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SQUIBS

How metaphor affects grammatical coding: the Saxon genitive in computer manuals

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The distribution of the Saxon genitive and the *of* genitive in computer manuals is significantly different from their distribution in other texts. This is because the manuals contain a high proportion of computer nouns (nouns referring to computer hardware and software), which pattern like human nouns rather than like inanimate nouns. An analysis of the conventional metaphors used to talk about computers reveals that they are often construed as people, and the higher proportion of the Saxon genitive is a grammatical repercussion of this construal.

1 Introduction

The Saxon genitive *(X's Y)* and the *of* construction *(Y of X)* in English are very similar in meaning and can sometimes be used more or less interchangeably (*the printer's house* = *the house of the printer*). In other cases, one form is clearly preferred over the other. In a statistical study of these constructions, Leech, Francis, and Xu (1994) isolate three factors which determine the choice of construction and calculate their relative weight. The factors are, in order of importance:

A. SEMANTIC CATEGORY OF X: human > locative > organizational > animal > abstract > concrete inanimate
B. SEMANTIC RELATIONSHIP BETWEEN X AND Y: origin > subjective > possessive > attributive > partitive > objective
C. TEXT TYPE: fictional > journalistic > learned

The ordering of values within each factor corresponds to the likelihood of the occurrence of the Saxon genitive: for example, human nouns are the most likely to take *-'s*, followed by locative nouns, followed by organizational nouns, and so on. Leech et al. claim that the statistical model derived from the data makes accurate predictions about the probability of the occurrence of *-'s* or *of* in a particular context.

Leech et al.'s corpus included three types of texts: journalistic, learned, and fictional. This study tests the validity of the first and most important factor, the semantic category of X, on a rather different collection of texts, namely, the documentation provided by software manufacturers with their products. As we shall see, this corpus yields significantly different results, and the differences are clearly attributable to semantic factors.

Table 1 *Results for factor A: this study*

Category of X	No. of Saxon genitives	No. of *of*-constructions	Total
Human	31	12	43
Organization	12	9	21
Abstract/Concrete inanimate	75	734	809
TOTAL	118	755	873

Table 2 *Comparison of Leech et al.'s results and the results obtained in this study*

Category of X	% of Saxon genitives (Leech et al.)	% of Saxon genitives (this study)
Human	55	72
Organization	24	57
Abstract/Concrete inanimate	0	9

2 The corpus

The texts studied were software manuals and program descriptions. The corpus comprised 63,741 words, with about a third of the texts written for the lay person, a third for computer professionals, and the rest falling at various points in between. A parallel corpus of 17,771 words consisting of newspaper articles about computer technology was assembled for the purpose of comparison.

3 Results

The raw results obtained in the present study are summarized in table 1; in table 2, they are converted into percentages and compared with the results obtained by Leech, Francis and Xu.[1]

Both sets of figures show the same general tendency: the proportion of Saxon genitives is highest for human nouns and lowest for abstract and concrete inanimate nouns, with organization nouns falling in between. However, there are two striking differences. First, my figures show a much higher proportion of Saxon genitives in each category, in spite of the fact that the overall proportion of this construction in the entire corpus is actually lower than in Leech et al. (14 per cent, whereas theirs had 18 per cent).[2] This seeming contradiction is due to the fact that my corpus

[1] Locative and animal nouns have not been included in the tables because they were not sufficiently represented in the corpus to warrant generalizations. Abstract and concrete inanimate nouns have been grouped together because it was often difficult to make non-arbitrary distinctions between the two. The figures in table 2 have been rounded off to the nearest whole number.

[2] These figures were arrived at after excluding time and place nouns from the Leech, Francis and Xu data,

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contained a much higher proportion of abstract and concrete inanimate nouns, which take Saxon genitives extremely rarely. (The ratio of abstract and concrete inanimate nouns to human nouns is approximately 2:1 in the corpus used by Leech et al. and 19:1 in mine.)

The second point where the two sets of data diverge is in the presence or absence of Saxon genitives on concrete inanimate and abstract nouns. The figures reported by Leech et al. seem to point to a categorical rule: there are *no* Saxon genitive endings on the former, and only one on the latter (out of a total of 400 abstract nouns). My data show a clear preference for the *of*-construction, but this is by no means the only option: 75 out of 809, or 9.3 per cent of the total number of occurrences, take the *-'s/s'* ending.

The higher proportion of Saxon genitives on human and organization nouns in my corpus can presumably be attributed to the influence of the third factor in the Leech, Francis and Xu model, the semantic relation of X and Y: the overwhelming majority of the genitive constructions belonging to this category designate either origin or possession (*IBM's SAA standard, user's manual*), whereas the *of*-constructions tend to designate attributive relationships (*the presence of the user, the name of the organization*). However, there is nothing in their corpus, or in the statistical model derived from it, that would lead us to expect the comparatively frequent occurrence of the Saxon genitive on inanimate nouns in the texts analysed in this study.

A closer look at the semantics of these nouns will provide a hint about what is going on. As noted above, the texts analysed in this study were all part of the documentation provided by software manufacturers with their products; consequently, they had a high incidence of 'computer nouns', i.e. nouns referring to computers and computer software. Unlike ordinary abstract and concrete inanimate nouns, these nouns take the *-'s* ending quite freely, thus skewing the results. This is made clear by the figures in table 3, where computer nouns are treated separately.[3] Of the twenty-one abstract/concrete inanimate nouns that occur with the Saxon genitive but are not computer nouns (i.e. nouns that refer to the machine or to a program), all but two designate *parts* of a computer or program, or something that is displayed on the computer screen. The two remaining instances (*the word's occurrence, the paper's text*) are true exceptions, and their frequency (2 out of a total of 670 occurrences) is similar to that noted by Leech et al. (1 out of 400).

Thus, the statistics in table 2 mask a semantic regularity. What remains to be explained is why computer nouns, both concrete and abstract, differ syntactically from other nouns.

as I have done from mine. This leaves 251 Saxon genitives and 1,154 *of*-constructions. Thus, the former comprise 17.9 per cent of the total.

[3] Nouns designating software running on a particular machine and the machine itself are subsumed under the same category because they tend to be used interchangeably. Thus, a manual might state that when a user presses a particular key combination, the computer will perform a certain action, or, alternatively, that the program will perform the action.

Table 3 *Results for factor A: this study (revised)*

Category of X	No. of Saxon genitives	No. of *of*-constructions	Total	% of Saxon genitives
Human	31	12	43	72%
Organization	12	9	21	57%
Computer	54	85	139	39%
Other inanimate	21	649	670	3%
TOTAL	118	755	873	—

4 Discussion

Leech et al.'s figures for factor A can be summarized in the following semantic generalization: prototypical human nouns tend to take the Saxon genitive; prototypical inanimate nouns take *of*. Non-human nouns, however, can behave like human nouns when they are seen as approximating the human-noun prototype. Thus, animal nouns usually pattern like human nouns, particularly when they refer to pets, or to animals viewed as possessing human characteristics (for example, animal protagonists in a story). Organizations are often thought of as if they were living organisms: the various units that they consist of are viewed as analogous to parts of the body; the circulation of information corresponds to the circulation of blood; and, like humans, they have (corporate) goals, interests, etc. Not surprisingly, therefore, organization nouns often take the Saxon genitive. I suggest that computer nouns can take the *-'s* ending because speakers attribute certain human characteristics to them. We will find evidence for this by looking at some semantic aspects of the language used to talk about computers, and more specifically, metaphor.

People often talk about computers as if they were human beings. When they describe their machines as *temperamental* or *malicious*, we can say that they are playing with language; but when they talk of their PC's *memory*, of *artificial intelligence*, or of *instructions to the processor* they are probably not even aware that they are using metaphors. It is conventionalized metaphorical expressions of the latter kind, or what Lakoff and Johnson (1980) call *linguistic*, as opposed to novel, or poetic, metaphors, that we will be primarily interested in here. In their book, Lakoff and Johnson argue that linguistic metaphors are not just fancy, florid ways of speaking, but reflect the way people conceptualize the world around them. Whatever one thinks of their argument, it is undeniable that personification of computers is a perfectly ordinary way of talking about them. All the manuals in my corpus contained metaphors, literally hundreds of them; some examples are provided below. (Not all of these examples have been drawn from the corpus.)

(1) (a) Computers can *understand* only two things: 1 and 0.
(b) [A list of short cuts is provided] to remind you how TACT *interprets* the PC's function keys.

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(c) TACT will *assume* you want to replace the entire field with the new material.
(d) You're running a program, and suddenly you realise your computer isn't *paying any attention* to you.

(2) (a) VM host *asks* for Terminal Type again.
(b) if you *make a complex request of* TACT . . . it will *respond by presenting* you with . . .
(c) TACT *tells* you what the shortcuts are in several ways.

(3) (a) . . . your server should *try* and send the following [files] . . .
(b) NCSA Telnet *gives up* on opening the connection . . .
(c) Ctrl-I *forces* NCSA Telnet to send the local buffer.
(d) [Files] the other computer is *allowed* to send you at any one time . . .

(4) (a) My hard disk's *died* on me.
(b) A *virus* is a program that *infects* your computer.
(c) Oh, no! It [the computer] has just eaten my diskette!

The above examples show that a number of typically human characteristics are attributed to computers. Those grouped in (1) indicate that computers are thought of (or at least talked of) as if they were intelligent beings: they can think, understand, make assumptions, etc. The use of verbs such as *ask* and *tell* in the sentences in (2) indicates that they are believed to be capable of engaging in acts of communication (both as speakers and as addressees); and verbs such as *try, give up, allow*, and *force* in (3) suggest that computers have their own intentions. The examples in (4) show that the personification of computers can even go as far as attributing to them the physiological aspects of human existence.

Of course there are limits on how far the metaphor can be stretched. Computers are not human: one does not promise to take them to the zoo or provide them with contraceptives. Moreover, the 'computers are people' metaphor is just one way of thinking about them. In other contexts and for other purposes, other metaphors are used, e.g. the geographical metaphor, in which the computer's memory or a program is seen as a country through which the user travels – a country which contains *paths, shortcuts, addresses*, and *locations*. Further examples of this metaphor are given in (5) below.

(5) (a) As you *move from program to program*, it's easy to *get lost* and forget *which directory you're in*.
(b) Do this if you wish to *get out of the dialog box* without changing anything.
(c) While *in Help* you can *jump to* other Help items.
(d) You have now seen all the basic *navigational tools within* TACT.

The geographical metaphor is particularly useful when discussing the internal structure of a program, and hence it tends to predominate in more technical texts. This explains the lower frequency of the Saxon genitive on computer nouns in these texts (e.g. only 13 per cent in the instructions that come with Telnet, which presuppose a fairly extensive knowledge about computing, as compared to 85 per cent in the manual for TACT, written for the lay person).

Thus the statistically discernible syntactic tendencies in a text reflect the way the

language user conceptualizes the key actors in the text. When a program is thought of as something that helps the user get things done, a kind of assistant, computer nouns behave syntactically very much like human nouns. On the other hand, when a program is thought of as a set of instructions to the processor, what becomes more relevant is how to 'access' particular parts of the program, and computer nouns pattern like locative nouns.

An application can also be thought of as a product on the market; in this case it is simply a concrete inanimate noun, a thing in a box. This explains another curious fact about computer nouns: in other kinds of text, e.g. newspaper articles, they behave very much like ordinary concrete inanimate nouns. The frequency of occurrence of the Saxon genitive on computer nouns in the supplementary corpus (nineteen newspaper articles about computer technology) was only 5 per cent. These articles, however, did not deal with the inner workings of specific applications; instead, they tended to focus on the most recent innovations in IT technology, on prices and what to look for when buying a computer. Therefore, the discernible syntactic patterns mirror semantic regularities in these texts as well.

5 Conclusions

We have seen that in genitive constructions computer nouns tend to behave like human nouns, rather than like other inanimate nouns. Hence, their syntactic patterning does not fit the predictions made by Leech, Francis and Xu (1994). Of course, their model could be modified to accommodate the findings of this study, but it is difficult to see how this could be done in a principled way. Adding another possible value – 'computer' – for factor A won't do the trick, since computer nouns do not readily take the Saxon genitive in all kinds of texts. One could introduce a new text type category (say, 'computer manual style'), but this is clearly unsatisfactory: we cannot postulate a new text type every time we run into a collection of texts that do not fit the model, as this would lead to an endless proliferation of 'styles'.

This paper was meant to illustrate both the strengths and the weaknesses of the method proposed by Leech et al. Corpus linguistics makes it possible to formulate generalizations of the kind that emerged from their study; and it also provides the means for questioning these generalizations. However, a statistical analysis of texts cannot *explain* why words should pattern the way they do. To find explanations, we must go beyond corpora and into the realm of semantic and functional considerations.

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