose, your audience, and the task you are asking of your readers. Before you begin to write, you should also decide on what material is essential for your document. You should include in your document only the content that is necessary to fulfill your purpose and meet your readers' needs.

Analyzing your task. It is very difficult for any writer to write clearly if the policy or message the writer is supposed to convey is not clear. You should make certain at the very beginning of any writing project that you have a message to convey and that you can articulate what that message is.

Knowing your purpose and your audience. In many of the guidelines, we temper our advice with comments about doing what is appropriate for your readers. Knowing who your readers are, what they are likely to know, and what they need to know is vital to good document design; so is understanding why you are writing the document and what you (or your agency or company) hope to achieve by means of the document.

Thinking about how readers will use your document. Our goal in presenting the **Guidelines** is to help you, the writer, to help the reader understand your document. One of the critical factors you have to consider is how the reader will use the document. Most public documents, other than brief notices, letters, and short memos, are primarily used for reference. After reading it once, the reader is likely to return to the document only when faced with a problem or a question. Therefore, when you select and organize your material, you should make it as easy as possible for readers to locate information quickly and to find all related information in succinct sections. (The guidelines in Section A are most relevant to helping you to make the reader's task easy.)

Selecting only the necessary content. Sometimes the easiest and best way to simplify a document is to throw out all of the content that isn't necessary to convey your message to your readers. If you have several diverse groups of readers, it is sometimes best to write different documents (or a document divided into several sections, one for each set of readers) so that people are not burdened with irrelevant material.

When you have followed these pre-writing steps, you will be ready to apply the guidelines in this book.

Chapter II Document Design Guidelines

Section A

This section presents four guidelines, all of which will help you organize a document better and make it easier to understand and use. The first guideline explains principles for organizing sentences within paragraphs, and organizing paragraphs within a document. The other three guidelines discuss some ways of telling your readers how the document is organized and where they can locate specific information in the document.

A-1.

Put sentences and paragraphs in a logical sequence.

To understand and use a document your readers must be able to relate the Information and ideas in it to each other. How you sequence your sentences and paragraphs—what you put first, second, third—can make it either easier or more difficult for readers to figure out these relationships. Obviously, a jumbled, illogical sequence will make the readers' task difficult. A logical sequence will make the task easier because it will group information in a way that readers can grasp and understand.

"Logic" is a very broad concept. What is "logical" for any particular document depends on the content you want to present, your knowledge of the content area, and who your readers are. We clearly cannot tell you how to be "logical" in the few pages of this guideline. We can, however, give you a few notions about how to sequence content in some meaningful fashion that will help make your document clearer to readers.

Explanation and Illustration

In a simple sense, putting sentences and paragraphs in a logical sequence means putting first things first. Which things should be first depends on the particular document—its subject, purpose, and audience. You would put different things first if you were describing a procedure for filling out a form than you would if you were arguing the merits of one marketing policy over several others. The crucial point is to choose some sequence that will hold together for the reader the relationships among ideas and information in the document.

Since we can't give you an all-purpose formula for finding the most logical sequence for any document, here are some suggestions for sequencing content that can apply to many different documents.

Discuss things that affect many people before those that affect few. Public documents often cover topics that apply to large numbers of people. If some of the information that you are writing concerns almost all of a group of people and other information in the document concerns only a few, you should discuss the information that concerns the most people first. The paragraph below is an example. The paragraph discusses tax forms 1040 and 1040A first because all taxpayers have to fill out one of them. The forms for applying for a tax credit and for reporting information about capital assets are discussed later because only a few taxpayers will be interested in them.

> This package contains Form 1040, related forms and the instructions needed to complete them. Before starting Form 1040, please check to see if you can file Form 1040A instead. Some elderly people can pay less tax by using a tax credit. To do this, they must file Schedule R or RP. To report the sale or exchange of a capital asset, you must use Schedule D. In certain cases, you may have to use Form 4797 instead of Schedule D.

Discuss the general before the specific. You should write about the "big picture" before you describe the parts and pieces that make up the whole. This concept is related to the time-honored relationship between the topic sentence of a paragraph and the following sentences that flesh out and expand upon the topic sentence. In one way or other, you should give the readers an idea of what you are going to talk about before you start talking. In the example below, the writer first explains the overall purpose of an environmental impact statement (the general), before discussing its components (the specific).

> An environmental impact statement is the heart of a Federal administrative process designed to ensure achievement of national environmental goals. The statement's primary purpose is to disclose the environmental consequences of a proposed action, thus alerting the agency decision-maker, the public, and ultimately Congress and the President to the environmental risks involved.
>
> Each environmental impact statement must include: a detailed description of the proposed action, a discussion of the probable impact on the environment and alternatives to the proposed action. A draft statement must be prepared and circulated for at least 90 days before the proposed action. A final statement must be made public at least 30 days before the proposed action.

Discuss permanent provisions before temporary ones. When you are writing content that has provisions that are long lasting and others that apply only at certain times or under special conditions, you should present the long-term content first. The following paragraph illustrates this. The writer discusses the procedures that must always be followed before those that must be followed at certain times.

> Before the clearance officer opens the building to the public, he must empty the overnight deposit box, record the copier readings and unlock the fire door on level A. On Tuesdays and Thursdays, he must also unlock the fire door in the projection room. On Sundays, he should not record the copier readings, but must tabulate the visitor register with the previous week's entries.

Put content in a time sequence. A logical way to present information that is strongly related by time is simply to put the sentences and paragraphs in a time sequence. Information that is strongly related by time are actions or events which depend on each other according to the order in which they occur. Steps in a procedure are sometimes related by time, for example when the third step in the procedure can't be executed until the first two steps are followed. In the example below, the writer explains how to appeal a decision about a social security claim. Each step in the procedure depends on the previous steps; the writer lists them in the order in which they will necessarily occur.

> This pamphlet explains what you may do if you believe the decision on your social security claim for retirement, survivors, or disability insurance benefits is not correct and you want to have the decision re-examined.
>
> 1. First you may ask that the decision be *reconsidered**.***
> 2. You may next ask for a *hearing before an administrative law judge* if you disagree with the results of that reconsideration.
> 3. If you disagree with the decision of the administrative law judge, you may, then ask for a review of that decision by the *Appeals Council.*

Other Related Principles

Although a logical sequence should be apparent to the readers in itself, you can reinforce your readers' understanding of the logical sequence by illustrating it explicitly in an overview, in headings, and in a table of contents (see Guidelines A-2, A-3, and A-4).

Listing conditions separately is an example of putting sentences in a logical sequence (see Guideline B-7).

Qualifications

In some cases, the sequence in your document will be determined before you even start writing, perhaps because you are responding to another document or because you have been given a strict format from which to work. In such cases, you may not have as much control over the sequence of paragraphs, but you should be able to sequence the sentences within them logically.

What the Research Says

A variety of research has looked at different factors related to the logical ordering of content in sentences and paragraphs. Most of this research has been done in university laboratories and educational settings with students of all ages. A body of research shows, unsurprisingly, that content that is ordered—whether by topic, time sequence, related ideas, or some other way of ordering—is recalled and understood better than unordered content. Perlmutter and Royer (1973) found that prose passages organized by names of concepts or attributes of concepts were easier to recall than unorganized prose. The superiority of organized content over scrambled or randomly organized prose was confirmed by Meyers, Pezdek, and Coulson (1973), Frase (1973), and Yekovich and Kulhavy (1976). In contrast, Bruning (1970) and Beaugrande (1979) failed to show any superiority in recall performance for organized prose.

Other research supports the general notion of presenting major (superordinate) points of a topic and more specific (subordinate) points in a hierarchical fashion. Meyer and McConkie (1973) found that college students were able to recall more ideas from a prose passage when it was hierarchically structured. Gardner and Schumacher (1977) also found that putting major points before specific points helped performance on some learning tasks but not others. This research generally supports the recommended practice of presenting general topics of a subject area before specific ones.

Other research supports the value of placing the major point early in a paragraph. Those studies show that putting the topic or theme of the paragraph in the first sentence improves reading speed, accuracy of recall, and the ability to identify the theme of the paragraph (Kieras, 1978, 1979; Kintsch, 1979; Kintsch & van Dijk, 1979).

There is also some research support for presenting content in temporal order. Clark and Clark (1968) found that sentences were recalled better when they were written in the sequence that the actions occurred. Kulhavy, Schmid, and Walker (1977) confirmed that high school students recalled temporally organized content better than randomly organized content. Temporal order is helpful when the content is more narrative (Kintsch & Kozminsky, 1977; Mandler & Johnson, 1976; Rumelhart, 1977).

A final body of research that supports the value of organizing content is the studies that have been done on scenarios. In general, scenarios are somewhat like stories in that people carry out actions in a time and place. By making the prose sound more narrative (story-like) by referring to the reader and to specific events, you can make the prose easier to understand. Cohen and Graesser (1980), Graesser, Hoffman, and Clark (1980), and Kozminsky (1977) found that narrative prose was easier to recall and read. Flower, Hayes, and Swarts (1980) observed that readers actually construct their own scenarios when they try to interpret complicated prose, a finding that suggests the importance of creating scenarios in prose text.

A-2.

Give an overview of
the main ideas of the text.

The information in any document is arranged in a specific order. As documents get longer or more complex, even when they are subdivided into different sections, they become harder to understand. By providing an overview of the document's content before the main body of the text, you make it easier for the user to read and understand the whole document.

Overviews summarize information. They are introductory statements that describe what the document talks about, or what the document is used for, or how it is organized. Overviews help readers by making it easy to find out at a glance whether the document meets their needs and is worth reading,

In general, overviews introduce the intended readers of the document to new information by familiarizing them with the key content. Overviews stress central concepts, facts, and terms, as well as preview the overall structure of the material in the document. You should write the overview in the same style as the main body of the text; that is, be direct and to the point.

Explanation and Illustration

The classic example of overviews are the one paragraph to one page introductions in most instructional textbooks that give a preview of the contents of each chapter. (The paragraph on the page that introduces Section A is an example of an overview.) Overviews for public documents should follow this same general pattern. While the content and length of overviews should vary depending upon the nature of the document, in all cases you should put the overview immediately before the "main bodies" of the text. These "main bodies" of text could be specific sections of a document, individual chapters, or the entire text of a short document.

One direct way to construct an overview is to point out the kinds of information or the ideas that are presented in the main text of the document. An example of this kind of overview, taken from a government pamphlet that describes equal pay, is the following:

Introduction

> The Equal Pay Act of 1963 amended the Fair Labor Standards Act to require that men and women performing equal work must receive equal pay. This pamphlet outlines the types of jobs to which the equal pay provisions apply, what is meant by "equal pay" and "equal work," and what action can be taken by any person who has a question regarding the applicability of the equal pay standard.

Note that this overview simply describes what's in the document. In just a few seconds, the reader can decide if the pamphlet has the kind of information he or she needs.

Another useful way to develop an overview is to give "signposts" for the document. This means that the overview states the specific sections (or chapters, or divisions) of a document and the kind of information that the reader will find in each section. When the writer puts signposts in a document, the reader learns precisely how the document is organized and what it discusses. Here is an example adapted from a document of the federal government concerned with funding low income housing.

> The Housing Assistance Plan (HAP) portion of the Community Development application package consists of three sections. Section I presents a form called "Survey of Housing Conditions" and gives instructions for completing the form. Section II presents detailed instructions for determining the housing assistance needs of lower income households. Section III tells how to propose locations for lower income housing and provides a map of your city to help you do so. The Appendix presents tables to help you calculate the income levels in accordance with the formulas established by this department.

Note that this overview clearly tells the readers that this document consists of three sections and an appendix and briefly explains what each of these sections covers. An overview that describes "signposts" in a document is especially helpful when the document is long, when it is divided into sections, and when different users might be interested in different sections.

Overviews can also take the form of a set of instructions on how to use the document. This approach combines the "signposting" feature described above with specific instructions to users of the document. Here is an example of this kind of overview, taken from a handbook describing Medicare to possible recipients:

> How to Use Your Medicare Handbook
>
> This is *Your Medicare Handbook*. It tells what Medicare is and how it works. Keep the handbook where you can find it. Then, when you need medical care, you can use the handbook to find out whether the services you need are covered by Medicare and how much Medicare can pay.
>
> Medicare will help pay for many of your health care expenses, but not all of them. You should know in advance what expenses Medicare does not cover. On pages 42 and 43 there is a list of the services Medicare cannot pay for and some that Medicare can pay for only under certain conditions.
>
> Page 48 tells you how to submit your Medicare insurance claims, and beginning on page 52 there is an address list showing where to send your claims.
>
> Page 39 tells you what to do if you think there has been a mistake in a Medicare decision or the amount of payment.
>
> As you read the handbook, you will see stars (*) by some words. A star means that there is a footnote at the bottom of the page that will give you additional information.
>
> There is also an index at the back of the book. If you want to know about a particular subject, look it up in the index to find out what page it's on.

Note that the first paragraph of the overview tells what the handbook is for and how it can be used. Subsequent paragraphs combine signpost information (page numbers) with instructions on when to refer to specific pages for certain needs. This type of overview makes clear what the document is about, who should use different parts of it, and when they should use it.

Overviews that relate later sections of a document to earlier ones are particularly useful when different sections build on one another. Many instructional texts, for example, fit this category because facts and concepts in early, introductory chapters are integrated and applied in later, more complex chapters. The following overview from a basic text on statistics illustrates this approach.

> Chapter 5 HYPOTHESIS TESTING
>
> In the previous chapters we have centered upon basic statistical concepts, and mainly upon how these concepts underlie our reasoning from data to descriptions of what data are intended to represent. In the present chapter we turn to a discussion of a type of decision procedure which incorporates reasoning with statistics. In such cases the decision concerns a statement that we are attempting to assess by conducting a study. In short, this decision procedure concerns the role of statistics in hypothesis testing. Within this procedure we still use descriptive statistics and sampling statistics, but we use them in a rather special way.

Note that this overview is similar to the first overview we described in this guideline in that it previews information immediately following it. However, this overview is different because it connects information from different sections. You should consider this kind of overview when the reader is expected to proceed through the sections of the document sequentially.

Other Related Principles

Overviews can only summarize the content and organization of the document. They will be more helpful when the sentences and paragraphs are logically sequenced (see Guideline A-1).

Overviews should be keyed to the major ideas and divisions of the document, which in turn should be identified by headings and subheadings (see Guideline A-3).

In one sense, overviews can be thought of as a highlighting technique that separates the main body of the text from critical content and helps catch and maintain the attention of the users of the document (see Guideline C-1).

Qualifications

Overviews are only necessary when the document is fairly long or when it is divided into different sections. There certainly is no need for an overview in intraoffice memos, most business letters, and very short documents that can be read in full in a very short time. However, even short documents like these should begin with a topic sentence that functions as a very brief overview.

Remember, too, that most documents have a wide range of readers and users, most of whom the writer doesn’t know. Overviews can serve all of these potential readers by helping them decide if the document is appropriate to them.

- If the reader has to read the document, the overview helps him or her understand the content.
- If the reader is merely curious about the document, the overview might stimulate him or her to read the document or sections of it.

- If the reader isn't sure that the document is relevant or helpful, the overview should help him or her decide.

The proper length of an overview depends upon the length and organization of the text that will immediately follow. Overviews in general will range in length from a paragraph to two pages. Overviews longer than this probably are not overviews and readers will blur the distinction between overview and main text.

What the Research Says

A vast amount of empirical research has studied the effects of overviews on learning from written prose. The research support for this principle is broad and consistent. The many research studies done in this area have been reviewed by Hartley and Davies (1976) and Luiten, Ames, and Ackerson (1980).

The bulk of the research has been done in school settings to determine if summaries of instructional material immediately prior to the content itself facilitated learning. All age groups from grade school to college age have been studied. A variety of overviews have been examined: previews, instructional objectives, advance organizers, pretests, and audiovisual introductions. While it is not clear which type of overview is best for specific readers and conditions, the support is sufficiently broad to establish the general value of overviews for understanding written text in any environment and for any audience.

A-3.

Use informative headings.

It isn't sufficient to organize the content of a document well. You must also show the organization to the readers. You can do this by using informative headings and subheadings.

Headings can help the readers and users of a document in several ways. For people who are curious about what the document is for, headings show the organization and scope of the document; for people who need to find specific information in a particular part of the document, headings help them locate it; for people who wonder what a certain section of the document talks about, headings give them cues about the content.

Explanation and Illustration

Well-written headings (and by this we also include subheadings) are a way to help readers get what they need from a document easily and quickly. Headings are most helpful in long documents that cover different topics and in documents that contain specific information needed by different people. While headings are fairly easy to use, you can mislead your readers and cause confusion by poor headings.

Well-written headings tell the reader (1) the nature of the information contained in text following the heading; (2) the organization of the document; and (3) the location of particular content.

Headings that are Informative: Headings should give readers a good idea of what the following section of text is talking about. This means that your headings should be informative.

You can make headings informative by using enough words to describe the content that follows. An example of an informative heading is shown below (taken from a table of contents of a life insurance booklet). Note that the headings are complete enough for the reader to understand what each section is about. The reader is informed by the headings; they give him or her enough information to decide if it is worth the time to read.

TABLE OF CONTENTS

You also can make informative headings by converting them into questions. You make the heading sound like a question the reader might ask by using personal pronouns in the question. Compare the headings below, taken from, a set of instructions for obtaining loans to attend college. You can see that using the pronoun "I" in the heading directly addresses the reader and gives personal meaning to the information. At the same time, the heading is very clear about what that particular section discusses.

Original Heading	**Revised Heading**
Student Eligibility	Can I get a college loan?
Other Forms of Financial Aid	What other kinds of aid can I get?

You have to guard against headings that are uninformative, or worse, that actually mislead the reader. Headings that are single, abstract words such as "Purpose," "Authority," or "Provisions," or strings of nouns such as "Clearance Requirements," or "Copyright Patent Infringement Provisions" are not informative. Headings like these tend to be vague. They can mean different things to different people, and they are so broad that any number of topics could be discussed under them. An example of uninformative headings is shown in the following table of contents from a report.

TABLE OF CONTENTS

SECTION PAGE

Preface 1

Introduction.. 2

Part I..5

Part II..23

Conclusion.. 47

Bibliography.. 51

Note that the headings give no clues to readers about what they will find if they turn to "Part II" on Page 23. They don’t tell the reader anything about the document’s content.

Headings that show organization. In long or complex documents, headings and subheadings should serve as a kind of outline. You should be able to thumb through the document and tell what major points and subtopics are discussed in the text just by reading the headings and subheadings. The headings and subheadings show the relationship of major topics to subtopics; they indicate how the content is organized.

You can use several different levels of headings to show the relationship between major points and subtopics, much the way that a good outline does. You can show relationships of major and subordinate topics by the arrangement of the different levels of headings on the page. You can also make the relationships distinct by adding underlining, bold face, capitalization, and other highlighting techniques.

While the illustration on the next page is only one variation of this approach, it is sufficient to point out the kinds of cues that readers can get by the physical appearance and the spacing of headings.

Loading Hazardous Materials

The rules for the amounts of hazardous materials you can load depend on what the material is and where you load it.

Inaccessible Places: How Much and What You Can Load

An inaccessible place is one which a crew member cannot get to during a flight because of the design of the plane or a package that a crew member cannot open, such as a freight container.

In an inaccessible place on both passenger and cargo-only planes, you can load:

1. up to 150 pounds net weight of nonflammable compressed gas;
2. up to 50 pounds net weight of any hazardous materials allowed on passenger planes.

Accessible Places: How Much and What You Can Load

An accessible place is one which a crew member can get to during a flight.

You can load any amount of hazardous materials in accessible places on passenger and cargo-only planes, except for the following:

1. You cannot load any hazardous materials in the cabin of a passenger plane.
2. You cannot load hazardous materials on planes described in Section 175.3.

Headings that show location. You can use headings to tell readers where specific topics are located by keying the headings in a table of contents to identical headings within the document. Readers can easily and quickly find the precise location of the particular section of the document they want.

Other Related Principles

Headings tell readers how the document is organized and what ideas and facts are discussed in the text that immediately follows them. Readers use headings in conjunction with tables of contents to locate information (see Guideline A-4). Headings also are related to overviews (see Guideline A-2) and to tables of contents in that they all cue readers about the content presented in different sections of the document.

To be informative, you should write headings in simple, clear words; don't make headings abstract by using long noun strings (see Guideline B-10). You can make headings distinct and noticeable by using color, bold face, and other highlighting techniques (see Guideline C-1).

Qualifications

You can't organize a disorganized document or make unclear logic clear by headings alone. Headings are not a substitute for careful planning and logical organization of the document's content. Headings are only one design element that will not make or break a document on their own. Headings can supplement and enhance clear prose language and good visual design in a document.

What the Research Says

The research is consistent in supporting the role of headings for making documents easier to use and understand. Dooling and Mullet (1973) and Sjogren and Timpson (1979) have reported research that demonstrates headings aid in understanding prose content that immediately follows. Swarts, Flower, and Hayes (1980) found that headings that are vague and focused on broad concepts can mislead readers. In contrast, Charrow and Redish (1980) found headings had no effect on understanding the content of product warranties, although people preferred reading warranties that had headings.

A-4.

Make a table of contents for long documents.

The table of contents shows readers what is in a document, where particular sections are, and how they're organized. A table of contents is particularly useful when the document is long and readers will use it as a reference to find specific information quickly. Even when a document will not be used as a reference, a table of contents can be helpful because it gives readers a sense of the scope and organization of the document.

Tables of contents are commonly used and their value is self-evident. Nevertheless, documents are often published without a table of contents; and some tables of contents that are published keep the location of information a mystery. A good table of contents will inform the reader about what's in the document and what page it's on.

Explanation and Illustration

The table of contents is shaped according to the organization that you or another writer has put into the document. The important thing to remember is that the table of contents is not a mere formality, but an opportunity to inform your readers. Some tables of contents tell readers almost nothing about what is in the document, as in the two examples that follow.

These tables of contents contain uninformative headings. The first is so vague that it could be the table of contents for almost any document. The second is so abstract and technical that it would be usable only by readers who already know a good deal about the subject of the document. Moreover, it contains no page numbers, which makes it difficult for readers to locate information. Remember that readers often know very little about the document when they first use the table of contents, and it is up to you to make the document as easy to use as possible.

POOR: Uninformative headings

TABLE OF CONTENTS

SECTION	PAGE
Preface	1
Introduction	2
Part I	4
Part II	8
Conclusion	10
Footnotes	11
Bibliography	13

POOR: Abstract and no page numbers.

You can present information in a table of contents in a variety of ways, using questions, phrases, names or short descriptions. The examples below are informative tables of contents which present information in some of these ways.

GOOD: Shows the organization of the document, has informative headings, and tells the reader where the information can be found in the document.

Try It, You'll Like It! has seven major sections:

GOOD: Uses personal pronouns and questions to make the document personal to the reader:

§ 95.455	On what channels may I operate?
§ 95.457	How high may I put my antenna?
§ 95.459	What equipment may I use at my CB station?
§ 95.461	How much power may I use?
§ 95.463	May I use power amplifiers?

GOOD: Has informative headings which make it clear to readers what will be talked about under each section.

Where To Find It	**Page**
How this policy protects you and your family	3
Extra insurance on top of your other policies	3
Broader coverage than your other policies	4
Five types of claim not covered by this policy	4
A closer look at your coverage	5
Your extra auto liability insurance	5
Broad auto coverage for you and others	5
Your extra boat liability insurance	6
Your extra golf cart and snowmobile insurance	6
Your extra airplane insurance	7
Your extra personal liability insurance	7
What else we will do for you	8
What you must do for us	8
Other conditions of this policy	9
Can this policy be canceled	9
A final word	9

Other Related Principles

The table of contents helps readers to use and understand long documents in much the same way that overviews and headings do, and should be used for many of the same reasons (see Guidelines A-2 and A-3).

Although a table of contents contains headings and is not written like regular text, many of the writing principles apply. For example, your table of contents will be easier to understand if you use personal pronouns, avoid nominalizations and unnecessary words, and unstring noun strings. (See Guidelines B-2, B-3, B-9, B-10).

Qualifications

You don't need to make a table of contents for short documents (less than 5 pages) or for documents that don't divide and identify different sections by headings.

What the Research Says

We do not know of any research that has directly studied the effects of tables of contents on locating information in a document. This is to be expected because the value of tables of contents for helping readers to find specific information is self-evident and not a research question. The research that has been done on informative headings is related in that it provides insights on how to construct tables of contents so that they are of greatest use to readers. That research demonstrates, for example, the importance of making headings informative so that readers get a clear idea of how the document is organized, what its content is, and where the content is located within the document (see Guideline A-3). In addition, there is indirect support for tables of contents from research on a prose text that was revised following the guidelines in this book. An informative table of contents was one (but only one of many) of the differences between the old and the new text being studied. People using the new text were significantly faster in locating information and significantly more accurate in finding the correct information (Felker & Rose, 1981).

Section B

The guidelines in this section present principles to help you write and recognize sentences that readers can understand. Guidelines B-1 through B-4 explain principles that will help you to write sentences that make clear who does what to whom. Guidelines B-5 through B-8 present principles you can use to write sentences that help readers connect ideas and related information correctly. Guidelines B-9 through B-11 explain principles that will help you write clear sentences by avoiding words and phrases that most readers have trouble understanding.

B-1.

Use the active voice.

Active sentences maintain the underlying logic of who did what to whom, helping the reader to keep the distinctions clear. Paragraphs and larger text comprised mainly of active sentences give readers the impression of prose that moves along.

Unfortunately, most public documents are written mainly in the passive voice, which gives them an impersonal, dry tone and often causes the reader to focus on the wrong element in the sentence—i.e., on the person or thing that was acted upon rather than on the person or thing that performed the action. Furthermore, some passive sentences are hard to understand because they have lost the information about who did the action in the sentence. Substituting active sentences livens up passages and makes them easier to read.

Explanation and Illustration

The voice of a sentence tells you the relation of the subject and the verb. When the subject does the action expressed by the verb, the sentence is in the active voice. Active sentences always follow a subject-verb-direct object sequence.

> The applicant pays a $25 fee.

In the above example, *applicant* is the subject, *pays* is the verb, and *fee* is the object. Note that the subject does the action expressed by the verb.

In contrast, in the passive voice the action is done to the subject. Passive sentences make a direct object into a subject.

> A $25 fee is paid by the applicant.

Note that the passive voice reverses the order of two elements in the active sentence; what is done precedes the agent doing it. When passive sentences are long, it becomes harder for the reader to figure out who is doing what to whom.

You can tell if a sentence you have written or have read is active by doing two simple steps:

1. Find the subject of the sentence and the verb.

2. See if the subject is doing, has done, or will do the action stated by the verb.

If the answer is "Yes," the sentence is active.

To write an active sentence, the writer must be clear about the actor (or the agent or doer, the "who" of who does what to whom). Actors can be:

- *a person* -- "John drove..."
- *a pronoun* -- "She wrote..."; "They telephoned..."
- *an organization* -- "The FBI wants..."; "Exxon purchased..."
- *a thing* -- "Doors open…." "The hose could have sprayed..."

Note that in all cases the actor or the subject is doing the action stated by the verb.

The following sentences illustrate what really makes the active and passive voice different. The sentences mean the same, but the passive sentence changes the focus of a sentence. Passive sentences change the order of the actor/doer/agent and what is done.

> **ACTIVE:**
>
> The staff will provide technical assistance for developing information needed to complete Table I.
>
> **PASSIVE:**
>
> Technical assistance will be provided by the staff for developing information needed to complete Table I.

Passive sentences become even more of a problem when the writer leaves out parts of the sentence. A peculiar feature of passives is that you can omit the "by-phrase" and not name the doer or agent. Here is a passive sentence and the same sentence without the by-phrase.

> The form should be filled out by the applicant.
>
> The form should be filled out.

By deleting the by-phrase you avoid saying who is responsible for the action. The sentence becomes indefinite; it becomes more impersonal, less clear, and harder to understand. When you write many such sentences in a document this effect multiplies until you end up with a piece of writing that few readers will be able to understand. The example below consists of long passive sentences, some with the by-phrases omitted. It is typical of public documents. Compare it with the rewritten version, which uses the active voice to make clear to the reader who is doing what in each sentence.

> **PASSIVE:**
>
> In certain cases, a petition to classify his status for issuance of a visa *must be approved* before the alien may receive a visa. A visa *may not be issued* until the consular officer is in receipt of a certification from the Secretary of Labor. After the visa *is granted*, or it *is ascertained* that a visa *is not required*, final transportation arrangements *may be made*.

ACTIVE:

In certain cases, the consular officer *must approve* a petition to classify the alien's status for issuance of a visa before the alien may receive a visa. The consular officer *may not issue* a visa until he is in receipt of a certification from the Secretary of Labor. After the consular officer *grants* the visa or *ascertains* that the alien *does not require* a visa, the alien *may make* final transportation arrangements.

Other Related Principles

You can often avoid the passive voice by using personal pronouns (see Guideline B-2).

Qualifications

You should write most of your sentences in the active voice. Writing experts and research both support the general value of active sentences for understanding. In particular cases, an occasional passive sentence is perfectly OK to use:

- when you want variety in your writing
- when you want the reader to focus attention on the object of the sentence
- when the sentence is short and easy to understand

What the Research Says

The research supports both the principle and its qualifications. A large body of research begun in the early 1960s showed that active sentences are easier than passives on many measures. These measures included how quickly people could understand or use sentences, and how accurately people later recognized or recalled sentences. Reviewed in Fillenbaum (1971) and Palermo (1978), the major studies include those of Miller (1962), Mehler and Miller (1964), Savin and Perchonock (1965), Gough (1965), and Clifton and Odom (1966).

Later research qualified these results by showing that, in some contexts, passive sentences are as easy or easier than active sentences. The research has defined these contexts very specifically: they are those in which the intent is to focus on the object of the action. Among the qualifying studies, Turner and Rommetveit (1968) and others (Huttenlocher & Weiner, 1971; Wannemacher,1974; Hupet & LeBouedec, 1975) found passives under these qualifying circumstances easier for people to understand, use, and remember. Osgood (1971) and Johnson-Laird (1968) found passives preferred by people selecting sentences to refer to the object of the action.

In more common sentence contexts, where the focus is on the doer of the action, most experimental studies still find that actives are better than passives (Layton & Simpson, 1975; Kulhavy & Heinen, 1977).

B-2.

Use personal pronouns.

Personal pronouns in sentences are direct and specific. They make clear to the reader who does what in the sequence of actions or events you describe in a sentence.

Business and government documents are often written as though some invisible hand is at work making decisions and implementing procedures. They contain descriptions of actions without actors or refer to actors only indirectly. Readers become frustrated when they must stop to figure out who is doing what, or when they feel as though they are dealing with some elusive authority. When you refer indirectly to readers as "examinees" or "respondents," they may feel that they have been removed from decisions and procedures which directly affect them. You can improve this situation by using personal pronouns to make clear who the actor is in each case.

Explanation and Illustration

Personal pronouns are such common words as "I," "she," "they," "you," "me," "him," and so on. Personal pronouns can be used in a variety of ways in sentences: as subjects (I, you, we), as objects (me, you, us), and as possessives (my, your, our).

In many documents, it is easy and appropriate to give your writing a personal feeling by addressing the reader directly as "you," and by referring to yourself and your organization as "I" and "we." The following sentence illustrates this notion.

> *We* will not grant a visa until *you* submit satisfactory evidence that *you* will be able to proceed to the United States.

In this sentence, the pronouns have enabled the writer to create a sequence in which it is easy to follow the logic of who will do what to whom.

One way to decide whether you need to use a personal pronoun is to look for sentences which describe an action, but which do not name an actor. Here is the same example in its original form:

> A visa may not be granted until satisfactory evidence is submitted to show that the alien will be able to proceed to the United States.

Note how impersonal and indefinite this sentence is. Who's doing the action? Invisible forces are at work: something or someone won't grant a visa unless an equally shadowy something or someone submits evidence. If you compare the first sentence with the second one, it is clear that pronouns breathe life into a sentence and directly involve the reader.

Let's look at another example:

ORIGINAL:

The top portion of the statement will be used to process the payment to the user account. Its enclosure in the return envelope supplied with the bill will aid in the accurate crediting of the user's account.

REWRITE:

We will use the top portion of the statement to process *your* payment to your account. If *you* enclose it in the return envelope which *we* supplied with *your* bill, *we* will be better able to accurately credit *your* account.

Personal pronouns can also humanize legal documents such as apartment leases, contracts, bank loans, and Insurance policies. You can often substitute the pronoun "you" for words like "applicant," "examinee," "lessee," and "party." Similarly, you can substitute the pronoun "we" for "lender," "agency," "company," etc. Compare the following. Which is the more "human?" Which is easier to understand?

ORIGINAL:

How Beneficiary May Be Changed. *The Insured* under the Policy may from time to time change his designation of beneficiary without notice to or consent of the previously designated beneficiary by filing written notice thereof through the Holder on a form furnished by or satisfactory to *the Company*, whereupon an acknowledgment of the change will be furnished *the Insured* for attachment to *his* certificate. Such change shall take effect on the date *the Insured* signed such written notice of change, whether or not *the Insured* is living when the acknowledgement of the change is furnished.

REWRITE:

How to Change Your Beneficiary. Under this Policy, *you* may from time to time change the designation of *your* beneficiary without notice to or consent from the beneficiary *you* designated previously. *You* can do this by filing a written notice through the Holder (The American Physical Group Insurance Fund) on a form which *we* furnish or approve. *We* will furnish *you* an acknowledgement of the change which *you* must attach to your certificate. The change will take effect on the date *you* sign the written notice, whether or not *you* are living when *we* furnish the acknowledgement.

Other Related Principles

If you write in the active voice (see Guideline B-1) and avoid nominalizations (see Guideline B-3), you will find that using personal pronouns comes more naturally. Passive sentences and sentences with nominalizations often obscure the identity of the actor. Personal pronouns specify the actor.

Qualifications

Be consistent when you use personal pronouns. Call the same persons "you" and the same persons "we" in all parts of the document.

For business and legal documents (apartment leases, contracts, insurance policies), and for many application forms, you should state in the beginning how you will refer to everyone who will use the document.

When a document is very long, readers often lose track of who is being called what, as they get further into the document. In this case, it is better to use only one set of pronouns. You might decide to call the reader "you" and refer to your organization with a noun ("the bank"), or by name ("the FBI" or "Exxon").

What the Research Says

The main support for this principle comes from research showing that if readers can relate passages to something they are familiar with, or something that is personally meaningful, readers understand and remember these passages better (Anderson, Reynolds, Schallert & Goetz, 1977; Pichert & Anderson, 1977; Graesser, Higginbotham, Robertson & Smith, 1978; Flower, Hayes & Swarts, 1980). While these studies provide indirect support for the principle, the use of such personal pronouns as "you" and "we" is clearly an effective way of making prose personally meaningful.

Other indirect support comes from studies done on familiar or frequent words (reviewed in Redish, 1980). These studies show that words that occur more frequently throughout our language are generally easier to read and understand than words that occur less frequently. Personal pronouns are among the most frequently used words in English.

B-3.

Avoid nouns created from verbs; use action verbs.

Sentences with heavy, abstract nouns created from verbs are impersonal, bureaucratic, and often hard to understand. Changing those nouns back into verbs and stating who did what to whom will make your sentences clearer and easier to understand. It will also eliminate a frequent source of ambiguity.

Explanation and Illustration

An interesting feature of the English language is that you can make a noun out of a word that "normally" is a verb. However, these nouns usually give the sentence an abstract, impersonal tone. Consider the following:

> The *specification* of the company is that employees work between 9 and 5.

Specification is a nominalization, a word made into a noun from the verb *specify*. The equivalent sentence without the nominalization is:

> The company *specifie**s*** that employees must work between 9 and 5.

There are many nouns in English that have been created from verbs—nouns such as:

This noun	**is derived from this verb**
refusal	refuse
promulgation	promulgate
assignment	assign
reliance	rely
verification	verify
happening	happen
occurrence	occur
participation	participate
disclosure	disclose

These nouns are called *nominalizations* or *nominals*, and in bureaucratic documents they are often used with "filler" verbs to take the place of one simple verb. Thus, you will sometimes find "made a decision" in a sentence, when "decided" would have been appropriate; or you will find "Affix your signature on line 53" rather than simply "Sign on line 53." This creates "ponderous prose," and helps create an impersonal, bureaucratic tone in a document.

How can you tell when you are writing (or reading) a nominalization? First, look for nouns that end in *-tion, -al, -ance, -ence, -ment, or -ure*. (Look again at the words in the list we just gave.) Second, look for nouns embedded in the phrase "the ______________ of" (e.g., "the disclosure of"). Third, look for nominalizations in sentences that are missing any mention of who does what. Fourth, look for these nouns in particular at the beginning of sentences.

Consider this sentence:

> The implementation of the policy will enable the Agency to regulate other areas.

Implementation is a nominalization. It is a noun that has been derived from a verb (*implement*); it ends in *-tion:* it is embedded in the phrase "the ________________ of;" there is no agent describing who "did" the implementation (the city? the Police? John? the agency?); it is the subject of the sentence.

A noun can be a nominalization if it meets any of the four conditions. In the sentence below, the nouns *seeking* and *utilization* are nominalizations.

> Four major factors influence consumer information seeking and utilization.

These nouns are derived from the verbs *seek* and *utilize*. They end in *-ing* and *-tion*, and they bury within themselves the doer of the action, but they aren't couched in a "the _____________ of" phrase and they aren't the subject of the sentence. (*Factors* is the subject.)

When you use nominalizations, you make a document "bureaucratic" and abstract because nominalizations cause the sentence to lose certain information. The example below illustrates this. In the first sentence, the verbs (in italics) show the action; the actors are named.

> When the Agency *implemented* the rule, the company had to *reasses**s*** its policy.

Now, look what happens when you use nominalizations (in italics) in your writing. The same sentence reads like this:

> The *implementation* of the rule necessitated a *reassessmen**t*** of policy.

The nominalized forms (*implementation of*; *reassessment of*) make the sentence impersonal and abstract. The nominalizations take the place of the actors and the verbs in the original sentence, and they obscure the information about how the nouns and verbs are related. For example:

> *Implementation* replaces <u>when the Agency implemented</u>
>
> *reassessment* replaces <u>the company had to reassess</u>

Nominalizations usually make sentences shorter, but because they are static, they sap the vitality out of a sentence by giving up information about who did what, when.

To give yourself a good idea of what a typical passage with many nominalizations "sounds" like, read the following paragraph and its rewritten version. Note the nominalizations, their form and location in the sentences, and compare the liveliness of the paragraphs with many and few nominals.

POOR:

*Decision****s*** about the *distributio****n*** of assistance funds should be made taking into *consideration* the following questions. Will the plan foster the *conservation* of existing stock through the *prevention* of housing *deterioration*? Will it foster the *promotio****n*** of neighborhood stability?

BETTER:

When you *decid****e*** how to *distribut****e*** assistance funds, you should *consider* the following questions. Will the plan *conserve* existing stock by *preventing* housing from *deteriorating*? Will it *promote* neighborhood stability?

Other Related Principles

You can often avoid nominalizations if you remember to use personal pronouns (see Guideline B-2).

If you make sentences active and emphasize the agent or doer in a sentence, you will be less likely to use nominalizations (see Guideline B-1).

Since nominalizations are often abstract, technical, or legalistic, you can avoid many nominalizations by choosing simpler vocabulary (see Guideline B-9).

Qualifications

An occasional sentence with nominals is not going to cause much trouble for any reader. The problems start when many sentences contain nominals, and when nominals are combined will passive sentences and abstract, technical words.

Nominalizations are quite legitimate to use in at least two situations. First, when preceding passages have made it very clear who are the particular people, agency, organization, etc. involved in an action. For example, if previous passages have described the actions of a city police department and their intent to develop a new policy, the reader most likely is clear about who is planning to do what. An occasional nominalization would not be a problem in such a case.

Second, nominals *sometimes* genuinely are used as nouns and need not be replaced.

His computer program could not be revised because the *documentation* was so poor.

You could rewrite this sentence with the verb *document*, but you would not be adding information to the sentence.

His computer program could not be revised because it was poorly *documented*.

What the Research Says

There is little research related to nominalizations. In a study that provides isolated support, Coleman (1964) found that It was easier to predict missing words from a sentence with an active verb than when the sentence was transformed into nominalized form. This finding was taken as evidence that nominalizations hinder comprehension.

Indirect support for avoiding the use of nouns that have been made from verbs comes from research done on other document design principles. Sentences that use simple nouns and action verbs (i.e., avoid nominalizations) tend to be shorter and more concrete. Paivio (1971) demonstrated that concrete sentences are easier to understand. Coleman (1962) and studies reviewed in Redish (1980) found that shorter sentences tend to be better understood by readers.

B-4.

Avoid whiz-deletions.

In English, many subordinate clauses are introduced by the words "which is," "who were," "that are," etc. These "little words" help make the structure of the sentence clear to the reader—they make it easier for the reader to understand how the subordinate clause relates to the rest of the sentence. Removing these "little words" is called "whiz-deletion." "Whiz-deletion" can often make a sentence unclear or ambiguous; it can place a greater than necessary burden on the reader. Wherever possible, replace the missing "which is," "who was," etc.

Explanation and Illustration

Many subordinate clauses in English are introduced by a relative pronoun (who, which, that) plus a copula verb—a form of the verb "to be" (is, are, was, were, etc.). These "little words" help make it clear to the reader how the subordinate clause relates to the rest of the sentence. For example,

> The director wants the report *which was* written by the Home Office.

When writers remove the relative pronoun plus copula verb the process is called "whiz-deletion." (The term "whiz" is derived from *wh*(ich)... is (was, are, etc.). A "whiz-deletion" in the example above would look like this:

> The director wants the report written by the Home Office.

As you can see, removing the words "which was" makes the sentence potentially ambiguous. It can mean what the original example meant, or it can mean that the director wants the report to be *written* by the Home Office. Thus, whiz-deletion can make sentences unclear or ambiguous.

To avoid ambiguity and to reduce the burden on your readers, restore the missing relative pronoun plus copula verb whenever possible.

For example, change:

> This policy does not pay benefits to Park Police kicked by horses.

to:

> This policy does not pay benefits to Park Police *who have been* kicked by horses.

Change this:

> We are detailing methods of computing unit costs and requirements for cost detail submitted to support your proposed hourly rates.

To this:

> We are detailing methods of computing unit costs and requirements for cost detail *which should be* submitted to support your proposed hourly rates.

Other Related Principles

Once you have put the "whiz" words back in, you may find it necessary to put the clause into the active voice in order to further clarify what is going on (see Guideline B-1).

Qualifications

It is not necessary to always restore the relative pronoun plus copula verb. If the whiz-deletion does not interfere with the clarity of the sentence and the reader’s ease in reading it, you may leave the sentence as it is.

What the Research Says

Most of the research support for avoiding whiz deletions is indirect. The one direct study was done by Charrow and Charrow (1978) who found that deleting a "whiz" made jury instructions hard to understand. The other research has been done on the effects of deleting the introductory word in different kinds of embedded clauses. Among these are the work of Fodor and Garrett (1967), Foss and Lynch (1969), Hakes and Cairns (1970), Foss (1970), and Hakes (1972). These studies confirm that keeping relative pronouns as introductory words to clauses improves how quickly people read and understand a sentence on a variety of measures. The theoretical explanation for this result is that relative pronouns serve as "surface clues" to signal to readers that a clause is coming up.

B-5.

Write short sentences.

Readers can take in only so much new information at one time. At the end of a sentence, readers pause to chunk together what they have just read. If you write short sentences, your readers will be able to do this easily.

Long sentences contain more ideas than readers can remember when they come to the end of the sentence. Long sentences also tend to be grammatically complex, which makes it difficult for readers to relate the ideas to each other.

Explanation and Illustration

Many style manuals say that sentences should be 25 words or less in length. This is a good rule-of-thumb, but it may not always be an adequate measure by itself. The important thing to remember about sentence length is to present your readers with only as many ideas as they can handle at one time. The following sentence contains at least five ideas which would be easier to understand if they were written in five shorter sentences.

> **TOO LONG:**
>
> Since each of the complaints principally alleged a lessening of potential competition, not an increase in aggregate asset concentration or a heightening of product differentiation barriers to new entry, it is clear that the enforcement policy has not isolated a special merger problem but that product extension mergers in grocery product manufacturing present a similar capability for lessening potential competition as do all other types of mergers, regardless of the industries in which they occur.
>
> **BETTER:**
>
> Each of the complaints alleged that potential competition decreased. None alleged that aggregate, asset concentration or product differentiation barriers to new entry increased. As a result, we know that the enforcement policy has not isolated a special merger problem. Rather, the complaints show that product extension mergers in grocery product manufacturing may decrease potential competition. This is true of all types of mergers, regardless of the industry in which they occur.

There are no hard and fast rules for determining whether a sentence is too long. The same sentence might be short enough for an economist, but too long for a high school student. When you judge sentence length, you must take into account various factors, such as your audience, the difficulty of the ideas, what has come before in the document, etc.

When you want to rewrite a sentence that is too long, try to sort out the ideas in it. Find the subject and the main verb. Then determine how the other phrases in the sentence relate to the subject and main verb: are they conditions, qualifications, exceptions, elaborations, reasons, results? Do they refer more directly to one of the other phrases than to the subject and main verb? By identifying the parts of the sentence and their relations to each other, you can judge which parts are not crucial to the basic idea you want to present in the sentence. Then you will know which parts to rewrite in separate, shorter sentences.

The examples below show how to rewrite sentences that are too long.

This is one long condition on the main part of the sentence. There is even a condition within the condition, i.e. the reason the application was rejected.

TOO LONG:

If the application is rejected on the ground that it is considered to be improperly filed because of failure to submit a labor certification, fee may be refunded. *Main Verb*

Subject

BETTER:

If you fail to submit a labor certification, we will consider your application to be improperly filed, and we will reject it. If this is the case, we will refund your fee.

TOO LONG:

Subject *Main Verb*

This Qualification Separates the Main Verb and the Subject

For some areas, a housing needs assessment more recent than available Federal census data has been prepared by a regional or State planning agency, and the assessment addresses the housing assistance needs of workers employed, but not living in the community.

This elaboration has its own subject and verb and could easily stand as a separate sentence.

BETTER:

For some areas, a regional or state planning agency has prepared an assessment of housing needs. This assessment is based on data more recent than available Federal census data. It addresses the needs of workers employed in the community, but who do not live there.

Other Related Principles

Writing in the active voice and avoiding unnecessary words often helps to cut down sentence length (see Guidelines B1 and B-9).

Sentences with excess information are too long (see Guideline B-6).

Qualifications

You do not have to make every sentence short. Too many short sentences can make a passage sound choppy. A well-constructed long sentence can give needed variety to the rhythm of the passage. Also, some ideas may make more sense when you present them together in one long sentence than in several short ones.

Writing short sentences may make an entire passage longer, and it may seem that the readers will have to take in more information. However, the readers will probably understand the passage better because they will be able to pause and chunk together the ideas as they go along.

What the Research Says

Short sentences are intuitively appealing and research supports that they enhance comprehension. Coleman (1962) confirmed that shortening sentences aids understanding written prose. Research that has been done in developing and validating readability formulas supports the general conclusion that shorter sentences make prose more readable (see Redish, 1980, for a review of research on readability formulas).

Other research has found that factors in addition to sentence length influence comprehension. For example, Paivio (1971) pointed out that whether a sentence is abstract or concrete makes a difference; Rohrman (1968) showed that the grammatical complexity of a sentence is important; and Perfetti (1969 a, b) and Kintsch and Keenan (1973) demonstrated that whether a sentence Is sparse or dense in terms of the amount of information can be more significant for comprehension than length of sentence. The important point to derive from the research is that, while length of a sentence is an important consideration, it is not sufficient in itself to ensure that the sentence will be easy to understand.

B-6.

Do not insert excess information into a sentence.

Sentences become hard to follow when you try to jam too much information into them. This typically happens when you insert explanatory clauses and phrases between the subject, verb, and object of the sentence, or add excessive introductory material before the subject, or too much information at the end of the sentence. Too much information in a sentence, even with correct punctuation, is hard to understand.

Explanation and Illustration

The subject, verb, and object of a sentence tell us who did or is doing what to whom. The English language is wonderful in the ways that these basic parts of a sentence can be modified, explained, and expanded by adding words, phrases, and clauses at almost any point in the sentence. This makes it possible to say a great deal in a single English sentence.

Too much added information, however, causes problems. Writers of public documents often try to get as much information as possible into a single sentence. This results in sentences that are hard for the reader to follow. What is "too much information"? The precise answer to this depends on the content and the readers of the document. But in general, the answer is: "There is too much in a sentence when readers can't easily understand the meaning of the sentence (i.e., who's doing what to whom, when)."

You should look for excess information in a sentence in four principal places.

You can have too much Information between the subject and the verb. This makes it difficult for the reader to find out what the subject of the sentence is doing or is supposed to do.

For example,

> All the procedural steps *from the first one to the last, as well as the policies, resources; structure, personnel, and organizational factors, which also impinge on the proposed system* must be evaluated in terms of their effects on each other.

There is far too much information between the main subject "All the procedural steps," and the verb "must be evaluated." Reading many sentences like this will quickly become a chore. One way of making this sentence clearer is to handle the "excess" information in another sentence.

For example,

> All *the procedural steps* and other related factors *must be evaluated* for their interactive effect on each other. These related factors include policies, resources, structure, personnel, and organizational factors.

You can have too much information between the verb and the object. This makes it difficult for the reader to find out what the action or activity in the sentence pertains to.

For example,

> A chemical which is highly cumulative could destroy *through secondary toxicity or through food chain transfer* an economically or ecologically important fish population.

This sentence is choppy and hard to follow, and the reader doesn't know what's going to happen for a long time. This is because the verb "destroy" is separated from the object "an economically or ecologically important fish population" by a mass of verbiage. You might rewrite this sentence by moving the "excess" information to the end of the sentence, thereby moving the verb and object closer together.

For example,

> A highly cumulative chemical could destroy an economically ecologically important fish population by secondary toxicity or food chain transfer.

You may have too much information before the subject of the sentence. This may make it impossible for the reader to even find the main clause of the sentence.

For example,

> *Thirty calendar or more days prior to the public hearing on the draft facility Plan, or if no public hearing is held, a reasonable time before submittal of a facility plan to the State for approval***,** the draft facility plan should be submitted to the A-95 clearing house for a second review.

In this example, the reader only gets to the subject of the sentence "the draft facility plan" after reading through 36 words. This can be very confusing. You might rewrite this sentence treating the "excess" information as conditionals.

For example,

> The draft facility plan should be sent to the A-95 clearing house for a second review
>
> (1) If there is a public hearing on the plan, 30 days prior to the hearing;
>
> or
>
> (2) If there is no public hearing, within a reasonable time before the facility plan is sent to the State for approval.

You may have too much information at the end of the sentence. This can cause readers to forget who has done what to whom by the time they finish the sentence.

For example,

> We also question $2,000 of the proposed travel cost *to attend professional meetings as a direct charge.*

It is unclear here how the phrases "to attend professional meetings" and "as a direct charge" relate to the rest of the sentence. They appear to have been attached randomly to the end of the sentence. You might rewrite this as two sentences.

For example,

> We also question $2,000 of the proposed travel cost. The direct charges to attend professional meetings seem excessive.

When you put excess information into a sentence, you may make the sentence awkward or ambiguous. In general, if you find that a sentence you have written contains too much information, break it up into two or more sentences.

For example, this one long sentence has a lot of intrusive information:

> Interested persons, on or before December 31, 1981, *may submit* to the Hearing Clerk, 1000 Pennsylvania Avenue, N.W., Washington, D.C., 20000, *written comments* regarding this proposal.

You could rewrite it this way:

> If you are interested in this proposal, send your written comments to this address:
>
> Hearing Clerk
1000 Pennsylvania Avenue, N.W.
Washington, D.C. 20000
>
> Make sure your comments arrive by December 31, 1981.

Other Related Principles

You can often avoid inserting excess information into sentences by remembering to keep sentences short (see Guideline B-5).

Sometimes multiple conditions load a sentence with excess information. You can reformat such sentences by making the conditions clear (see Guideline B-7).

You can eliminate excess information from sentences by crossing out unnecessary words or phrases (see Guideline B-9).

Qualifications

It is possible to write perfectly correct and clear sentences with added words, clauses, or phrases before the subject of a sentence, between the subject and the verb, between the verb and the object, and at the end of a sentence. Not every sentence has to follow a simple subject-verb-object format. The key is to not add so much information at any of these points that the meaning and action of the sentence becomes fuzzy, or that the action in the sentence becomes hard to follow.

What the Research Says

An extensive and varied body of research is relevant to this principle. One area of research has focused on how extra information in a sentence makes sentence structure more complex.

One way to look at structure is in terms of the number of ideas in sentences. Several studies have examined this aspect of structure. In general, results show that sentences with many clauses are harder to understand. Forster (1970) and Forster and Ryder (1971) found that sentences with two subordinate clauses are harder to understand than sentences with only one. The location of extra clauses within a sentence is also important. Sentences with clauses placed at the front or middle tend to be harder to interpret than when clauses occur at the end. This finding is supported by Miller and Isard (1964), Fodor and Garrett (1967), Hakes and Cairns (1970), and Larkin and Burns (1977).

Other studies have looked at the structure of sentences in terms of how words are grouped from left to right in the sentence. These studies have observed problems other than clauses. They, have looked at extra information in the form of words and phrases as well. The results confirm the benefits of putting the extra information at the end of the sentence. For example, a series of studies (Martin & Roberts, 1966; Martin, Roberts, & Collins, 1968) shows that most sentences with words or phrases in front of the subject, or between the subject and verb, are harder to remember (e.g., "The very nicely built house collapsed.").

The typical explanation for these findings involves short-term memory. People can attend to only so much information at a time, and adding clauses at the beginning and middle of sentences puts a greater burden on memory than when clauses are inserted at the end of a sentence (e.g., Fodor, Bever, & Garrett, 1974).

A second area of research has focused on how extra information makes the content of the sentence denser (Kintsch & Keenan, 1973; Graesser, Hoffman, & Clark, 1980). Density refers to the number of sentence ideas combined in a sentence (e.g., "The red bird flew" contains two sentence ideas "The bird is red" and "The bird flew"). The results of this research generally show that dense sentences take longer to read and are harder to understand.

While the research does not tell us how much information is "excessive" in particular sentences for particular audiences, the overall results do show that as more information is included, the sentences take longer to understand.

B-7.

List conditions separately.

Conditional ("if...then") sentences are often very complicated and hard for readers to understand. The more conditions a sentence contains, and the more different combinations of "ands" and "ors," the more difficult the sentence will be for the reader.

Conditional sentences are common in many business, government, and legal documents. You will find them especially in regulations that tell people what they can do when, and in application forms that tell particular people to fill out certain sections of the form. You can make conditionals easier to understand by listing each condition separately and making them distinct.

Explanation and Illustration

A conditional sentence is a sentence of the form "If A, then B," or "When A is the case, do B." For example,

> If you are a homeowner, you must complete Form 102.

Conditional sentences can be complicated by having several conditions, or several ways of combining conditions. For example, note the several conditions that have to be met in the following sentence.

> To be eligible for benefits, you must show either your identification card and driver's license or a notarized birth certificate.

As the conditions increase, sentences become more and more difficult until they end up being almost impossible to understand. Here's an example (the different conditions are in italics):

> *If* at the date of termination of Employee *or* Dependent Insurance you are disabled by sickness *or* injury *so as* to be unable to perform the normal duties of your employment, *or* one of your Dependents is confined to a hospital for sickness *or* injury; *and if* before the end of three months after such termination Covered Charges are incurred for such sickness *or* injury *for which* benefits would be payable *except* for such termination; *then* benefits shall be payable *as if* such insurance had not been terminated, for Covered Charges incurred *for such* sickness *or* injury *before* the end of one year after termination.

It is very difficult to sort out the various conditions in this sentence and to keep track of what happens under different circumstances. As a writer, you have to be very careful to keep the conditions straight so that the reader can understand. You can follow three general rules-of-thumb.

1. If there is only one condition, state it first.

   EXAMPLE:

   *If you are over 65**,** you will automatically qualify for benefits.*

2. If there are several conditions, state the rule or consequences first and list the conditions or exceptions afterwards.

   EXAMPLE:

   You can receive benefits under any of the following circumstances:

   1. You are over 65
   or 2. You are a veteran
   or 3. You are handicapped

   ANOTHER EXAMPLE:

   You may vote in November's election if you are
   ☐ a resident of Dawson County, AND
   ☐ 21 years of age or more, AND
   ☐ a registered voter.

As you will note from these examples, it is important to state every *and* or *or* very clearly. You can't depend on "normal" punctuation within a sentence to make the *and* and *or* relationships clear.

You have to be especially careful when you have both "and"s and "or"s in the same sentence because conditions become very complex. You have to work to make clear to the reader which conditions go together. Consider this sentence:

You should sign block 23 of Form 2139 if you make over $10,000, are a resident of the city, and are under age 65, or are self-employed in the city.

Do you sign the form if you meet all of the first three conditions (make over $10,000, a resident, under 65) or if you meet the last condition (self-employed in the city)? Or, do you sign the form only if you meet the first two conditions (make $10,000 or more, a resident) and meet at least one of the other conditions (under 65, self-employed in the city)?

You can get rid of the ambiguity caused by conditionals by rewriting and reformatting the sentence this way (assuming that our first explanation of the ambiguity is correct):

Sign block 23 of Form 2139
If (1) You make over $10,000
and
You are a resident of the city
and
You are under age 65

or if (2) You are self-employed in the city.

The point is that when you have combinations of "and"s and "or"s in a conditional sentence, you have to be particularly careful about how you show which conditions belong together.

3. If there are different provisions for different cases, a table may be clearer than straight prose.

EXAMPLE:

§95.421 Who may sign applications.

...applications, amendments thereto, and related statements of fact required by the Commission shall be personally signed by the applicant, if the applicant is an individual; by one of the partners, if the applicant is a partnership; by an officer, if the applicant is a corporation; or by a member who is an officer, if the applicant is an unincorporated association. Applications, amendments, and related statements of fact filed on behalf of eligible government entities, such as states and territories of the United States and political subdivisions thereof, and units of local government, including incorporated municipalities, shall be signed by such duly elected or appointed officials as may be competent to do so under the laws of the applicable jurisdiction.

A much clearer way of expressing this is as follows:

§ 95.421 Who may sign applications.

(a) If you are an individual, you must sign your own application personally.

(b) If the applicant is not an individual, the signature on an application must be made as follows:

Type of applicant	Signature of applicant
Partnership	One of the partners
Corporation	Officer
Association	Member who is an officer
Governmental Unit	Appropriate elected or appointed official

Other Related Principles

Complex conditionals are often long sentences. If you break them up into lists, you will, in effect, be creating shorter sentences, which are easier for readers to understand (see Guideline B-5).

When different conditions apply to different individuals in different situations, you often can use tables to show the complex relationships (see Guideline D-2).

You can use underlining, capital letters, bold face type, color, and other highlighting techniques to make "and" and "or" conditions distinct (see Guideline C-1).

Qualifications

Most readers will have little trouble with sentences having only one or two conditions separated by one "and" or "or."

What the Research Says

This principle has considerable research support. A group of studies demonstrates that "and-or" conditions and other words that link parts in an "if" condition can be difficult to process. The work of Haygood and Bourne (1965), Neisser and Weene (1962), and Neimark and Slotnick (1970) found that "or" and two-category concepts such as "not both/and" and "not either/or" are difficult for people to understand. Rose and Cox (1980) and Holland and Rose (1980) confirmed that adult readers had difficulty carrying out an instruction when it contained "or," "not either/or" and "not both/and" conditions. Holland and Rose (1980) concluded that, in general, people can grasp "and" constructions ("A, B, C, and D") more easily than "or" constructions ("A, B, C, or D") or mixed ones ("A or B, and C or D").

A second group of studies demonstrates solutions to the problems of interpreting "and/or" conditions. These studies show that separating the parts of the condition usually helps readers go faster and make fewer errors. Three ways of separating, conditions appear to help.

One way is syntactically, by changing the wording. The Holland and Rose (1980) study found that separating the parts of an "or" construction by repeating the "or"s ("A or B or C or D") eliminated the ambiguity of that construction.

The second way is to separate the parts graphically, by putting them in a vertical list. A study by Wright and Reid (1973) found that simply listing the parts of a condition in separate prose statements improved how people followed instructions that had complex conditions.

A third way is to separate conditions structurally, by changing the instruction into an algorithm. In this method, the "and"s, "or"s, and "not"s are taken out and replaced by arrows or other special directions that show a reader how to proceed. A study by Holland and Rose (1981) found that algorithms helped readers avoid nearly all the errors they made with prose.

B-8.

Keep equivalent items parallel.

In a long sentence or paragraph, items or clauses that have the same relationship to a major idea should have parallel structure. In other words, the subordinate ideas should all have the same grammatical construction—all nouns, or all infinitives, or all active voice verb clauses, or all questions, etc. It is also a good idea to break up a long sentence with many parallel items into a list, set off by bullets or some other typographic device.

Explanation and Illustration

You will often find sentences (or paragraphs) in which several items or clauses have the same relationship to a major idea. For example,

> Before filling out this form, make sure you have *last year's income tax form, a copy of your current W-2 form, a number 2 pencil, a legal size envelope, and the address label from the bottom of the enclosed envelope.*

In this example, all the italic phrases refer to items that the person filling out the form needs to have. The items have parallel structure. Here's another example:

> In drafting this rule, you should take into consideration *who the audience is, what their specific concerns are, whether they are familiar with the policies and procedures of the department,* and *how they are likely to react.*

In this example, the italic clauses are *questions* that the drafter should have the answers to before drafting the rule. The questions have parallel structure.

In good writing, the subordinate ideas all have the same grammatical structure—that, is, all noun phrases (as in the first example), or all questions (as in the second example), or all active voice verb clauses, (you will open the door; you will set off the alarm...) or all infinitives, (to buy X, to mail Y...) or all participial phrases, (walking...,jogging...,bicycling..., baking cookies...), etc.

Sometimes, however, writers lose track of what they are writing, and begin to mix items with different grammatical structures. For example,

> **POOR:**
>
> a. Each appropriate office should designate responsible persons for clearance.
> b. The names of these designated persons should be forwarded to the Personnel Management Divisions.
> c. Remind administrative officers of their responsibilities as set forth in Order 3110.5.
> d. Delete initials from checklist and insert names.

In this example, the first two items are in the present tense, but the first is active and the second is passive. The third and fourth items are imperatives (commands). This example can be written into parallel structure by making all the items into imperatives.

BETTER:

Each appropriate office should:

a. Designate responsible persons for clearance.
b. Forward the names of designated persons to the Personnel Management Division.
c. Remind administrative officers of their responsibilities as set forth in Order 3110.5.
d. Delete initials from checklist and insert names.

When you have a sentence or paragraph with several parallel items or clauses, you can often make them easier to understand by making the items into a list. The list can then be set off with typographic devices, such as bullets (•), dashes (-), checkmarks(✓), or by numbers and letters. For example, the first example in this guideline could be reformatted like this:

Before filling out this form, make sure you have the following:

- a copy of last year's income tax form
- a copy of your current W-2 form
- the address label from the bottom of the enclosed envelope
- a number 2 pencil
- a legal size envelope

Note that the combined use of parallel structure and bullets makes the passage crisp and easy to read.

When you make a list, a related notion is to order the list in a logical sequence either a time sequence, a sequence of steps, or any order that is logical and reasonable for the material you are dealing with. For example:

In-case of fire, follow these steps:

(1) Leave your office.
(2) Set off the alarm.
(3) Find the nearest exit.
(4) Walk through the exit.
(5) Do not panic.

Other Related Principles

You can make sentences shorter by listing equivalent items (see Guideline B-2).

Sentences with excess information or many conditions often need to be broken up into lists of equivalent items (see Guidelines B-6 and B-7).

Qualifications

If you have only two or three parallel items in an occasional sentence, there is usually no need to break them into a list.

If you use too many lists with bullets, dashes, numbers, etc. in consecutive paragraphs, your document will look cluttered and start sounding choppy.

What the Research Says

We found no research that directly investigated the effects of parallel items on understanding. However, the research done on surface structure, or the external form of a sentence, does offer indirect support for the principle (reviewed in Fodor, Bever, & Garrett, 1974). Although these studies have not varied parallel grammatical form, they have looked at how reading is affected by other surface aspects of sentences that do not change sentence meaning. These aspects include the presence of redundant function words, relative pronouns, and the position of some words and clauses.

The presence of surface clues to what items in a sentence logically go together makes a big difference in how smoothly readers get through the sentence. The presence of grammatically parallel items is a salient clue that those items are equivalent.

B-9.

Avoid unnecessary and difficult words.

Many documents are full of words that are either unnecessary or unnecessarily difficult. These words make sentences longer and more complicated than they need to be. Many readers who don't understand the difficult words become so intimidated by them that they throw up their hands and won't even finish reading the document. Write to communicate; use words that most people understand.

Our goal in this book is to help you write in a direct, coherent manner that communicates clearly with your readers. We know that supervisors often like to see technical and legal words even when they are not necessary, but remember that your readers may not understand these terms. If your readers can't understand your document, it won't be effective. You can show your professional sophistication and expertise even when you write in everyday language.

Explanation and Illustration

When every paper that crosses your desk is full of unnecessary and difficult words; it is easy to develop the habit of using them yourself. You can break this habit by learning to recognize such words, and then avoiding them.

Cross out unnecessary words. Unnecessary words crop up in your writing when you use empty sentence introductions and redundant phrases. You can be sure a word or phrase is unnecessary if you can cross it out without changing the meaning of the sentence For example, you can cross out meaningless sentence introductions such as:

It is possible that . . .
This is to inform you that . . .
There are . . . (There is . . .)
It may be necessary to . . .

Compare the sentences below. The first of each pair contains a meaningless sentence introduction. Note that the meaning does not change when the introduction is crossed out.

POOR:

The purpose of this instruction is to set forth the policy and guidelines for the implementation of flexitime.

BETTER:

This instruction sets forth the policy and guidelines for the implementation of flexitime.

POOR:

There are three people who can sign this application.

BETTER:

Three people can sign this application.

Many redundant phrases are common expressions which writers use out of habit. You can usually cross out one or more words in these phrases without changing the meaning:

personal opinion
honest opinion
each individual
in addition to
positive benefits
reason why (OR the reason is because)

Writers sometimes use legal phrases that are redundant. For example:

each and every
any and all
full and complete
false and untrue
final and conclusive
null and void

This sentence:

> Each and every man here must stand up and be counted.

means the same as:

> Each man here must stand up and be counted.

And this sentence:

> I want a full and complete account of why the plan wasn't considered final and conclusive.

means this:

> I want a full account of why the plan wasn't considered final.

Sometimes writers are redundant because they want to emphasize something. Sometimes the emphasis is necessary and makes sense. For example, you could write:

> This is my *personal* opinion, not the opinion of the group I represent.

More often, though, a redundant phrase only makes the sentence longer without adding necessary emphasis.

Replace difficult words with ones your readers are likely to know. The only way to know whether a word is a difficult is to know who your readers are. A foreign affairs expert may have no difficulty understanding a word in a political science article that the average reader may find incomprehensible. The same foreign affairs expert may find the technical terms in a financial aid form too difficult. Even highly sophisticated readers appreciate straightforward, simple English. Many "fancy" words can easily be replaced by simpler words that more readers are likely to know.

The list below contains unnecessarily difficult words that writers commonly use and simple words that you can use to replace them. The list is by no means complete. Its purpose is to give you an idea of what unnecessarily difficult words look like. Notice that some of the these words are legal terms.

DIFFICULT	**SIMPLE**
administer	manage
aggregate	total
allocate	give, divide
constitute	make up
deem	consider
effectuate	carry out
enter (on a form)	write
for the duration of	during
herein	here
heretofore	until now
implement	carry out
indicate	show
initiate	begin
in lieu of	instead of
in the event that	if
issue	give
on behalf of	for
per annum	a year
prior to	before
proceed	go ahead
procure	get
promulgate	make, issue
provided that	if (or change sentence)
pursuant to	under
render	make, give
represents	is
said, same, such	the, this, that
solely	only
submit	send
subsequent to	after
terminate	end
to the extent that	if, when
utilize	use
with regard/respect to	for

Here are two pairs of examples that show how unnecessarily difficult words look in a sentence and how they can be replaced with perfectly good, simpler words to make the meaning clearer.

DIFFICULT WORDS:

This *represents* a change of eligibility criteria from the standard *heretofore utilized* by the Administration.

SIMPLE WORDS:

This *is* a change of eligibility criteria from the standard *used* by the Administration *until now*.

DIFFICULT WORDS:

The agency will *allocate* the funds so that the Special Action unit can *effectuate* the plan we *promulgated* last year.

SIMPLE WORDS:

The agency will *divide* the funds so that the Special Action unit can *carry out* the plan we *made* last year.

Define or explain technical terms that you cannot change. There are times when you cannot eliminate or change technical terms or legal terms of art, even though you know that some of your readers will not be familiar with those terms. You should define, explain, or give an example of these words when you use them.

One way that you can define a technical term is to put the definition or explanation in parentheses after the term the first time you use it. Here are two examples.

If you are self-employed, you may exclude (subtract) up to $100 from the total.

You did not qualify for full Social Security payment because you did not reach mandatory retirement age at the beginning of the tax year. (Mandatory retirement age is the age at which your employer makes all employees in your employee class retire because of age.)

You can also insert a full explanation or example right into the text, as in the following rewritten jury instruction.

There is a type of negligence that involves the conduct of the plaintiff, rather than the defendant. It is called "contributory negligence."

If a plaintiff is negligent, and his negligence helps his own injury, we say that the plaintiff is contributory negligent.

A plaintiff who is contributory negligent cannot recover money for his injury.

Other Related Principles

Nominals are examples of abstract, unnecessarily difficult words. They make a straightforward action into something that is more like a concept (see Guideline B-3).

You can make many words simpler by replacing them with personal pronouns. For example, you can use "you" instead of "lessee" (see Guideline B-2).

If you cross out unnecessary words, your sentences will be shorter and easier to understand (see Guideline B-5).

Qualifications

You should write each document with your readers in mind. A legal term for an audience of lawyers, or a technical chemical term for chemists, may not create problems. But a legal or technical term for another audience might very well be contusing. Even among lawyers or chemists, people in one subspecialty may not understand the technical terms from a different subspecialty. You can use more difficult words when a simple word can't replace it or when the simpler word doesn't carry the same meaning.

What the Research Says

Research supports the position that "difficult" words impede prose comprehension. This research defines hard words by properties such as familiarity, length, pronounceability, concreteness, and complexity of meaning.

Researchers have examined these properties independently. Each property appears to contribute to reading difficulty.

Words that are less frequent (Thorndike & Lorge, 1944) and that are defined as harder by the other properties mentioned above take longer to recognize and name (Gibson, Bishop, Schiff, & Smith, 1964; Reicher, 1969; Wheeler, 1970). Harder words, and the sentences they belong to, are harder to remember (Jorgensen & Kintsch, 1973; Anderson, 1974). Sentences and text containing harder words take longer to read (Graesser, Hoffman, & Clark, 1980; Gibson & Levin, 1975), and the reading takes more effort, as measured by how well readers do on a second ongoing task (Foss, 1969). Sentences containing harder words take longer to use in various meaningful tasks, such as judging a sentence as true or false, or solving a reasoning problem (Clark, 1969; Just & Clark, 1973; Clark & Chase, 1972).

The results of these and other studies of word difficulty are reviewed in Cofer and Musgrave (1963), Dixon and Horton (1968), Paivio (1971), and Clark and Clark (1977). Studies by Kintsch (1974), Gentner (1978), and Thios (1975), on the other hand, suggest that people understand and remember sentences with more complex words, like "wander," better than sentences with simpler words like "move." The more specific word (i.e., "wander") seems to aid understanding even though it is more complex. These results suggest that making text easy for the reader is a matter of balance between finding specific words and avoiding words unfamiliar to readers.

The remaining part of the guideline—avoid unnecessary words—has not been specifically addressed in research studies. We have indirect support, however, from the research of Coleman (1962) and Kintsch and Keenan (1973) that short sentences and less dense sentences aid reading.

B10.

Unstring noun strings.

Noun strings—sequences of nouns, in which the first nouns modify later ones—are often difficult for readers to understand and give a bureaucratic tone to documents. Breaking long strings of nouns into shorter phrases will make your writing less stilted and easier to read.

Explanation and Illustration

Noun strings are sequences of nouns (with an occasional adjective) in which the first nouns act as adjectives to modify later nouns. For example,

> product extension mergers

(The first two nouns modify the noun mergers.)

> option period rates
> antitrust enforcement scrutiny
> pricing factor analysis
> consumer information seeking behavior

Noun strings lack the "little" connecting words, such as *of*, *for*, *about*, *in*, and the possessive marker, *'s*, that would clarify how the nouns are related to each other. Let’s see how the noun strings listed above sound when the "little" connecting words are inserted:

> rates for the option period
> scrutiny of the antitrust enforcement
> analysis of pricing factors
> consumers’ behavior in seeking information

Adding the connecting words increases the number of words in the phrase, but the phrase is easier to understand.

You will not usually have to worry about unstringing two-noun strings (e.g., Budget Office, price analysis) because most readers can handle them easily. However, as noun strings get longer they become harder to understand. You should break down long noun strings into smaller pieces and supply the missing connecting words. Consider these sentences with long noun strings (in italics):

> **LONG NOUN STRING:**
>
> The military agency published a *host area bomb shelter production planning workbook.*
>
> **REVISED SENTENCE:**
>
> The military agency published a workbook that tells people how to plan the production of bomb shelters in the host area.

LONG NOUN STRING:

The City of Phoenix terminated its arson control assistance program.

REVISED SENTENCE:

The City of Phoenix terminated its program to assist people in controlling arson.

Most readers would, agree that these sentences, with strings of seven and four nouns respectively, are more cumbersome and harder to read than the revised sentences. But think how much harder it would be to read and comprehend page after page of sentences packed with long noun strings!

Noun strings became a real problem for readers under four sets of circumstances:

1. When it is unclear how the nouns relate to each other, e.g.:

   - product extension mergers
     (Are these mergers of product extensions? Or extension mergers of products?)

2. When the noun string is preceded by an adjective, and it is unclear what the adjective modifies, e.g.:

   - special enforcement policy treatment
     (Is the enforcement special? Or the treatment?)

   - local school food authority
     (Is the school local? Or the authority?)

3. When the noun string is too long, e.g.:

   - host area crisis shelter production planning workbook

4. When the noun string hides jargon terms that aren't clear even when you unstring the noun string.

   - product extension merger
     (What is a product extension or an extension merger?)

In all these cases, the reader has to work hard to understand what is going on. To give yourself a chance to see and hear what noun strings "sound" like when you read them in typical prose, read the following passage. This passage is from a government document on waterfront parks. The noun strings are in italics.

> We must understand who the initiators of *water-oriented greenway efforts* are before we can understand the basis for *community environment decision making processes. State government planning agencies and commissions* and *designated water quality planning and management agencies* have initiated such efforts. They have implemented *water source planning and management studies* and have aided *volunteer group greenway initiators* by providing *technical and coordinative assistance*.

Now, read the revised passage. It's a little easier to read and understand without the long noun strings. The "little words" which unstring the noun strings are in italics.

> We must understand who the initiators of efforts *to* promote water-oriented greenways are before we can understand the process *by which* a community makes decisions *about* environmental issues. Planning agencies and commissions *of the* state government and agencies *which* have been designated to plan and manage water quality have initiated such efforts. They have implemented studies on planning and managing water resources and have aided volunteer groups *that* initiate efforts *to* promote greenways by providing them with technical advice and assistance in coordinating their activities.

Other Related Principles

Because many noun strings contain nominals, rewriting the nominals as verbs will help you unstring those noun strings (see Guideline 8-3).

Qualifications

If the noun string is the name of a program (e.g., Food Stamp Program), or equipment (e.g., air blower control lever), or office (e.g., Document Design Center), you obviously will not be able to unstring it, but you should avoid adding other nouns to these names.

What the Research Says

We know of only one study that has directly looked at the effects of noun strings on comprehension. Gleitman and Gleitman (1970) found that people had difficulty in paraphrasing noun strings that were novel combinations of simple words (e.g., "bird house dish"). The results showed that many such strings either could not be interpreted or were inconsistently interpreted. The study revealed that ease of interpretation was highly dependent on level of education: people with advanced graduate degrees produced quicker and more systematic paraphrases than did those with no more than a high school degree.

Two areas of research provide indirect support for this principle. First, because noun strings delete articles, prepositions, and other function words, they pack content words more closely together than when the strings are untangled. Thus, sentences with a noun string are always more dense in terms of information than are their unstrung counterparts. Research on "lexical density," as this factor of word packing has been called, indicates that more dense sentences are harder to remember (Perfetti, 1969 a, b).

Second, noun strings afford few "surface clues," or grammatical signals that show what role the content words play in a sentence. For noun strings, the missing signals include the prepositions, articles, and normal subject-object order that are found in the untangled strings. Fodor, Bever, and Garrett (1974) found that sentences without surface clues took longer to understand than when the clues were present.

B-11.

Avoid multiple negatives.

Positive sentences are easier to understand than negative ones. Two or more negative words in a sentence become very hard for readers to understand. When sentences have two or more negative words, many readers will stop and ask themselves, "What did that say?" and then reread the sentence at least one more time. If you avoid using two or more negatives in a sentence and instead write positive statements, your prose will be easier to read.

Explanation and Illustration

There are different kinds of negative words. The most obvious negatives are *negative* words such as:

no
not
none
never
nothing

Another common type of negative is the *negative affix*, which is attached directly to the beginning or end of a word. For example,

non-	nonexistent, non-flammable
un-	unhappy, undo
dis-	disentangle, disillusioned
de-	detach
in-	inefficient, ineffective
il-	illegitimate
ir-	irresponsible, irregular
ex-	exclude
-less	hopeless, hapless

There are also negatives that are less obvious words that have a negative meaning, but that don't necessarily look negative. For example,

absent	empty
deny	limit
reject	proscribe
wrong	forbid
fail	except
doubt	unless
foreswear	until

Any of these kinds of negatives used alone in a sentence is usually fine. The sentence will probably be clear and most readers will probably understand it, as these examples show.

That is *not* my argument.
You *never* sign your name on this form.
She is an *irresponsible* executive.
It is a *nonexistent* problem.
The engine *failed*.

The problems start when you add more negatives. If you put any two negatives together in a clause, you make the clause positive. And readers have much more trouble understanding a double negative than the equivalent positive sentence. Consider these sentences:

This negative sentence	**MEANS**	**this opposite sentence**
He was *not absent*.		He was present.
Wyoming is *not unlike* Utah.		Wyoming is like Utah.
The procedure, will *not* be *ineffective*.		The procedure will be effective.
Don't exclude me!		Include me!
She did *not fail* the test:		She passed the test.
It was *never illegitimate*.		It was always legitimate.

It should be obvious to you that it takes a little more time and more work to grasp the meaning of the sentences in the left column than those in the right. It would take even longer and entail more work if the multiple negatives were in long sentences that contain complex ideas.

One of the most common problems in business and government documents is double negatives of the sort:

not . . . . unless
not . . . . except
not . . . . until

What these double negatives really mean is the following:

not . . . . unless = only if
not . . . . except = only if
not . . . . until = only when

Thus,

No clause can become valid *unless* approved by the Company.

really means:

A clause becomes valid *only if* the Company approves it.

and:

Do not use this procedure *except* when the airplane is landing.

really means:

Use this procedure only *when* the airplane is landing.

When you have more than two negatives in a single clause of a sentence, or even within a single sentence, you are probably creating a severe comprehension problem for your readers. The following example from a government regulation is almost impossible to untangle because of the many negatives in it (the negatives are underlined):

§ 928.310 PAPAYA REGULATION 10.

Order. [a] No handler shall ship any container of papayas (except immature papayas handled pursuant to **§**928.152 of this part):
(1) During the period January 1 through April 15, 1980, to any destination within the production area unless said papayas grade at least Hawaii No. 1, except that allowable tolerances for defects may total 10 percent: *Provided*, That not more than 5 percent shall be for serious damage, not more than 1 percent for immature fruit, and not more than 1 percent for decay: *Provided further,* ...

The solution is to use negatives only when absolutely necessary, and avoid using two or more negatives within a single sentence.

Other Related Principles

Using multiple negatives is often a case of saying something simple in an unnecessarily complicated way (see Guideline B-9).

Qualifications

While an occasional sentence with a double negative will be tolerated by most readers, and while you may sometimes want the precise shade of meaning of some double negatives (e.g., not unlike), it is usually better to avoid them.

What the Research Says

A variety of studies have looked at both single and multiple negatives. Most results confirm that negation in either form complicates understanding. Some results suggest that negation in certain contexts may help understanding.

Among the studies that demonstrate the advantage of positive sentences over negative sentences are those by Clark and Card (1969), Mehler and Miller (1964), and Savin and Perchonock (1965). These studies found that positive sentences are recalled better. Wason (1961), Trabasso, Rollins, and Shaughnessy (1971), Just and Clark (1973), and Just and Carpenter (1976) found that positive sentences could be judged true or false faster and more accurately than negative sentences. In addition, Clark (1969) and Roberge (1976) both found that it was easier to reason with positive sentences.

Other studies have looked at various forms of negative expressions. These include, most commonly, negation in the form of a "not" in a sentence; negation of a word, such as "unhappy" (Sherman, 1976); and negation that occurs implicitly, within a word, such as "forget" vs. "remember" (Just & Clark, 1973). Moreover, Sherman (1976) found that sentences get harder to understand the more negative terms they contain.

The studies cited here and others are reviewed in Clark and Clark (1977) and Wason and Johnson-Laird (1972).

Section C

This section presents six guidelines that influence how text is arranged on a page. The typographic principles that they discuss will help you produce a visually appealing document as well as one that is easy to read. Readers are more likely to use a document if the text is arranged well on the page. Well-arranged text not only makes the document more inviting and physically easier to read, but can also aid the readers' understanding of the material. Some of the principles require the services of professional typesetters and printers and you may not be able to apply them. However, knowledge of these principles will help when you meet with designers and printers.

C-1.

Use highlighting techniques, but don't overuse them.

Highlighting techniques are a visual way of calling attention to some part of a document. Bold face, italics, underlining, and color are common highlighting techniques. You can use them to emphasize important parts of a document and to make certain parts distinct from others.

Highlighting techniques make documents look better by providing visual relief in an otherwise uniform page of text. However, overuse of highlighting techniques can make the document cluttered and confusing.

Explanation and Illustration

You can use highlighting techniques in a variety of ways to emphasize important points, to set off examples from the rest of the text, to make the parts of the text distinct by calling attention to the headings. The examples below illustrate some uses of highlighting techniques.

General rule. The purpose of the Equal Credit Opportunity Act is to ensure that credit is made available fairly and impartially. The law prohibits discrimination against any applicant for credit because of <u>race</u>, <u>color</u>, <u>religion</u>, <u>national origin</u>, <u>sex</u>, <u>marital status</u>, or <u>age</u>, or because the customer receives income from any <u>public assistance program</u>, or because the customer has exercised rights under <u>consumer credit laws</u>. These are the "prohibited bases" under the law.

Creditors may continue to evaluate credit applicants on the basis of their willingness and ability to repay. However, the law does impose certain restrictions on the questions you may ask and the way you consider information. You should review your application forms and your procedures for taking and evaluating credit applications, to make sure you are complying with the following specific rules and that, in general, you apply your standards of creditworthiness evenly.

In this document, bold face is used to call attention to headings and key points are underlined.

Rules on obtaining information. When a customer applies for credit, you may **not**:

- ask the applicant's sex, race, color, religion, or national origin.

- ask about birth control practices or plans to have children.

In this document, the author uses bold face for an important point and italics to give an example.

You're covered for any accident involving an auto you own, borrow, rent or use as a temporary substitute. We'll also cover accidents during maintenance, loading and unloading. **And we'll cover your liability to the owner for damage to an auto you borrow or rent**.

We'll also cover anyone else who uses a covered car with your permission provided it's used for the purpose you intended.

You're transferred from New York to California. You and your family go by plane, so you hire Mike, a college student, to drive the family car west. Mike has an accident in which a passenger of the other car loses his right arm. Mike is sued for $500,000. Mike has no insurance, but he's covered by your automobile policy up to $300,000. We cover him too, and negotiate a settlement for $100,000 for our part of the coverage.

Under this section we'll cover all relatives living with you and anyone under 21 in your or their care. They're covered for any accidents involving an auto they own, rent or use as a temporary substitute.

In this document, the author uses bold face and white space to set off an example.

If you want additional coverage for items or collections of greater value, it's available. But you must arrange for it through your agent. In any case, you pay the first $500, and our maximum protection of $500,000 applies to the total damage or loss from any one accident or incident. Here is an example:

Your home if broken into. A, diamond necklace and $2,000 in cash is taken. The necklace was worth $3,500 so your total loss is $5,500. You pay the first $500 and we pay the rest up to our limits. You're covered for $2,000 for the loss of the necklace and all of the $2,000 in cash. We send you a check for $4,000. If you had arranged for full coverage for the necklace, you'd only pay the first $500. We'd send you a check for $5,000.

Headings in this document are made distinct by using boldface. The first sentence of each paragraph is also emphasized with bold face.

PLAN FOR VARIETY

Plan to include a wide variety of foods from day to day.

Do not use the same food on consecutive days—meat balls with spaghetti on Monday and beef patties on Tuesday.

Do not use the same food on the same day of each week. Each Monday should not be "hot dog" day nor Tuesday "chicken and mashed potato" day.

Plan for a variety of types of lunches. Plan lunches around a casserole, a soup and sandwich or main dish salad.

Plan to include different forms of foods prepared in different ways. Lists of various main dishes, ways to prepare vegetables and suggestions for variety in breads will be helpful.

Do not use two foods prepared in the same way in the same lunch—two creamed dishes or two casserole-type dishes.

Do not use foods prepared in the same way each time they are served—vegetables can be served raw or cooked, peeled or unpeeled, creamed, scalloped with different sauces or seasonings—but be sure the "different way" of serving is as good or better than the "usual way."

The reader's attention is called to an important point with boldface type. The heading uses bold face in a larger type size.

What Is Equal Credit Opportunity?

The law says that a creditor may not discriminate against you—treat you less favorably than another applicant for credit—because of your sex or marital status.

Just because you are a woman, or single, or married, a creditor may not turn you down for a loan.

The rules that follow are designed to stop specific abuses that have limited women's ability to get credit.

Color is another good highlighting technique. It makes documents look less cold and official. In documents with many parts, color is particularly useful to show which parts belong together.

If you overuse one highlighting technique in a document, or use too many different ones, you will defeat your own purpose. When too many parts of the document are made to look important or distinct, no one part will seem especially important or distinct. Too many different highlighting techniques in one document will also give it a cluttered look.

Your readers will be confused if you don't use highlighting techniques consistently. For example, if you put some headings in italics and others in bold face, the readers will wonder what the difference means. If there isn't any difference, you'll only confuse your readers.

Other Related Principles

White space can be used as a highlighting technique. Isolating headings or parts of the text in white space will call attention to them (see Guideline C-4).

Qualifications

In some cases, using italics, bold face, and color is impractical because they require a typesetter or a graphic artist. However, if a typewriter is your only resource, you can still make good use of underlining and white space, and you can substitute capitals for boldface (but don't use all capitals for more than a few words at a time).

What the Research Says

Considerable research supports the general value of typographic cues for highlighting specific information in text.

Crouse and ldstein (1972) found that college students understood and remembered underlined information in a long text passage better than when the same information was not underlined. This is consistent with an earlier finding by Cashen and Leicht (1970) who found that college students not only recalled underlined passages better but recalled more information adjacent to the underlined passages as well. Other studies confirm that underlining improves recall and comprehension, especially when readers do the underlining themselves (e.g., Fowler & Parker, 1974; Rickards & August, 1975; Fass & Schumacher, 1978). While document designers cannot expect readers to underline material in most public documents, these studies support the overall effectiveness of underlining as a highlighting technique.

Some researchers have examined color as a highlighting technique. Katzman and Nyenhuis (1972) found that college students recalled more information from color than from black and white photographs and also rated the colored ones more attractive and interesting. Chute (1979) reviewed the use of color in a variety of media forms and concluded that color cueing can promote better learning of task-relevant material for both high and low aptitude learners.

Bold face type is also an effective highlighting technique. Foster and Coles (1977) found that bold face helped college students comprehend information. Poulton and Brown (1968) and Salcedo, Reed, Evans, and Kong (1972) confirmed that bold face is an effective cueing technique and can help readers comprehend information and follow directions.

While research supports specific highlighting techniques, there is evidence against combining too many techniques. Hershberger and Terry (1965) and Glynn and DiVesta (1979) found that multiple cueing can be confusing and can detract from understanding.

C-2.

Use 8 to 10 point type for text.

For most documents, 8 to 10 point type is the most readable size.

Readers will often skip over text which is printed in type that is too small. Small type strains the eye and puts too much information in too little space. It makes a document look crammed and uninviting.

Type that is too big uses more space than is necessary and can be expensive. Too little information in too much space makes reading tedious and inefficient. Readers tend to perceive each word in parts, rather than as a whole.

Explanation and Illustration

Typesize is measured in points. A point is 1/72 of an inch. The larger the number of points, the larger the type.

EXAMPLE:

6 Point	10 Point
8 Point	11 Point

Point size alone will not tell you how big the type will look. You must also take into account the type face—the shape of the letters. Two different typefaces in the same point size have a different visual size: one will look bigger than the other. For example, 10 point Century (a kind of typeface) looks bigger than 10 point Univers (another kind of typeface).

This is an example of 10 point Univers Type.
This is an example of 10 point Century Type.

Choose typesize according to visual size, not point size alone.

You should choose a typesize that is easy to read and pleasing to the eye, and which makes the most efficient use of space. For most documents, 8 to 10 point type will do this.

Compare the two following passages. The first one is printed in 7 point type and the other in 10 point type. Note how much easier it is to read 10 point.

```
        Your meter was changed during the consumption period covered by
these first statements. This situation means that you will receive two
statements for the consumption period which is currently being billed.

        The enclosed statement covers the period from the end of the last
consumption period to the date the meter was removed. In a few days you will
receive a second statement which will cover the period from the installation
of the new meter to the end of the normal consumption period.
```

```
      Your meter was changed during the consumption
period covered by these first statements. This
situation means that you will receive two statements
for the consumption period which is currently being
billed.

      The enclosed statement covers the period from
the end of the last consumption period to the date
the meter was removed. In a few days you will receive
a second statement which will cover the period from
the installation of the new meter to the end of the
normal consumption period.
```

This book is set in 10 point Arial medium with 12 point bold face headings. The examples are generally set in 9 point Arial type.

Other Related Principles

When you choose the typesize, remember that typesize affects the length of each line of text. Lines of text which are too long or too short are hard to read (see Guideline C-3).

Qualifications

Although 8 to 10 point type is a good size for most documents, it is not the right size for all documents. Reference books, for example, are usually printed in type that is smaller than 8 point because readers need to use them only briefly to look something up. You must make your own judgment about the best typesize for each document according to its purpose and your audience.

What the Research Says

Research generally confirms writing experts' judgments that 8 to 10 point type is easily read for most kinds of printed text and typefaces. Poulton (1955) found that the most legible typesize for a variety of typeface's ranged from 9 to 12 point. Davenport and Smith,(1963) in studying newspaper print concluded that there is little difference in legibility for adult readers between 7.5 and 9 point type. Tinker (1965), in summarizing his and other research, defined the most legible typesizes to be either 9, 10, 11, or 12 point. Hartley (1978) supported Tinker's interpretation of the research with the added proviso that 8 point type is a reasonable typesize for some instructional text.

C-3.

Avoid lines of type that are too long or too short.

A document is easier to read when there is neither too much nor too little information in each line of type. The reader's eye should move at a pace that it is used to and that is comfortable for the amount of information being taken in. Optimal line length for most text is 50 to 70 characters. This is a good length because experience has shown that it's not so long that it tires the eye, and not so short that the eye must keep jumping back and forth.

Explanation and Illustration

Long lines of type keep going when the reader's eye is ready to move to another line. This makes reading tiring and uncomfortable. The eye won't stay on course, but will tend to stray to another line. Also, long lines make the margins too small, which makes the whole page look crammed. In the example below, the lines of type are too long.

You must apply IN PERSON between the hours of 8:15 A.M. to 4:00 P.M., Monday through Friday only, with this completed form to the MUNICIPAL CENTER OFFICE to renew your permit. On each renewal, AFTER AGE 70, you must have a physician complete the certificate below and pass an eye test and a psycho-physical (reaction) test. In addition to the requirements shown for persons having reached AGE 70, AT AGE 75, you must pass a written test on District of Columbia traffic regulations and a driving test.

On the other hand, lines of
type that are too short require
too much eye movement.
They cause the eye to move
in a jerky pace and create
awkward breaks in the text.
To read many pages of this
would be a chore.

The lines in this book range up to 80 characters, but the large typesize and easy to read typeface make the lines of type comfortable to read. We did not go to two columns of type because of the many examples. In many documents, you can use two columns to keep the line length to 50-70 characters. This length allows the reader to move at a comfortable pace and leaves enough room for good-sized margins.

Other Related Principles

Since typesize affects line length, you must take typesize into account when deciding about line length (see Guideline C-2). Line length also affects the amount of white space in margins (see Guideline C-4).

Qualifications

A few lines of type that are either "too long" or "too short" aren't going to cause the reader a real problem. The problems come when there are many pages of long or short lines.

There may be times when for aesthetic reasons or for emphasis you might want to set off a brief passage with short lines.

What the Research Says

The most comfortable line length to read depends on other typographic factors such as typesize and typeface. On the basis of existing research, Tinker (1965, 1969) recommends an optimum line length of 10 to 12 words per line, or about 50 to 70 characters, for most conventional typesizes. Larger typesizes have fewer number of words per line than smaller typesizes, but the optimal line widths still range between 50 to 70 characters (Tinker & Patterson, 1963; Rehe, 1974).

C-4.

Use white space in margins
and between sections.

When you use white space well, the document looks better and is easier to read. You can use white space to inform readers about what is important in the document and where its parts begin and end.

Explanation and Illustration

White space is the blank space without any type. It is as much an element in the design of a document as the type itself. You should use white space deliberately and not just let it fall where it may.

You can use white space in margins to keep the document from looking crowded. A crowded document, like the one below, is uninviting and hard to read.

> **Part 2**
> **Personal Injury Protection**
> The benefits under this Part are commonly known as "PIP" or "No-Fault" benefits. It makes no difference who is legally responsible for the accident.
> We will pay the benefits described below to you and other people injured or killed in auto accidents. For any one accident, we will pay as many people as are injured, but the most we will pay for injuries to any one person is $2,000. This is the most we will pay no matter how many autos or premiums are shown on the Coverage Selections page.
> We will pay three kinds of benefits:
> **A. Medical Expenses**
> We will pay all reasonable expenses incurred as a result of the accident for necessary, medical, surgical, X-ray and dental

Use white space to inform your readers. You can emphasize important text by isolating it in white space. White space between sections reinforces the reader’s understanding that one part has been completed and that another part is beginning. It is a visual way of illuminating the organization of the document.

The document on the next page is a designed version of the example we’ve just shown you. Notice the difference in the general appearance of the documents when you first glance at them. The one on the next page looks less crowded. There is more white space in the margins and between the lines.

Part 2
Personal Injury Protection

The benefits under this Part are commonly known as "PIP" or "No-Fault" benefits. It makes no difference who is legally responsible for the accident.

We will pay the benefits described below to you and other people injured or killed in auto accidents. For any one accident, we will pay as many people as are injured; but the most we will pay for injuries to any one person is $2,000. This is the most we will pay no matter how many autos or premiums are shown on the Coverage Selections page.

We will pay three kinds of benefits:

A. Medical Expenses
We will pay all reasonable expenses incurred as a result of the accident for necessary medical, surgical, X-ray and dental

This version of the document does a better job of informing the reader: The sections are more clearly differentiated with greater amounts of white space between them. The reader's attention is drawn to the headings because they are isolated in white space.

There is no one correct arrangement of white space. How you use white space is a matter of style and visual appeal. Different ways of using white space serve different purposes. In the document below, the white space in the left margin has been used for headings which guide the reader.

LEASE

I. WHAT I AGREE TO DO

MONEY

1. I will pay you $ ________ as rent every _________________. I will pay the rent to you at this address: ____

Rent money

Today I am paying you $_______________ which is the rent until ______________________
On ________________ I will pay you $ ____________ which is the rent until _____________

After that, I will pay the rent of $ ________ for each ______ before the start of that _______

Key money

2. I will pay $ ______ for the use of ___ keys which you are giving me today. When I leave, I will give you back ___ keys and you will give me back my money if I have ended my lease in the right way.

Promise money

3. I will pay you $ __________ which you can keep while I live in the property I have rented. If I break any of my promises under this lease and it costs you or the landlord money, the cost can be deducted from what I have paid. After I leave, you may use as much of the money as you need to clean the property and fix anything I have broken. The rest of this money you must return to me as soon as possible after I leave.

KEEPING UP THE PROPERTY

Good repair

4. I have looked at the property and found it to be in good condition. I understand that you have made no promises about the condition of repairs. I promise to keep the property in as good a condition as it is now. I will pay for any damage beyond reasonable wear and tear.

Negligence

5. I will pay for damage caused by negligence. Negligence can mean something I did (example my child breaks a window with a baseball) or something I failed to do (example: I forgot to turn the water tap off and the floor is damaged).

Plumbing

6. If I tell you within five days after I move in that any drains are clogged, you will have them fixed at your expense. After that, I will pay for any work that needs to be done to keep all waterlines (sink drains, commode, and sewer lines) open.

Other Related Principles

Lines of type which are too long make the margins too small (see Guideline C-3).

White space can be used effectively with headings (see Guideline A-3) and with different highlighting techniques (see Guideline C-1).

Qualifications

Using white space is important in document design; but with the exception of isolating headings, it is more a matter of visual appeal than it is a crucial factor in the nuts and bolts of readability.

What the Research Says

There is little reported research on the effects of white space because its influence can't be separated from other design factors such as line length, headings, spacing between words, and indentation. One study done with a short news story found that readers rated versions with wide margins more appealing than versions with little white space, but there was no difference in understanding the story (Smith &McCombs, 1971). Drew, Altman, and Dykes (1971) found that undergraduate teachers-in-training rated instructional materials that had white space which clearly differentiated sections higher than materials without these features. This effect, however, was found only when two versions were directly compared against each other. When the two versions were rated separately, there were no significant differences. Other indirect research support comes from Tinker (1965, 1969) who found that a line length of 50 to 70 characters, which leaves ample white space in margins, is more readable than longer line lengths.

C-5.

Use ragged right margins.

Many readers find documents with ragged right margins more inviting and easier to read than documents with even margins. Although this preference is a matter of taste and tastes change, it is worth taking into account when you design a document.

Explanation and Illustration

When lines of text are different lengths, the right margin is uneven or "ragged." This book uses ragged right margins.

When lines of text all end in the same place, the right margin is even, and the lines are said to be justified.

> This paragraph illustrates text set flush left and flush right. This is called justified type. The left and right margins are both even. To make the right margin even, the printer puts extra spaces between words and letters all along the line.

Ragged right margins are less formal than even margins. They give the document a more relaxed, contemporary look that many readers find more inviting.

Some readers find that ragged right margins make the text easier to read. When each line looks different, the eye is less likely to stray to another line because it can quickly separate and identify each line. Also, the eye does not have to adjust to the different spacing between letters in each word which is necessary to justify the type. In contrast, justified type may be harder to read because the lines do look the same, and the spaces between letters are different in each word.

There are other advantages to ragged right margins. Some printers have found that using ragged right margins reduces production costs. Also, it is easier to make corrections in a document with ragged right margins because there is more space at the end of each line in which to make them; every line does not have to be changed.

Other Related Principles

Using ragged right margins is an example of how the use of white space affects the way a document looks (see Guideline C-4).

Qualifications

Although many readers currently prefer ragged right margins, their use is not crucial to readability. As tastes change, so may this principle.

What the Research Says

In general, research shows little difference between justified and unjustified margins. Gregory and Poulton (1970), however, found that poor readers had more difficulty reading justified text. Other studies found no difference for adult readers in either reading speed or comprehension between justified and unjustified text (Fabrizio, Kaplan, & Teal, 1967; Hartley & Mills,1973; Wiggins, 1967). In another study Hartley and Burnhill (1971) compared different arrangements of unjustified text only and found no differences in reading speed or comprehension. The general conclusion is that unjustified and justified text are equal (except for poor readers) but unjustified text should always be considered because it reduces production costs, it is easier to correct, and it is currently preferred by many document designers.

C-6.

Avoid using all caps.

Many business and government documents contain notices or other large blocks of text that have been printed in ALL CAPS (all capital letters) for emphasis. However, using all capital letters actually interferes with the legibility of text. If you want to highlight or emphasize part of a document, do not use ALL CAPS. Instead, use bold face, or italics, or color for that purpose.

Explanation and Illustration

Statutes and regulations often require that certain parts of legal documents be highlighted in some way, so that they are more noticeable to the reader. Other times, document designers want to make certain that sections of their document's text stand out. There is a misguided notion that printing a block of text in ALL CAPS will make the text more noticeable, and the message it contains more emphatic.

Writing a block of text, or even a few sentences in ALL CAPS makes the text harder to read. One of the ways readers have of differentiating letters is by their shape. The shapes of lower-case letters are more distinctive than those of capital letters. For example,

FLASHLIGHT BATTERY

Flashlight Battery

Research has shown that a block of text in ALL CAPS is harder to read and takes longer to read than the same block in caps and lower case. Furthermore, when you have more than three or four words in ALL CAPS, you lose the effect of emphasis. For example,

POOR:

WORN OUT TIRES WITH LESS THAN 2/32 INCH TREAD RECEIVE A REPLACEMENT ALLOWANCE, OFF THE ORIGINAL PURCHASE PRICE, OF 50% DURING THE FIRST QUARTER OF PERIOD.

BETTER:

Worn out tires with LESS than 2/32 inch tread receive a replacement allowance, off the original purchase price, of 50% during the first quarter of period.

If you want to make the text stand out and easy to read and understand, do not specify ALL CAPS. If you want to give emphasis to a piece of text, there are other graphic techniques that you can use. You can use bold face type, italics, or color. For example,

WHO IS COVERED	(All caps)
Who is covered	(Bold)
Who is covered	(Italics)

You can also place important information in a prominent place in the document, and use an eyecatching heading to call attention to it.

Other Related Principle

When you want to stress more than a few words in a text passage, consider such highlighting techniques as underlining, bold face, and italics (see Guideline C-1).

You can make a word or very short phrase (say, four words or less) in ALL CAPS standout even more by surrounding it with white space (see Guideline C-4).

A word or very short phrase will help readers understand the relationship between topics in a document if used as a major heading in a document (see Guideline A-3) and in tables of contents (see Guideline A-4).

Qualifications

You can use ALL CAPS effectively for major headings, and to emphasize individual words and short phrases in the text.

What the Research Says

The research consistently supports the belief that words and phrases in all capital letters take longer to read, are hard to read, and require up to 30% more space than words set in lower case. Tinker (1969) summarized his early research in this area and concluded that all caps cause difficulty because they produce uniform word-shapes that give no cues for deciphering the words. Research by Foster and Coles (1977) found that bold face helped college students comprehend information better than all caps because bold face gives better cueing to readers. Other research by Poulton and Brown (1968) with teleprinter output, and by Salcedo, Reed, Evans and Kong (1972) with pesticide labels, confirm that long strings of capitals are harder to read than lower case and bold face letters.

Section D

The four guidelines in this section present some alternatives to prose that will help you to explain what you are writing about: Guideline D-1 shows how you can use illustrations to supplement the written content of a document. Guidelines D-2 through D-4 explain various graphic devices you can use to show numbers, trends, and other quantitative information.

D-1.

Use illustrations to supplement text.

Pictures and other kinds of illustrations have been used in textbooks for students of all ages. These illustrations serve many different purposes; but, in general, they are meant to help students better understand the information being presented. Illustrations are also useful in business and government documents. As an alternative to prose, illustrations not only can "take the place of a thousand words," but they can make the document more interesting and more understandable to the reader as well.

Explanation and Illustration

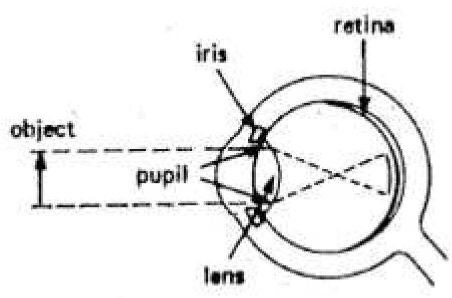
There are many different kinds of illustrations—photographs, drawings, diagrams, maps, and flowcharts, to name just a few. Because you can use these different kinds of illustrations in so many different ways, for so many different kinds of documents, we cannot offer you an exhaustive set of guidelines that covers all possible uses. We will demonstrate how you can use a few of these illustrations to supplement written text, and encourage you to consider illustrations whenever you are trying to get readers to understand what you are writing about.

You must have a reason to use an illustration. If you think an illustration will help explain the points you are writing about in the document, or will help the reader to remember a certain topic, or will help the reader to *keep interest*, then you should consider using an appropriate illustration. Remember, however, that you must have high quality illustrations to support written text effectively.

Photographs. You can use photographs when you want to sustain the reader's interest and motivation in a document, or when you want to show the reader what something "looks like." Photographs have a high degree of realism, and they best support text when you want to demonstrate the visual reality of the topic being written about. You must use good quality photographs.

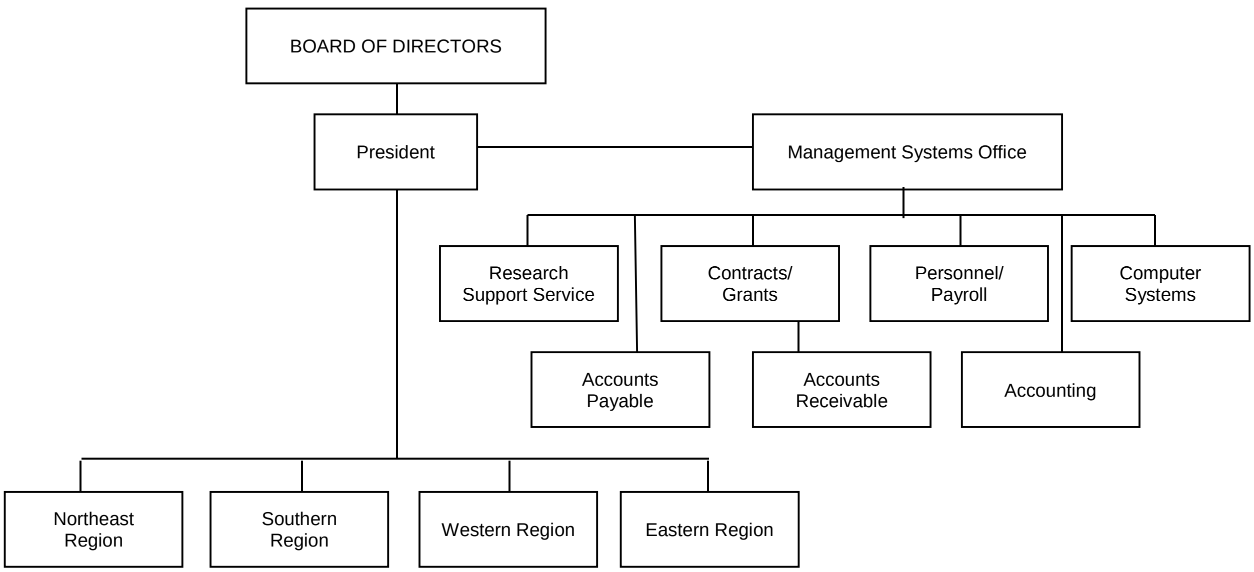
Line Drawings. Line drawings are less realistic than photographs but in many circumstances they are more effective than photographs. You should consider line drawings when you want to explain and emphasize only *certain* features of a complex topic and not other features. Good line drawings will instruct your readers by showing rather than by telling, they will enhance what you've written in the text, and they will save you writing many words.

Consider this simple line drawing of the eye.



If you were writing instructions for a general audience on the main parts of the eye and how it works, the line drawing would be useful because it points out the important parts; it helps explain what might have been written about how the eye works; and it saves words. A photograph of the eye or a complex line drawing that shows more intricate structures would not be as effective because they would show more detail than is needed. Written text alone would be even harder to understand.

Diagrams. You can use diagrams effectively when you want to explain a complex organization or a detailed procedure consisting of many steps, Here's a diagram of the organization of a large company.



It should be obvious to you that if you were to describe the organization shown in the diagram and discuss how each unit is interrelated by written words alone, your document would be long, probably boring, and unclear.

Other Related Principles

You should consider using illustrations along with other alternatives to prose, such as tables (see Guideline D-2), bar charts (see Guideline D-3), and line graphs (see Guide-line D-4).

Qualifications

You should use illustrations with text in a document only under certain conditions:

- if they are of high quality
- if they visually support written content
- if they have a clear purpose in the text
  - to help readers understand
  - to help readers remember
  - to help readers become motivated

What the Research Says

Considerable research has been done on illustrations. The research is not consistent because of the scope of illustrations both in variety and how they are used. Most of the research reported was done on instructional texts in schools, and it isn't always clear how well these findings apply to adult readers and technical documents.

Some research demonstrates that simple line drawings are more effective in understanding complex content than photographs or detailed drawings. Dwyer (1971, 1972) found this effect for learning about the human heart, and this research was generally supported by others (Gorman, 1973; Rasco, Tennyson & Boutwell, 1975; Royer & Cable, 1976; Borg & Schuller, 1979; Strang, 1973). In another study, Spangenberg (1971) discovered that pictorials connected with names of objects in visual displays aided college students to learn the names more than verbal descriptions of the objects alone.

The research that has been done on diagrams is mixed, largely because there are so many different forms of diagrams. Wright (1973, 1977) and Wright and Reid (1973) have compared prose information with different kinds of diagrams to determine differences in understanding the content. In general, the diagrams (logic tree, algorithm, flow chart, matrix) were used more accurately than prose, but the effects depend on the user and conditions of use. Wason (1968) found that British civil servants were able to understand complicated information better when presented in a logic tree than as prose. Holliday (1976) discovered that flow charts were superior to text for teaching high school students verbal chains. While the research on diagrams is spotty, most people who write technical documents would agree that diagrams are helpful.

The extensive research literature on many kinds of illustrations has been reviewed by Macdonald-Ross (1977, 1978) and, more narrowly, by Duchastel (1979, 1980). They conclude that illustrations will enhance understanding if they are of high quality and if they are relevant to accompanying text.

D-2.

Use tables to supplement text.

Tables are an efficient way to present large amounts of quantitative information in a compact space. If you were to describe the same amount of information often found in tables in words, you would need many pages. What you wrote would very likely be much harder for, readers to understand. Tables are frequently used in business and government documents to show many kinds of social and economic statistics. For presenting numbers, tables are an alternative to prose that can help make documents clear to readers.

You can also use tables to organize written prose when it consists of lengthy descriptions of procedures, conditions, or lists of items. When you arrange this kind of prose into a tabular format, you save space, use fewer words, and make the document easier to understand.

Explanation and Illustration

The major value of tables in documents is that they enable you to present a very large amount of numerical data in a small amount of space. A single page can contain many numbers. Because tables can contain so much information, they can be confusing and easily misinterpreted. You can do several things to make tables easier to understand.

- Provide enough space to make numbers distinct (but don't spread it out too much, either).
- Provide row and/or column averages (they provide reference points for comparing numbers in the table).
- Use columns for the most important comparisons (it is easier to compare columns than rows).
- Round numbers (don't use more than 2 decimal places).

The first table below violates these rules; it is an example of how not to construct a table.

POOR:

Changes in Air Pollutants
(In millions of short tons)

POLLUTANT	1970	1972	1974
Particulates	25.6664	23.1872	19.7476
Sulfur Oxides	32.8001	32.3651	31.4691
Nitrogen Oxides	21.9743	23.8619	24.0965
Hydrocarbons	31.2899	32.6437	29.9466
Carbon Monoxide	13.1526	15.0079	19.837

This table is both hard to interpret and it is confusing. The numbers are cramped into too little space. The table doesn't give averages to serve as reference points. The main comparisons (pollutants) are in rows rather than columns. And the numbers carried to four decimal places are hard to remember and compare.

By following the recommendations we gave earlier, the improved table would look like this one.

REVISED:

Changes in Air Pollutants
(In millions of short tons)

YEAR	POLLUTANTS				
	Particulates	**Sulfur Oxides**	**Nitrogen Oxides**	**Hydro-carbons**	**Carbon Monoxide**
1970	26	33	22	31	13
1972	23	32	24	33	15
1974	20	31	24	30	20
Average	**23**	**32**	**23**	**31**	**16**

Even well-designed tables can be hard to understand, especially for general reading audiences. Tables are abstract in that the numbers presented in them have to be compared and interpreted mentally. That is one reason scientists and other professionals use them so much. Keep the following points in mind if you want to use tables in a document.

- Use tables for professional audiences; be cautious in using them for general audiences.
- Use prose to explain the major comparisons presented in tables.
- Label tables so that they are self-explanatory to readers.

You can also use tables to present written prose (strictly speaking, you present the prose in a "tabular format" rather than a table).You can do this when you are writing sentences with different conditions, or long lists, or procedures. A tabular format simplifies the discussion, requires fewer words than if the ideas were written out, and makes the document easier to read.

Here is an example of how prose is used effectively in a tabular format. You should note that if you tried to make the same points in writing only, you would need many more words than are contained in the table.

Rule 26 Who may operate under my license?

(a) You may permit only the persons listed below to operate under your license.

If you are:	***The authorized users are:***
Individual	*Yourself* Members of your immediate *Family* living in your household Each of your *Employees* as long as his or her communications are *only* about your business
Partnership	Each of your *Employees* of the partnership, as long as his or her communications are *only* about the business of the partnership.
Association	Each *Member* of the association as long as his or her communications are *only* about the business of the association. Each *Employee* of the association as long as his or her communications are *only* about the business of the association.
Corporation	Each *Officer, Director and Employee* of the corporation, as long as his or her communications are *only* about the business of the association.

Other Related Principles

You should consider using tables along with other alternatives to prose, such as Illustrations (see Guideline D-1), bar charts (see Guideline D-3), and line graphs (see Guideline D-4).

Tabular formats can help organize prose sentences when you are describing conditionals (see Guideline B-7) and long lists (see Guideline B-8).

Qualifications

Tables aren’t needed if you want to present a few simple statistics.

Tables are frequently used by social scientists, engineers, and other highly educated professionals. Tables are hard to interpret, so don’t use them for poor readers or general audiences.

Poorly constructed tables will be difficult to understand and could be misleading.

What the Research Says

The little research that has been done on tables has been directed at specific kinds of tables for specific audiences. Some research has been sufficiently general to assert the value of tables, however. In a series of studies Wright and her colleagues have found that the effectiveness of tables depends on other conditions. Tables are better than prose if the reader knows what to look for (Wright, 1971). Tables are effective for interpreting whether a given numerical value is more than some critical, baseline value (Wright & Barnard, 1975). Tables are better than graphs for presenting quantitative data, but not for showing trends (Wright, 1977).

Ehrenberg (1977) has developed some principles for constructing tables on the basis of his research and analyses of the use of tables in different professions. Macdonald-Ross (1977, 1978) reviewed the research on all forms of graphic devices, including tables, and concluded that quality is the key to effectiveness.

D-3.

Use bar charts to supplement text.

When you need to present and discuss quantitative information in a document, it often is hard to describe numerical trends and relationships by words alone. Bar charts are one alternative to prose that can help you make the discussion clearer to readers. You can use bar charts to support and clarify what you have written. And, importantly, most readers can easily understand bar charts

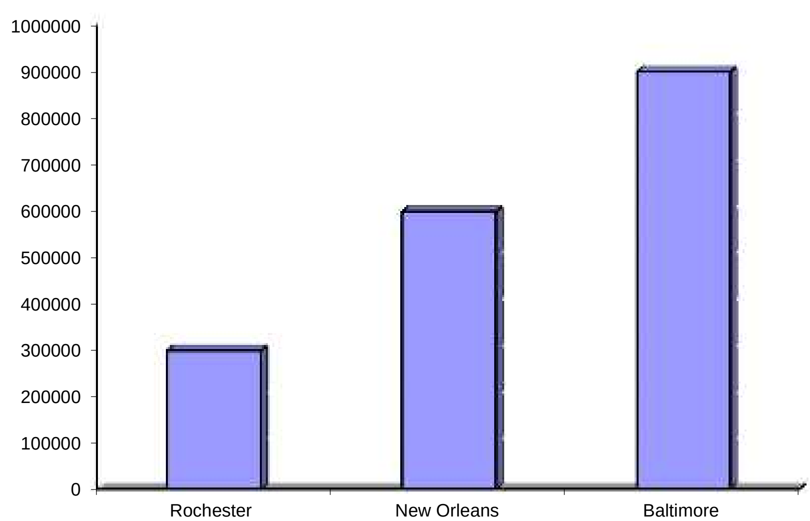
Explanation and Illustration

It is very cumbersome to describe quantitative data and relationships by prose. You have to write lots of words and, even then, it is hard to get across to readers what the numbers mean. Bar charts are a simple way to present quantitative information visually.

Bar charts are best used to compare sizes, or amounts, of different items at the same point in time. You can show relationships directly with bar charts and the relationships can be visually compared.

An example of a bar chart showing the 1970 population of three cities is shown below.

1970 POPULATION

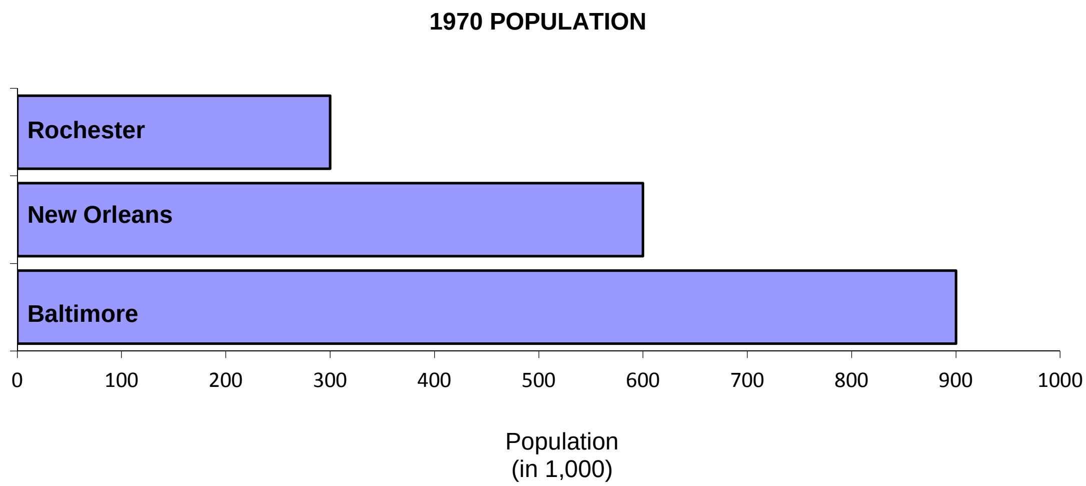


Even a very quick glance at this bar chart shows the readers the relative sizes of these three cities. Bar charts are efficient; they need only a small amount of space. Consider how this same information would be described in prose.

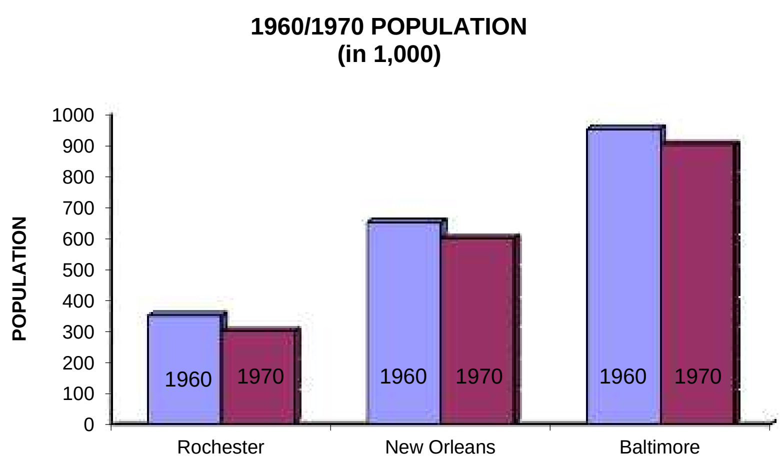
> The 1970 census showed that New Orleans had a population of about 600,000, Rochester just under 300,000 and Baltimore just over 900,000. New Orleans is approximately two-thirds the size of Baltimore, but about twice the size of Rochester.

This paragraph describes the same information that is shown in the bar chart, but is cumbersome and less clear. It should be obvious that it would be even more cumbersome and confusing if you tried to describe with only prose the relative populations of many cities. Combining prose with bar charts makes the comparisons clearer to readers.

The bar chart shown is "vertical" but it could just as easily be "horizontal," as shown below.



Both of these bar charts show the relationship of two things cities and population size. You usually can add one more chunk of information in a bar chart without causing confusion. As an example, the bar chart below adds information about changes in population between 1960 and 1970 for the same three cities.



You have to be careful not to pack too much information in a bar chart because it becomes cluttered. As you increase the number of relationships shown, the bar chart becomes harder to interpret.

Bar charts are fairly easy to construct, but they have to be done well if they are to be clear to readers. Here are some points to remember when constructing bar charts.

- Keep the bars a constant width (the length of the bar obviously varies to show quantity).
- Use prose with bar charts in order to explain the major relationships you are showing.
- Keep bar charts simple; don't make them too fancy by elaborate pictures and graphics.
- Use labels to show what is being compared (a bar chart without labels such as "population" and "300,000" is worthless).

Other Related Principles

You should consider using bar charts along with other alternatives to prose, such as illustrations (see Guideline D-1), tables (see Guideline D-2), and line graphs (see Guideline D-4).

Qualifications

If you are talking about a single piece of numerical information (e.g., the population of Houston) or are making a simple comparison (e.g., the shift in Houston's population between 1960 and 1970), you don't have to rely on a bar chart to make the point. If you use a bar chart, make sure that it is clear and well-marked; a poorly constructed bar chart may be worse than none.

What the Research Says

A few research studies suggest that bar charts are an effective way to present quantitative data. Feliciano, Powers, and Kearn (1963) found that bar graphs were superior to text alone, but for unsophisticated readers, were best when combined with text. Culbertson and Powers (1959) reported that bar charts were easier to read than line graphs, and Feliciano et al. (1963) found horizontal bar charts superior to tables. Macdonald-Ross (1977, 1978) in comprehensive reviews of the research literature, concluded, that no single graphic device is best for all users in all conditions, but that the quality of the graphic device is the most important factor for comprehension.

D-4.

Use line graphs to supplement text.

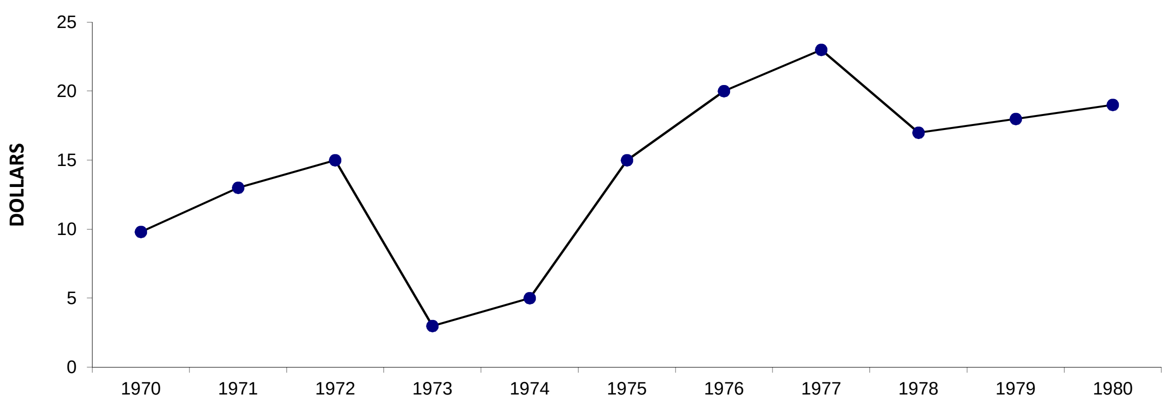
Line graphs are a way to present quantitative data in a document. Many kinds of numerical information are hard to describe by prose only and line graphs are one way of making the meaning of this numerical information clearer to your readers. Line graphs are an alternative to prose that can effectively support and clarify what you have written.

Explanation and Illustration

Line graphs are an efficient, direct way to show how something has changed overtime. These trends —changes in amounts, sizes, or rates over time—are very cumbersome to describe by prose alone. And if you have to describe many quantities for a large number of points in time, it is very hard to describe them all clearly.

Line graphs are ideally suited to show trends. Here's an example showing the changes in the amount of money invested over a ten-year period by "ACME Company."

Money Invested by ACME
(in millions)



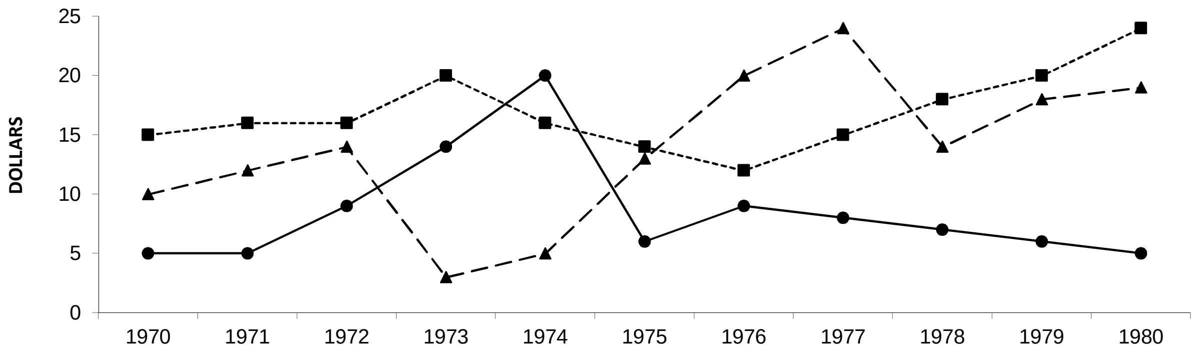
The line graph provides a simple, clear, visual picture of the investment history of ACME during the 1970s. It would be much harder and more cumbersome to describe what's shown in the line graph by prose alone. For example:

> **POOR:**
>
> Over the ten year period, ACME's investments generally were on an increasing trend with the exception of 1973 and 1978. In 1973, ACME's investments fell about $10,000,000 from the level of 1972. In 1978, investments declined about $7,000,000 from the previous year. The investments ranged from a high of $23,000,000 in 1977 to a low of $2,000,000 in 1973.

You can make the different trends clear by combining prose with line graphs. You introduce the general situation and major comparison in prose, and direct the reader to the line graph for particular comparisons.

One advantage of line graphs is that you can present a large amount of information in a compact space. The trends of a number of organizations, for example, can be presented in the same graph. Here's the same line graph as before with added information.

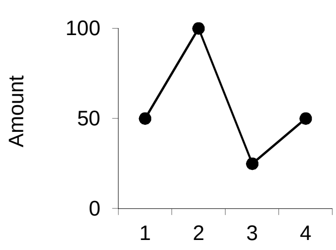
INVESTMENT EXPENDITURES
OF THREE COMPANIES
(in millions)



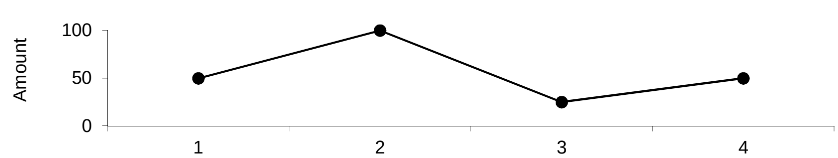
This example also shows some of the things that you can do to make sure that your line graph is clear. When there are several lines in a graph, you should make each one different enough so that the reader can distinguish them. One way you can do this is to use solid lines (--------------------), dotted lines (....................), dashes (- - - - - - - - - - -), or some combination, (- • - • - • -). You can also use different colors. You can distinguish the "points" on each trend line as well by using graphic devices such as closed dots (•), open dots (○), "x's" (x), enclosed triangles (▲), or open triangles (Δ), among others.

However, you must be careful when you construct line graphs, because you can distort the shape of trends if the horizontal and vertical lines of your graph are disproportionate in length. This effect is illustrated in the following line graphs. Note how the trend in the first graph looks much sharper and more dramatic than the trend in the second, even though the same trend is being shown. This deceptive appearance results from the lengths of the horizontal and vertical lines of the graph.

POOR



POOR



Here are some things to remember when constructing line graphs:

- Show points of time along the horizontal line.
- Use prose with line graphs in order to explain the major trends and relationships shown.
- Don't compare too many lines in the same graph; many lines that intersect each other are confusing to read and interpret.
- Make sure different lines are visually distinct.
- Make individual points on each line clear.
- Use labels to show what each line represents (a line graph without a title or labels that explain the time periods and the units of whatever you are comparing is useless).
- Don't make either the vertical or horizontal line of the graph disproportionate to the other length.

Other Related Principles

You should consider using line graphs along with other alternatives to prose, such as illustrations (see Guidelines D-1), tables (see Guideline D-2), and bar charts (see Guideline D-3).

Qualifications

If you want to describe a single trend over two or three points in time, you don't need to construct a line graph to get the meaning across to readers.

Line graphs are frequently used by scientists, engineers, and other highly educated professionals. Since line graphs are fairly hard to interpret, you should not use them for poor readers or the general public.

If you use line graphs, make sure that they are clear and well designed, a poorly constructed line graph may be misleading.

What the Research Says

The sparse research done with line graphs is generally supportive, but there is much we don't know about how graphs affect comprehension. Price, Martuza, and Crouse (1974) discovered that study time, the amount of information presented by a graph, and wording of a graph affect what college students recall from line graphs. Schutz (1961a) reported that engineers can extrapolate and compare trends more accurately with line graphs than with bar charts. He also found that color coding of trend lines improved performance but was not a major effect (Schutz, 1961b).

Line graphs appear to be difficult to read and interpret correctly. Culbertson and Powers (1959) found line graphs harder to read than bar charts. Research by Weintraub (1967) and Price, Martuza, and Crouse (1974) point out the special requirements of understanding line graphs and the need to learn the skills of interpreting graphs. In his reviews of the research, Macdonald-Ross (1977, 1978) emphasizes the importance of good quality in line graphs if they are to enhance comprehension.

Chapter III
Document Design Research

Document Design Research

This chapter presents the research studies that were cited in the section of each guideline entitled "What the Research Says." We have included the research 1) to give all readers some notion of the empirical research that has been done on each document design principle, and 2) to provide a starting point for interested readers who want to learn more about what research says about designing documents to make them clear.

Document design is a very broad field that encompasses many different factors, including

- how to write clearly
- how to present numerical information
- how to make a page attractive and informative, and
- how to understand the audience who will read the document.

The research that addresses these different factors is similarly diverse. We have cited studies from several research disciplines: cognitive psychology, linguistics, human factors, instructional and educational psychology, psycholinguistics, and typography.

The majority of the research that we cite consists of reports of studies and experiments published in research journals. The research cited is representative, not exhaustive. We have tried to balance the number of studies cited against the on-the-job needs of the users of this book. The research cited is organized by each of the 25 document design principles. We also have included several citations for reviews of research, which summarize and cite in one source many other document design research studies not mentioned in this book.

Reviews of Document Design Research

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