

SUMMARY

- ◆ Explains what syntactic cues are and why technical communicators should use them
- ◆ Discusses integrating this approach into established documentation processes
- ◆ Provides a procedure for learning to use syntactic cues effectively

Improving Translatability and Readability with Syntactic Cues

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INTRODUCTION

In the past few decades, many technical communicators have proposed guidelines for writing English-language documents intended for international audiences. These guidelines include

- ◆ Minimum Word Strategy, in which illustrations are used in place of text (Gange and Lipton 1984; Hodgkinson and Hughes 1982; Hoffman 1998; Pearsall 1988; Twyman 1985; Vogt 1986)
- ◆ Controlled or Simplified English (Dale and O'Rourke 1976; Gingras 1987; Hinson 1991; Kirkman, Snow, and Watson 1978; Kleinman 1982; Ogden 1932; Ogden 1942; Peterson 1990; Sakiey and Fry 1979; Strong 1983; Thomas and others 1992; White 1980)
- ◆ Terminology guidelines such as using consistent nomenclature and avoiding words with multiple common meanings (Downs 1980; Megathlin and Langford 1991; Nadziejka 1991; Olsen 1984; Phillips 1991; Velte 1990)
- ◆ Production guidelines such as planning for text expansion (because other languages are less succinct than English), separating text from illustrations, and taking different paper sizes into account (Hartshorn 1987; Holden 1980; Klein 1988; Matkowski and Coar 1983)
- ◆ Cultural guidelines such as avoiding humor; avoiding culture-specific examples in text, photos, and symbols (Bosley 1996); being aware of culture-specific connotations of colors (Sanderlin 1988; Swenson 1988); and more generally, being sensitive to cultural differences (Greenwood 1993; Hoft 1995).

Other guidelines focus on improving readability at the sentence, clause, and phrase level. Most of these are general readability principles such as using short sentences, using passive voice only when appropriate, keeping subjects and verbs close together, and avoiding long noun strings and nominalizations.

Sprinkled throughout the literature, we also find guidelines that aim more specifically to make translators' jobs

easier or to improve the readability of English-language documents for non-native speakers (Hunt and Kirkman 1986; Buican, Hriscu, and Amador 1993; and many others).

Like those last two types of guidelines, the syntactic cues approach focuses on individual sentences, clauses, and phrases, and it takes both translatability and readability into account. In addition, it

- ◆ Is based on the linguistic analysis and classification of thousands of sentences (primarily from software documentation) during the past 10 years
- ◆ Is supported both by research from other disciplines and by the hundreds of sentences in my collection that clearly illustrate the benefits of syntactic cues
- ◆ Is accompanied by a heuristic procedure that helps technical communicators identify potential ambiguities and readability problems in their writing

It takes some time to understand the benefits and limitations of the syntactic cues approach and to learn to apply it appropriately, but for many types of documentation, I believe that the results are well worth the effort.

WHAT ARE SYNTACTIC CUES?

Syntactic cues are elements or aspects of language that help readers correctly analyze sentence structure and/or to identify parts of speech. For example, suffixes, articles, prepositions, auxiliary verbs, and word order enable us to make grammatical sense out of the following lines from Lewis Carroll's "Jabberwocky," even though the content words are nonsense:

*'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe.*

That is, we know that *toves* is a noun because it ends in *-s* and is preceded by the article *the*; we know that *slithy* is an

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TABLE 1: SYNTACTIC CUES THAT ARE OPTIONAL IN SOME CONTEXTS

1. *that*
 2. *that* + the verb *to be*
 3. the articles *a*, *an*, and *the*
 4. *to* (both as a preposition and as an infinitive marker)
 5. modal verbs such as *can*, *should*, *may*
 6. auxiliary verbs such as *is/are/was/were*, *has/have/had*, *has been/have been/had been*, and *will have been*
 7. prepositions such as *by*, *for*, *with*, *in*
 8. correlative pairs such as *either . . . or*, *both . . . and*, *if . . . then*
 9. punctuation such as hyphens, commas, and parentheses
 10. pronoun or noun subjects
- ◆ See the Appendix for detailed explanations of these cues.

adjective because it ends in *-y* (a typical adjectival suffix) and because it occurs between an article and a noun; *gyre* and *gimble* must be verbs because of the presence of the auxiliary verb *did*.

Syntactic cues exist in all languages, though the specifics are of course different. For example, in English and many other Western languages, the articles *a*, *an*, and *the* (or their equivalents) are significant syntactic cues. Languages such as Chinese and Japanese don't have articles, but they have other syntactic cues that English lacks.

In most cases, syntactic cues are not optional. We cannot arbitrarily leave off suffixes or prefixes, nor can we omit articles, prepositions, or auxiliary verbs except under certain circumstances. However, in this article I am limiting my discussion and definition of syntactic cues to those that *could* be omitted. In addition, I am limiting my discussion to syntactic cues that exist in English. (See Table 1.)

Kimball (1973) examines the roles of several of these syntactic cues in sentence perception, and he provides an interesting explanation of their benefits in terms of transformational grammar. Since then, several technical communicators have touched on syntactic cues, though they do not refer to them by that name. For example, Weiss (1998) tells writers to use "optional words," and Jones (1996)

suggests using hyphens to clarify noun strings. Kulik (1995) advises writers to refrain from omitting *that*, and Buican (1993) tells us to avoid ellipses.

Despite this good advice, the historical emphasis on conciseness in technical communication leads many technical writers and editors to routinely and deliberately eliminate syntactic cues from their documents. This is unfortunate because, as the rest of this article will show, the benefits of syntactic cues can be clearly demonstrated and are supported by research from many disciplines.

BENEFITS OF SYNTACTIC CUES

Inserting a syntactic cue is not always the best way to improve a problematic clause or sentence. However, syntactic cues often improve readability and translatability in one or more of the following ways:

- ◆ They enable readers, translators, and machine-translation systems to *analyze* sentence structure more quickly and accurately. In this respect, they are particularly beneficial to non-native speakers of English.
- ◆ They make it easier for readers to *predict* the structure of subsequent parts of a sentence. Increased predictability can lead to an increase in reading speed.
- ◆ They eliminate certain types of ambiguities that
 - ◆ May go unnoticed by human translators, resulting in mistranslation
 - ◆ May be mistranslated by machine-translation systems
 - ◆ May force human translators to seek clarification or to make "educated guesses"

In contrast to Controlled English, the syntactic cues approach does not impose inordinate restrictions on vocabulary nor on the range of grammatical constructions that are permitted. And, when used with discretion, it doesn't result in language that sounds unnatural to native speakers of English.

Facilitating analysis

It is easy to see that inserting a syntactic cue can make it easier for all readers (both native speakers and non-native speakers of English)—and probably also for many machine translation (MT) systems—to correctly analyze the structure of some sentences. For example, consider the following sentence:

1a After a process creates a resource, any process it starts inherits the resource identifiers.

Human readers, as well as MT systems, are likely to stumble on the main clause because two subjects, *process* and *it*, appear to be followed by two verbs, *starts* and *inherits*. This is an apparent violation of normal word order in

English sentences. It is much easier to recognize that the main clause contains an embedded relative clause when we insert the relative pronoun (syntactic cue) *that*:

*1b After a process creates a resource, any process **that** it starts inherits the resource identifiers.*

When a relative pronoun is the subject of a clause, we can often omit the relative pronoun plus a form of the verb *to be*. For example, in sentence 2b, the relative pronoun *that* and the verb *are* have been omitted. Sentence 2a is more syntactically explicit.

*2a Programs **that are** currently running in the system are indicated by icons in the lower part of the screen.*

2b Programs currently running in the system are indicated by icons in the lower part of the screen.

Non-native speakers who are not fluent in English have particular difficulty when *that + to be* is omitted. The participles that are left behind (such as *running* in the above example) can play so many different grammatical roles that they are inherently confusing to non-native speakers (Cohen and others 1979; Berman 1984). In fact, participles are so problematic that I recommend replacing *present* participles (the *-ing* verb forms) with other constructions when possible. (*Past* participles, which usually end in *-ed*, cannot be replaced so easily, but they can often be expanded into relative clauses. See step 2 in the Appendix for further discussion.) For example, you could replace sentence 3a with sentence 3b, with no loss of meaning and no change in emphasis.

*3a DATAMAX continues **processing** program statements after **repairing** the data set.*

*3b DATAMAX continues **to process** program statements after **it repairs** the data set.*

Sometimes syntactic cues do more than make sentences easier to analyze and comprehend: they often eliminate ambiguities that confuse native speakers as well as non-native speakers and translators.

As sentences 3a and 3b illustrate, the syntactic cues approach is more than just inserting syntactic cues here or there. It often involves replacing an ambiguous or potentially confusing sentence constituent with something that is simpler and/or more syntactically explicit.

Facilitating prediction

The reading process has been widely characterized as a “psycholinguistic guessing game” (Goodman 1967). That is, as we read, we are constantly making predictions about what’s going to come next. Strong evidence for this claim is provided by “garden-path” sentences like the following:

4 The cotton shirts are made from comes from Arizona.

5 Since Jay always jogs a mile doesn’t seem that far to him.

If we weren’t continually analyzing or hypothesizing about the structures of these sentences as we read, then how could we explain the fact that these sentences “lead us down the garden path?” (That is, they don’t turn out the way we expect them to.)

The importance of prediction in the reading process is supported by the fact that we can read a meaningful sentence aloud much more rapidly than we can when the word order is jumbled or reversed (Smith 1988; Cziko 1978). Jumbling the words of course renders the sentence meaningless and makes prediction impossible. A study done in Sweden also found that reading speed increased when relative pronouns were included in Swedish (Platzach 1974).

Just and Carpenter (1987) state that because any single type of cue can be “weak, absent, or even misleading on occasion,” readers rely on evidence from all available cues when they analyze the structure of a sentence (p. 145). One goal of the syntactic cues approach, then, is to ensure that readers have all the syntactic cues they need to immediately arrive at a correct analysis and prediction for each part of a sentence. For example, the following sentence leads many readers down the garden path:

6a In Experiment 6 we were interested in the reading subjects spontaneously achieve for such a headline.

To prevent *reading* from being misinterpreted as an adjective, we could insert the syntactic cue *that* after it:

*6b In Experiment 6 we were interested in the reading **that** subjects spontaneously achieve for such a headline.*

Alternatively, we might decide that a more drastic revision is desirable—one that uses the less ambiguous word *interpretation* in place of *reading*:

6c In Experiment 6 we were interested in each subject's first **interpretation** of this type of headline.

Resolving ambiguities

Sometimes syntactic cues do more than make sentences easier to analyze and comprehend: they often eliminate ambiguities that confuse native speakers as well as non-native speakers and translators. For example, when the conjunction *and* is used, it may not be clear which parts of the sentence are being conjoined.

7 Semaphores enable an application to signal completion of certain tasks and **[to? they?]** control access to resources that more than one process may need to use.

In this case (as with many other “scope of conjunction” ambiguities), the difference in meaning between the two possible interpretations is slight. However, the ambiguity is an impediment to translation—especially if machine translation is being used. The simple act of inserting a syntactic cue (in this case, the infinitive marker *to*) resolves the ambiguity without making the sentence sound unnatural. Indeed, inserting *to* adds a pleasing parallelism to the sentence. Many writers occasionally insert syntactic cues for that reason, even if they are unaware of the other benefits of syntactic cues and of the full scope of the syntactic cues approach.

The articles *a*, *an*, and *the* can sometimes be used as syntactic cues to resolve the potential semantic ambiguity of the word *or*. For example, in sentence 8a, only an expert could know whether *exception* is a synonym for *hard error*, or whether they are two different things.

8a The system immediately terminates the program if a *hard error or exception* occurs.

If they are different things, then we can make that clear by inserting *an*, as in sentence 8b:

8b The system immediately terminates the program if a *hard error or an exception* occurs.

We can make it even clearer by using *either*. . . *or* along with the article *an*, as in sentence 8c.

8c The system immediately terminates the program if **either** a *hard error* **or** **an** *exception* occurs.

If *hard error* and *exception* are synonyms, then we could use parentheses to indicate their equivalence, if that convention is followed consistently within a document:

8d The system immediately terminates the program if a *hard error (or exception)* occurs.

Imperfect knowledge of English, as well as interference from their native languages, causes non-native readers to have particular problems with certain syntactic features of English.

Steps 4 and 5 of the Appendix discuss additional types of ambiguity that occur frequently in association with the conjunctions *and* and *or*.

Benefits of syntactic cues for non-native speakers of English

A huge volume of technical information is available only in English and must therefore be read in English by speakers of other languages. For example, documentation for highly technical products is not necessarily translated into all the languages of the countries where the products are sold. Many academic journals and reports of scientific research are published only in English, and currently the vast majority of the information on the World Wide Web is in English. Thus, non-native speakers of English constitute an important part of the audience for many documents.

Syntactic cues are particularly important for these readers. Unless they are extremely fluent, non-native speakers interpret individual words and syntactic structures more slowly than native speakers, and they are less able to anticipate the sequence of words (MacNamara 1970). Hatch, Polin, and Part (1974) found that first-language readers rely primarily on content words (nouns, verbs, adjectives, and adverbs), whereas second-language readers rely both on content words and on syntactically redundant function words (articles, conjunctions, and prepositions)—that is, on syntactic cues. Cziko (1978) found that “sensitivity to syntactic constraints develops before sensitivity to semantic and discourse constraints” (p. 485). He defines syntactic constraints as “constraints [that are] provided by the preceding words and [by] the syntactic rules of the language—for example, that the word *the* will most likely be followed by a noun.” Thus, syntactic cues help non-native speakers to interpret syntactic structures more rapidly and to better anticipate the sequence of words.

Imperfect knowledge of English, as well as interference from their native languages, causes non-native readers to have particular problems with certain syntac-

tic features of English. For example, I mentioned earlier that participles (verb forms that end in *-ing* or *-ed*) are problematic because they can fill so many different grammatical functions. Berman (1984) mentions several other sources of difficulty, including the lack of relative pronouns in relative clauses, deletion of *that* plus the verb *to be* in post-nominal modifiers, and omission of *that* as a noun-clause subordinator. Thus, in steps 2 and 3 of the Appendix, I suggest ways of expanding participles into explicit relative clauses (making them less ambiguous) or eliminating them completely. Step 7 addresses the use of *that* as a noun-clause subordinator.

See Swan and Smith (1987) for details about other difficulties that non-native speakers from 19 language groups are likely to have with English.

CAVEAT SCRIPTOR: LET THE WRITER BEWARE!

Remember: Inserting a syntactic cue is not always the best way to revise a sentence that is ambiguous or difficult for readers to parse. Sometimes a more drastic revision is appropriate. For example, for most readers, sentence 9a is a garden-path sentence.

9a To create a table and load it with a subset of data, create a DBMS view, and view the subsetted data, follow these steps:

We could prevent misreading by inserting the syntactic cue *to*, as follows:

9b To create a table and load it with a subset of data, to create a DBMS view, and to view the subsetted data, follow these steps:

However, a better solution might be to restructure the sentence, using a bulleted list:

9c Follow the steps below to

- ◆ Create a table
- ◆ Load the table with a subset of data
- ◆ Create a DBMS view
- ◆ View the subsetted data

Sometimes inserting a syntactic cue is unnecessary and makes the sentence sound unnatural. For example, in sentence 10, the infinitives *create* and *manage* are joined by *and*.

10 A file system enables applications to create and [to] manage file objects.

In this sentence it is not necessary to insert the syntactic cue *to* in front of *manage*, because *manage* immediately fol-

lows *and*; there are no intervening words that could lead to any confusion, ambiguity, or misreading.

At times, inserting a syntactic cue is not only unnecessary but would actually distort the meaning of the sentence. Consider the following sentence:

11a You can use the REDO command to recall the statements that produced the errors, [to] make the corrections based on the log information, and [to] resubmit the program.

If you insert the infinitive markers (*to*), then you are saying that the REDO command is used not only to recall statements but also to make corrections and to resubmit the program. Even someone who is not familiar with the subject matter can guess that this is unlikely. Sentence 11b would be an accurate revision of 11a:

11b You can use the REDO command to recall the statements that produced the errors. Next, use the information in the log to correct the statements, and then resubmit the program.

Sometimes it is necessary to rearrange or restructure a sentence slightly in order to insert a syntactic cue:

12a Before printing a monetary value, you usually assign it a format.

12b Before printing a monetary value, you usually assign a format to it.

In other cases it may be appropriate to restructure a sentence *instead of* using a syntactic cue. For example, 13b uses the syntactic cue *that*, but 13c simplifies the sentence structure by eliminating the relative clause altogether.

13a The software automatically determines the type of file it is reading and reads the file accordingly.

13b The software automatically determines the type of file that it is reading and reads the file accordingly.

13c The software automatically determines which type of file it is reading and reads the file accordingly.

Often I recommend restructuring a sentence *in addition to* using syntactic cues:

14a You can develop an application using Appli-pro that communicates with a client session using the TCP/IP sockets.

14b You can use *Appli-pro* to develop an application that uses the TCP/IP sockets to communicate with a client session.

A limited number of common phrases or sentence structures lend themselves to being simplified or restructured in these ways. See the Appendix for other examples.

THE SYNTACTIC CUES PROCEDURE

Because of the caveats mentioned above, I have found that it is not enough to simply give writers a list of syntactic cues and to suggest that they use these cues more frequently. For this reason, I have developed a detailed syntactic cues procedure that gives writers more guidance and structure. (See the Appendix.)

In many steps of the procedure, the writer is told to search for particular words or word endings, some of which may occur quite frequently. This can be tedious at first, but for most people it quickly becomes automatic. Enterprising individuals could probably automate some of the searching, and I wouldn't be surprised if controlled-language tools such as the Carnegie Group's *ClearCheck* or Cap Gemini's *CLarity* search for some of the same things that the syntactic cues procedure draws attention to.

In some steps, a basic understanding of English grammar is helpful, if not absolutely necessary. However, because the grammatical terminology may be an obstacle to some writers, I have used terms like “-ING words” (instead of or as a synonym for “present participles”) when possible, and I have included examples that illustrate each step.

I strongly recommend that writers and editors initially practice following the syntactic cues procedure in groups, applying it to excerpts from their own documents. In a group, if someone unknowingly changes the intended meaning of a sentence by inserting a syntactic cue, someone else is likely to notice. It is also good to share opinions about whether a particular syntactic cue makes a sentence sound unnatural. Moreover, another group member might see a better way of revising a problematic sentence—perhaps a way that does not even involve using a syntactic cue.

CONSIDERATIONS REGARDING THE USE OF SYNTACTIC CUES

In addition to the references that I have already cited, a considerable amount of other research from the fields of psycholinguistics and reading behavior supports the use of syntactic cues. Much of it involves methodologies and theories that require more careful, detailed discussion than is possible in this article. However, the following sections present some findings that I think are particularly interesting and noteworthy. (For additional reading, I suggest Martin and Roberts 1966; Fodor and Garrett 1967; Hakes and Cairns 1970; Hakes and Foss 1970; Hakes 1972; Dawkins 1975; Hakes, Evans, and Brannon 1976; Huggins

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and Adams 1980; Frazier and Raynor 1982; Clifton, Frazier, and Connine 1984; Frazier 1988; and Garrett 1990.)

There are different degrees of ambiguity and of sensitivity to ambiguity

In actual practice, writers seldom “lead their readers down the garden path” in ways that are startling or obvious, as in sentences 4 and 5, above. However, the fact that a sentence is ambiguous can easily go unnoticed by one person (the writer), yet be painfully obvious to another person (a translator or novice user, for example).

According to Schluoff and others (1986), we encounter ambiguous words and sentences so often in our everyday use of language that we usually don't even notice the ambiguities. However, there are different degrees of ambiguity, and “ambiguous sentences usually have a more or less pronounced bias toward one of their meanings, which means that one of the meanings is usually preferred over the other, either in general, in a given context, or to an individual” (p. 324). For example, the newspaper headline “Girl, 13, turns in parents for marijuana, cocaine” is more likely to be interpreted as meaning “Girl, 13, turns in parents for using marijuana and cocaine” than as “Girl, 13, turns in parents in exchange for a reward of marijuana and cocaine” (Perfetti and others 1987, p. 692). The more highly biased an ambiguous sentence is toward one of its meanings, the more likely it is that the ambiguity (that is, the alternate interpretation) will go unnoticed.

Just as phrases or sentences can have different degrees of ambiguity, so the degree of sensitivity to ambiguity varies widely among individuals. Perfetti and others report that “two [out of 48] subjects noticed both meanings for 22 of the 25 ambiguous headlines they read,” while “at the other extreme were two subjects who, only with probing,

noticed ambiguities in 2 of the 25 headlines, and one who noticed no ambiguities at all” (p. 705). Similarly, in a test of “grammatical sensitivity” administered by Schluroff and others (1986), the scores ranged from 18 to 33.5 out of a possible 35 (p. 329).

The fact that many ambiguities go unnoticed means that translators and other readers of technical information might arrive at the unintended meaning of an ambiguous phrase or sentence without even realizing that the alternate, intended interpretation is possible. This underscores the importance of a heuristic (the syntactic cues procedure) that can help writers, editors, and translators eliminate as much ambiguity from technical information as possible.

Context does not prevent misreading

One objection that subject-matter experts and even technical writers often raise when a garden-path sentence or other ambiguity in their writing is pointed out to them is that “the meaning is clear from the context.” This raises the question of whether contextual knowledge actually comes into play early enough to prevent faulty analysis by the parser.

Ferreira and Clifton (1986) found that readers initially compute an incorrect syntactic analysis of certain sentences even when the preceding context provides information which, in principle, could have been used to analyze the sentence correctly. Even readers who are familiar with the subject matter of a text will occasionally analyze sentences incorrectly when too few syntactic cues have been provided. They may backtrack and correct their faulty analysis fairly quickly, but “it is costly in terms of perceptual complexity ever to have to go back to reorganize the constituents of [a] phrase” (Kimball 1973, p. 37).

Rayner, Carlson, and Frazier (1983) similarly found that “the relative plausibility of an event described by a sentence did not influence the initial parsing strategy, as evidenced by eye fixation times” (cited in Perfetti and others, p. 693). Perfetti and others used newspaper headlines rather than sentences in their study, reasoning that the “syntactic impoverishment” of newspaper headlines would make it even more likely that plausibility would influence parsing strategy. They found that pragmatic information was indeed used by readers to interpret headlines, but that it was not brought in quickly enough

to override syntactic processes, “even when it would be advantageous to do so” (p. 706).

Perfetti and others also found that ambiguous headlines “take longer to comprehend even when preceded by context” (p. 701). Thus, it seems unlikely that subject-matter knowledge will prevent readers from being led down the garden path and having to reanalyze ambiguous sentences. Hence, those syntactic cues that reduce the likelihood of ambiguity can be beneficial to expert readers and non-experts alike.

There is only one difference between expert and non-expert readers in this regard: after the initial, faulty analysis, experts are more likely to have the necessary contextual knowledge to reanalyze the sentence correctly.

The reading process differs according to purpose

As Alderson (1984) points out, the reading process differs depending on whether the reader’s goal is global comprehension or local comprehension. For skimming—for “getting the gist of a text”—Berman (1984) says that syntax (and hence, syntactic cues) “may not be all that crucial.” However, if acquiring specific information accurately and in detail is important, then “exact appreciation of [the] syntactic components of each sentence remains an important aim” (p. 146).

If you produce documents that are not likely to be read word-for-word, then adding syntactic cues may not be worthwhile. However, for most documents, readers skim only until they find the relevant section of the document. After that, they usually read for detailed, local information, and syntactic cues again become important.

For some types of texts, syntactic cues may not be very helpful

If you are already using Controlled English, in which sentences are short, terminology is tightly controlled, and sentence structures are already greatly simplified, then it is unlikely that the syntactic cues approach will significantly improve the readability or translatability of your text.

At the other extreme, syntactic cues probably won’t do much to help a document that contains serious stylistic or organizational problems or whose content is inappropriate for its audience. It might be pointless to follow the syntactic cues approach until after the more fundamental problems have been addressed.

INTEGRATING SYNTACTIC CUES INTO YOUR DOCUMENTATION PROCESSES

Assessing “translation readiness”

Before you try to integrate the syntactic cues approach into your documentation processes, a realistic assessment of your organization’s level of “translation readiness” may be in order (Iverson and Kuehn 1998). In my experience, the syntactic cues approach is well received by organizations

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that recognize the cost-effectiveness of producing high quality, consistent information the first time around. (Not surprisingly, it has also been very well received by translators and translation agencies.) But, realistically, the syntactic cues approach does require training and practice, and many organizations are not ready to make this kind of investment. An organization that does not have the resources, processes, or corporate structure in place to focus on the needs of its global audience either will not be receptive to the syntactic cues approach or will not be able to sustain efforts in that direction.

Overcoming concerns about conciseness and word counts

The syntactic cues approach contradicts the training of many editors and writers, who have been taught for years to eliminate every “unnecessary” *that*, to use punctuation sparingly, and, in general, to strive for brevity. In addition, management may be concerned about syntactic cues adding to the costs of translation and publication because they increase word counts.

If these concerns are an issue in your workplace, then show your colleagues examples from your own organization’s documents of sentences that would be ambiguous or difficult to translate without syntactic cues. Count the words in the “before” and “after” versions. (In most cases, the increase in word count is negligible.) Be sure to note improvements that you made in the text as a result of following the syntactic cues procedure, even if you did not insert a syntactic cue.

In most cases, syntactic cues actually reduce translation costs by reducing the number of ambiguities that translators are forced to resolve. Because resolving an ambiguity often means making time-consuming, costly, and frustrating attempts to contact a particular subject-matter expert, translators are sometimes forced to guess at which meaning was intended. Alternatively, they may settle for equally ambiguous constructions in the target languages, if such constructions exist. If a document is translated into 10 other languages, then 10 translators must deal with each ambiguity in the source.

Consider also that translators and translation agencies typically base their rates on the difficulty of the text. If you can demonstrate that your texts are syntactically explicit and clearly written (and particularly if you also provide glossaries and explanatory notes to accompany your texts), then you can certainly negotiate a lower rate. Thus, in terms of both cost and accuracy (not to mention readability), the syntactic cues approach is a sensible strategy.

As Hunt and Kirkman (1986) have pointed out, “any supposed gain from saving space by omitting [syntactic cues] is usually outweighed by the extra decoding processes [that are] forced on readers” (p. 155). Readers would be far better served if writers and editors reduced word counts by other means instead.

Working with your translators

If your organization is receptive to the syntactic cues approach and to focusing more on translatability in general, then be sure to work with your translators or translation agency to customize the approach and to perhaps develop other guidelines for improving translatability. For example, some syntactic cues are more important for Western European languages than for Asian languages, or vice versa. Some are important if you anticipate using machine translation, but may be less important for human readers.

In addition, you and your translators may very well agree on other ways of conveying information that would reduce the need for *some* syntactic cues. For example, step 5c of the syntactic cues procedure suggests that you could use parentheses whenever you use the word *or* to conjoin two words that are synonyms. Step 6 suggests that instead of inserting hyphens into your source text, you could use a temporary comment to explain to translators how they should interpret unclear noun phrases.

Temporary comments can be an excellent solution in cases where your primary audience might find particular syntactic cues intrusive. For example, in sentence 15a it may not be clear to a translator—and it would certainly be ambiguous to an MT system—that MDDDB is an adjective (modifying *registration*) rather than a noun.

15a The GETMDDDBINFO function queries the metabase to retrieve information about the MDDDB or table registration.

If MDDDB is a noun, then it would be better to insert syntactic cues in the sentence as follows:

*15b The GETMDDDBINFO function queries the metabase to retrieve information about the MDDDB and **about the** table registration.*

If MDDDB is an adjective, the only way of making that clear to translators (including machine translation systems) would be to repeat the word *registration*:

*15c The GETMDDDBINFO function queries the metabase to retrieve information about the MDDDB **registration** and the table registration.*

If you feel that 15a would be clear to your intended audience and that 15b and 15c are stylistically unacceptable, then you could consider providing the appropriate expanded version of the sentence only to translators. Many publishing tools enable you to embed conditional text, which appears in one view of the information (in this case, the translators’ view), but not in the production version. For example, if you are using SGML, the sentence might appear as follows, where

<t-note> indicates a “translation note” that will appear only in the translators’ view of the text:

15d The GETMMDBINFO function queries the metabase to retrieve information about the MDDDB and <t-note> about the </t-note> table registration.

In any case, your translators will probably want to help you decide which types of information to provide and how to provide it.

CONCLUSION

The syntactic cues approach helps fill a significant gap in the literature about writing for international audiences. It is solidly supported by research as well as by myriad example sentences that clearly are improved as a result of following the procedure, and it has been very well received by translators and other non-native speakers of English.

Some writers and editors have undoubtedly been using some syntactic cues instinctively for years and are adept at detecting and correcting some types of ambiguities. However, the syntactic cues approach delineates and articulates the thought processes involved, and the syntactic cues procedure includes nearly all of the syntactic cues that are optional in English. (The few exceptions are so rarely useful that I chose not to include them.)

Although the approach takes time and effort to learn, I think it can help many technical communicators take a giant step toward a writing style that is eminently well suited to a global audience. **TC**

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Appendix: A Procedure for Using Syntactic Cues

If you want to develop your ability to use syntactic cues effectively on your own, you can follow this procedure or use it as a reference. Each step helps you identify places where syntactic cues might be appropriate. With practice, you will soon be able to decide where to insert syntactic cues without referring to this procedure.

Remember to use syntactic cues with discretion. Be careful not to change meaning or emphasis, and don't use so many syntactic cues that your text sounds unnatural to native speakers of English.

Note: Most of the grammatical terminology used here is not explained due to length limitations. If the example sentences do not make the terminology clear, then see Hodges and Webb (1995) or a similar handbook. For more detailed, technical explanations of English grammar, see Quirk and Greenbaum (1973), Quirk et al. (1972), or Celce-Murcia and Larsen-Freeman (1983).

Typographical Conventions

- * Bulleted items are example sentences.
- * Right arrows (\Rightarrow) point to suggested revisions of the original sentences or parts of sentences.
- * Words enclosed in square brackets are syntactic cues.
- * In the example sentences, words in boldface type are the key words to pay attention to.

1. Make sure you have not used a telegraphic writing style in which the articles (*a*, *an*, and *the*) and other function words are omitted. This writing style is often used in lists, in descriptions of functions or parameters, and in definitions.

Rationale: Articles help readers and machine translation (MT) systems recognize that a following word is a noun. (The noun does not always follow immediately; there can be adjectives and adverbs in between.) Other function words (such as prepositions) likewise help readers and MT systems to analyze sentence structure and to determine parts of speech.

- (From a set of instructions:) Provide [**a**] base class for all stream buffers. (There is no good reason to omit the article *a* here.)

2. Look for past participles—verb forms that usually end in *-ed*, such as *described*, *provided*, and *specified*.

- a. Consider expanding them by inserting either *that* or *that* plus some form of the verb *to be* (*that is/that are/that was/that has been/etc.*). However, don't feel that you have to expand ALL past participles, and don't expand them if doing so would make the sentence sound unnatural to native speakers or would change the emphasis in the sentence.

Rationale: Although other languages besides English permit relative clauses to be reduced to participles in this way, it is more difficult for readers to analyze sentences when this particular syntactic cue is missing—especially if other syntactic cues are missing as well. Also, sometimes a translator has to “expand” the participle into a relative clause, either because the target language does not permit reduced relative clauses or for other reasons. In that case, it is often difficult or even impossible for the translator to determine which tense to use for the verb *to be*, as in the following sentence:

- Timeout values [**that are?/that have been?/that were?**] set by specifying CSSET_TIMEOUT override timeout values [**that are?/that have been?/that were?**] set by specifying CLNT_CALL.

- b. If a past participle comes before the main verb in a sentence or clause, make a special effort either to expand the participle or to revise the sentence in some other way.

Rationale: Research has shown that readers form a tentative analysis of a sentence before reaching the end of the sentence. If they encounter a word that looks like it could be the main verb of a sentence, they are likely to interpret it that way. We shouldn't mislead them by putting a participle (reduced relative

clause) in a position that could lead to such a misinterpretation. In addition, some MT systems may be unable to translate such sentences correctly.

- A socket **[that is] opened** by one task is not available to another. (*Socket* is the subject; *is* is the main verb.)

- c. If a sentence or clause contains more than one past participle (reduced relative clause), then make a special effort to expand one or more of the participles or to revise the sentence in some other way.

Rationale: When multiple syntactic cues have been omitted from a sentence or clause, it can be very difficult for readers (both native speakers and non-native speakers) to analyze the sentence or clause correctly on the first reading. However, inserting syntactic cues in all possible locations might make the sentence sound unnatural. In that case, try to find some other way of revising the sentence.

- If a FREE LIBRARY command is executed for a library **[that has been] defined** by a LIBRARY statement in the server's session, then a CLEAR LIBRARY statement **[that is] executed** after the SERVER statement produces an error.

3. Look for present participles (verb forms that end in -ING) such as *corresponding*, *describing*, and *using*.

- a. If the -ING word follows a verb such as *begin*, *start*, or *continue* that can take an infinitive complement, then consider changing the -ING word to an infinitive.

Rationale: In English, -ING words (present participles) can represent many different parts of speech and grammatical constructions. Therefore, they are inherently confusing to many non-native speakers of English. It is best to either add syntactic cues to them (to make them utterly unambiguous) or to eliminate them altogether when it is possible to do so.

- DATAPRO/2000 continues **processing** program statements after it repairs the data set.
⇒ DATAPRO/2000 continues **to process** program statements after it repairs the data set.

- b. If the -ING word follows and modifies a noun, then always either expand the -ING word into a relative clause or find some other way of eliminating it.

Rationale: It is often possible that the -ING word is modifying a previous clause rather than the preceding noun. An MT system cannot reliably determine the correct interpretation. As noted above, it is best to avoid potentially ambiguous -ING words, and in this context it is usually very easy either to expand the -ING word into a relative clause or to find some other suitable modification.

- Conclude the terminal description with comment lines to explain the capabilities **[that are] being** defined.
- The relationships among data items are expressed by tables **consisting** (⇒ **that consist**) of columns and rows.

- c. If the -ING word follows a temporal conjunction such as *when*, *while*, *before*, or *after*, then make sure that the subject of the main clause or superordinate clause is also the implied subject of the -ING word. (A superordinate clause is a clause to which another clause is subordinate.)

Rationale: This is an often-violated rule of English grammar and is essentially the same as a dangling participle. An MT system cannot be expected to handle deviations from standard English grammar correctly. Moreover, violating this rule lowers the quality of our documentation in the minds of language-sensitive readers.

- When **registering** a control-window class, **you** must specify how many window words will be associated with that class. (Correct, because the subject of the main clause, *you*, is also the implied subject of *registering*.)

- If an **error** occurs while **updating** a VSAM file, the operating system may be able to recover the file and repair some of the damage. (Incorrect, because the subject of the superordinate clause, *error*, is not the implied subject of *updating*. ⇒ If an error occurs while **you are updating** a VSAM file,)

d. If the -ING word *using* occurs at the beginning of a sentence, then leave it alone.

Rationale: In my experience, writers virtually always use *using* correctly in this context.

- **Using** the Options tab, define the options that you want to use for your interactive sessions. (Correct, because the implied subject of the main clause, *you*, is also the implied subject of *Using*.)

e. If the -ING word *using* introduces a participial phrase but is NOT at the beginning of a sentence, then either eliminate it or clarify it.

Rationale: In my experience, writers virtually always use *using* incorrectly or ambiguously in this context. As with other -ING verbs in other contexts (see step 3c), the implied subject of *using* must be the same as the subject of the superordinate clause or main clause. Moreover, when *using* follows a noun, it is usually unclear (from an MT perspective) whether it modifies the noun or a preceding clause.

- These same **options** can also be defined **using** the Options dialog window. (Incorrect, because the subject of the main clause, *options*, is not the implied subject of *using*. ⇒ **You can define** these same options **by using** the Options dialog window.)
- The `get_caller` function returns the network address of the caller **using** an XPRT handler. (It is unclear whether *using* modifies *caller* or the preceding clause. ⇒ The `get_caller` function **uses** an XPRT handler **to return** the network address of the caller. (The emphasis is slightly different but is probably acceptable.))
- You can also invoke the REG procedure **using** options. (Does the writer mean **by using** options? Probably what s/he means is “When you invoke the REG procedure, you can also specify options.” This illustrates the confused thinking that the *using* construction often reflects!)

f. If an -ING word is acting as an adjective (occurring before a noun), then consider whether it could be mistaken for a gerund (acting as a noun), or vice-versa. If so, revise the sentence or phrase.

- The interface must rebuild its buffer pool and restart I/O when **processing** switches from one file to the next. (*switches* could be interpreted as a noun—i.e., “...when [the interface is] processing switches...”—but it is actually a verb, with *processing* as its subject. To prevent misreading, you probably need to drastically revise the sentence: ⇒ After one file has been processed, the interface must rebuild its buffer pool and restart I/O. It can then process the next file.)
- **Auditing** Data [as a heading] (Does this describe data that were collected during an audit, or could it be a task-oriented heading for a section that describes how to audit data?)

g. Don't worry about any -ING word that ...

- 1) is not derived by adding the suffix -ING to a verb—e.g., *during*, *spring*, *wing*.
- 2) is preceded by a preposition:
 - For more information **about printing** Help files, see Chapter 3.
- 3) ends in -s:
 - The correct **settings** for the latitudes and longitudes of major U.S. cities are listed in Appendix 1.
- 4) is preceded by any form of the verb *to be* (e.g., *is*, *are*, *was*, *were*, *has been*, *have been*):
 - If you **are using** browse mode, an error message appears at the top of the window.

5) is the subject of a clause or sentence or is otherwise acting as a noun (gerund):

- **Specifying** the system password gives you full administrative access. (When it's the first word of a simple sentence, an -ING word can only be a gerund.)

6) introduces a participial clause:

- The second argument has been set to NULL, **indicating** that the future amount is to be calculated. (Note that, unlike a participial phrase, a participial clause is—or should be—preceded by a comma.)

Rationale: In all of these sentences, the -ING word is unambiguous because other syntactic cues are present.

4. Search for all occurrences of the word *and*.

a. Consider whether you need to insert an infinitive marker (*to*), a preposition, a modal verb, an auxiliary verb, or another syntactic cue in order to make the sentence structure predictable and unambiguous.

Rationale: Whenever *and* appears, there may be a “scope of conjunction” problem. That is, it may be impossible for a translator (and for other readers—both native speakers and non-native speakers) to determine which parts of the sentence are being conjoined. Inserting a syntactic cue resolves the potential ambiguity and also makes the sentence easier for an MT system or human reader to analyze.

- The application can use the window to establish a dialog with the user and [**can? to?**] format text responses. (*can* is a modal verb; *to* is an infinitive marker. This sentence is ambiguous.)
- The coordinates that are displayed correspond to the top of the slider in the vertical slide bar, and [**to**] the left edge of the slider in the horizontal slide bar. (*to* is a preposition)
- This routine was originally generated by RPCGEN and [**was**] then modified to communicate with the program manager. (*was* is an auxiliary verb)

b. If the *and* is joining two noun phrases, and if an adjective precedes the first noun, then consider whether that adjective modifies a) both nouns or b) only the first one. If it modifies only the first noun, then try to make that clear by either a) inserting an article and/or an article plus adjective in front of the second noun, b) reversing the order of the noun phrases, or c) using a bulleted list.

Rationale: This type of ambiguity is known as ambiguous “scope of modification.” With some other types of ambiguity, translators can find equally ambiguous parallel structures in their own languages. But with the “scope of modification” type of ambiguity, translators (in languages like French and Spanish, at least) cannot do that. Adjectives in those languages must agree in number and case with the noun(s) they modify. So we have to make it clear which noun(s) an adjective is modifying.

- FILEMEMN and FILEMEMT contain the logical member name **and [the] [logical?]** member type, respectively. (Does *logical* modify only *member name*, or does it also modify *member type*? If it modifies only *member name*, you can make that clear by inserting *the* in front of *member type*.)
- Be careful when your input data include leading blanks **and** semicolons. (Does *leading* modify *semicolons*? If not, then reverse the order of the noun phrases: ⇒ Be careful when your input data include semicolons and leading blanks.)

c. If *and* is joining two noun phrases, could someone who does not know the subject matter determine whether the word that precedes *and* is a noun or an adjective? If not, then either insert the appropriate noun, reverse the order of the noun phrases, or find some other way of resolving the ambiguity.

- The remaining portion of the window contains text **and** line-number areas that are used to view source code. (It is not clear whether we mean just *text*, or *text areas*. Depending on what is meant, one of the following revisions is correct: ⇒ The remaining portion of the window contains text [**areas**] and line-number areas.... -OR- ⇒ The remaining portion of the window contains line-number areas and text....)

d. Consider whether you could replace *and* with *as well as* or *plus*.

Rationale: *As well as* and *plus* almost always introduce noun phrases. By contrast, *and* can introduce many different constructions (e.g., a new clause, a prepositional phrase, a noun phrase, etc.). Thus, *as well as* and *plus* make it easier for readers (and MT systems) to predict and analyze the structure of the rest of the sentence.

- LABEL= enables you to specify the type and contents of the label of either a tape data set or a disk data set[,] and [⇒ **as well as**] other information such as the retention period or expiration date for the data set.
- The document contains a timestamp at the beginning[,] and [⇒ **plus**] several site-specific processing-instruction tags.

e. Consider whether you could use *both... and* to help readers analyze the sentence.

Rationale: *both... and* (as well as *either... or*) make it easier to see which parts of a sentence are being conjoined.

- This information must specify [**both**] the syntactic category of the word **and** the categories of the phrases that it can take as complements.

f. If *and* is joining two verb phrases, consider inserting a pronoun or noun subject so that you will have a compound sentence (two independent clauses) or two separate sentences instead.

Rationale: Readability formulas typically factor in average sentence length. But from a psycholinguistic standpoint, the length and clarity of each clause is more of an issue. When a reader reaches the end of a clause, the proposition (idea) expressed by the clause is transferred from short-term memory into a more abstract representation in long-term memory. This improves readability by reducing the burden on short-term memory. In addition, shorter sentences and clauses are generally easier for translators to translate and for MT systems to analyze correctly.

- Push buttons are rectangular or oval, include only text labels, and may appear pushed in after being selected. (⇒ Push buttons are [**either**] rectangular or oval[.] [**They**] include only text labels[,] and [**they**] may appear pushed in after being selected.)

Note: Commas, periods, and other punctuation marks also act as syntactic cues by marking clause or sentence boundaries.

5. Search for all occurrences of the word *or*.

a. If equivalent terms (synonyms) are being used, ask yourself whether this is justifiable. Be consistent with your terminology. Use synonyms joined by *or* only if you are not sure which of two terms your readers will be familiar with.

Rationale: It is often difficult to determine what *or* means when it is joining two noun phrases. Does it mean that the two noun phrases are synonymous, or is one an alternative to the other?

b. Insert an article (*a*, *an*, or *the*) or use *either... or* (or do both) if the two terms that are joined by *or* are not synonyms.

- The system displays a message and prompts for user input when [**either**] a hard error **or an** exception occurs. (makes it clear that *hard error* and *exception* are two different things, if indeed that is the case)

- c. Use parentheses to indicate equivalence, if your company is willing to adopt this as a standard.
- a hard error (or exception)
 - 3 in. (7.62 cm)
- d. If *or* is joining two noun phrases, ask yourself whether a non-expert reader or MT system could readily determine whether the word that precedes *or* is a noun or an adjective. If not, then either insert the appropriate noun or find some other way of resolving the ambiguity.
- Table Name is the name of each fact or dimension table. (It is not immediately clear to someone who doesn't know the subject that we are talking about fact *tables* and dimension tables. ⇒ Table Name is the name of each fact [table] or dimension table.)
- e. If *or* is joining two verb phrases, consider inserting a pronoun or noun subject so that you will have a compound sentence (two independent clauses) or two separate sentences instead. (See 4f for the rationale and a comparable example.)

6. Look for long noun phrases. Hyphenate compound adjectives, put curly braces (or brackets, or whatever) around compound nouns, or provide some other explanation in a list of noun phrases that you should provide to translators. Decide whether hyphens should be inserted in the text for other readers as well.

Rationale: Translators need to know which words in a long noun phrase are more closely related. For example, a *terminal interrupt handler* is a compound adjective + noun construction (a handler of terminal interrupts), not a compound noun + adjective (an interrupt handler that is terminal). It would be hyphenated as *terminal-interrupt handler*. Often it is impossible for translators who are not familiar with the subject matter to determine how these should be translated unless we find some way to convey this information to them. But we certainly don't want to put *curly braces* in the actual document, and even hyphens are often intrusive to subject-matter experts—hence the need for a separate list for translators.

- The value in register 1 must be saved in the **argument string word** of the return value. (Hyphenating this as *argument-string word* tells translators that we mean "a word of memory that is designated to hold an *argument string*." But we might decide not to put the hyphen in the actual document.)
- The **library attention handler** will not call any other L\$U routines. (Compound nouns are never hyphenated, but we could write this as *library {attention handler}* in the list that we provide to translators. This would indicate that we mean "an *attention handler* for a *library*.")
- The **initial file mode creation mask value** is zero. (This requires revision plus hyphenation: ⇒ The *initial value* of the *file-mode-creation mask* is zero. Decide whether to put the hyphens in the actual document or to explain the noun phrase to translators.)
- The *rdfds* parameter specifies a **read file descriptor bit mask**. (Revise to say "...a *bit mask* for a *read-file descriptor*," or explain it to the translators.)

7. Look for forms of verbs or verb phrases like *assume*, *be sure*, *ensure*, *indicate*, *mean*, *require*, *specify*, *suppose* and *verify*. Ask yourself whether you could insert the word *that* after these verbs to make the sentence structure clearer.

Rationale: Non-native speakers of English cannot be expected to know which types of complements every English verb can take. In a different language, the closest equivalent to the verb *ensure* might take only a direct object, not a noun clause complement. We make it more difficult both for non-native speakers and for MT systems to interpret our sentences correctly if we don't use *that* to indicate that a noun clause is coming.

- It is important to **ensure [that]** the LDRTBLS value is large enough to contain your X client.
- Notice that a check mark appears next to the table name to **indicate [that]** the table has been selected.

8. Look for the verbs *give* and *assign*. Consider whether there is an indirect object that could be made grammatically explicit by using the word *to*.

Rationale: In many other languages indirect objectives are clearly marked by a dative ending or by some other means. Here we are just providing non-native speakers and MT systems with another syntactic cue to help them analyze sentence structure correctly.

- A label **gives** a variable a more informative name. \Rightarrow A label **gives** a more informative name **[to]** a variable.
- Before printing a date, you usually **assign** it a format. \Rightarrow Before printing a date, you usually **assign** a format **[to]** it.

9. Look for the word *if*.

- a. If it introduces a conditional *if* clause, then consider beginning the following clause with *then*. (Note: If the *if* clause is very short, it is not necessary to insert *then*. Also, it doesn't always sound good to insert *then*; according to Celce-Murcia and Larsen-Freeman (1983), no one has ever been able to formulate a rule that describes in which contexts *if...then* sounds acceptable to native speakers.)

Rationale: The *then* in an *if...then* construction provides "semantic reinforcement." That is, it reinforces the idea of a condition being followed by a result or consequence. It also clearly signals the beginning of the result/consequence clause.

- **If** you have not assigned a logical name to the data file, **[then]** specify the physical filename in the statement that refers to the file.
- b. If the first *if* clause is followed by a second conditional clause, then the second clause should generally also start with *if*.

Rationale: As with *if...then*, the second *if* in an *if...if* construction provides semantic reinforcement and signals the beginning of the second result/consequence clause.

- If any single lookup might take several seconds[,] and **[if]** many clients might request service simultaneously, **[then]** the server must be able to handle multiple clients concurrently.

10. When an adjective follows a noun, consider expanding the adjective into a relative clause. Make a list of each such adjective that you find in your company's documentation, and then search for other occurrences of those words.

Rationale: Relative clauses are more syntactically explicit than postnominal adjectives. Therefore, relative clauses are easier for non-native speakers of English to comprehend and for MT systems to analyze.

- This organizational structure is an aid to users **[who are]** familiar with X implementations on other systems.