Genitive and *of*-construction in modern written English. Processability and human involvement*

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On the basis of 698 instances of Saxon genitive and *of*-construction, the present paper explores the use of these modifiers from a corpus-linguistic perspective. In particular, the influence of the lexical class of the modifier, the semantic relationship expressed by the constructions, and weight and syntactic complexity is analysed. It will be argued that the variation of genitive and *of*-construction can be explained with regard to two major underlying factors, namely 'processability' and 'degree of human involvement'.

1. Introduction

The genitive case and *of*-construction have coexisted in the English language since the ninth century. Back then, the genitive was the usual construction, and, with English still being a synthetic language, it appeared in almost equal numbers either in front of or after the modified noun. The *of*-construction was a marginal variant, which, according to Fries (1940: 206) occurred in less than 1% of all cases. In the four hundred years to follow, the situation changed drastically. The gradual reduction of the inflexional system and the development of a fixed word order led to the extinction of the post-posed genitive by 1300. Whereas up to 1200 the post-posed genitive was substituted by its pre-posed variant in the majority of all cases, the *of*-construction increasingly gained ground from 1200 onwards and began to replace post-posed as well as pre-posed genitives. Around 1300, the *of*-construction was the most frequent

variant (84.5%[1]) (Fries 1940: 206). In Late Middle English and Early Modern English the extensive use of *s*-less forms in certain dialects further weakened the position of the genitive (Altenberg 1982: 13). However, in Modern English, the genitive has regained ground, especially in certain varieties of English, such as journalistic writing (Raab-Fischer 1995: 13) or American English (Jahr 1981: 22). Although in certain contexts both constructions are mutually exclusive, there exist large areas of overlap where both are possible variants. In these areas, the choice between genitive and *of*-construction is not a case of free variation but "largely determined by a number of conditioning factors, linguistic as well as extra-linguistic" (Altenberg 1982: 12). It is the aim of this study to analyse how these factors influence the variation of genitive and *of*-construction in modern written English.

The material will be limited to those cases where both constructions are posssible alternatives, i.e. where the genitive ('N_1's N_2') can be substituted by the *of*-construction ('*the* N_2 *of* N_1'), and vice versa. Hence, instances of 'post-genitive' (1), 'local genitive' (2) and 'independent genitive' (3) will not be considered.

(1)   a friend of hers
      *hers' friend[2]

(2)   we meet at Bill's
      *we meet at of Bill

(3)   his car is faster than John's
      *his car is faster than of John

I will further exclude those *of*-constructions in which the modifier or the head are not nouns (i.e. pronouns, determiners, non-finite clauses, etc.).

(4)   her face is as ugly as that of a dog
      *her face is as ugly as a dog's that

(5)   the cost of providing the startup
      *providing the startup's cost

Quantitative and qualitative partitive constructions (examples (6) and (7), respectively) as well as *of*-constructions of material (8) will be excluded, since these are usually non-definite and lack their genitive counterparts (Altenberg 1982: 29f and Quirk et al. 1985: 1278). For the same reason *of*-constructions with premodifying quantifiers will also be excluded (9):

(6)   a tin of soup
      *a soup's tin

(7)   this kind of work
      *this work's kind

(8)   a crown of gold
      *a gold's crown

(9)   most of the people
      *the people's most

The remaining constructions are, in principle, interchangeable. 'In principle' does not mean that each instance has to be transformable in a particular context, but all examples have to belong to "transformable classes: i.e. classes of the genitive or the *of*-construction for which members of the opposite category also occur" (Leech et al. 1994:62). Constructions which express partitive relations, for example, are transformable in this sense since alongside genitives (10) we also find corresponding *of*-constructions (10a):

(10)   the committee's chairman
(10a) the chairman of the committee

Still, instances of partitive constructions occur which cannot be transformed within certain contexts. The corresponding genitive to the *of*-construction under (11), for example, is of doubtful acceptability (cf. Quirk et al. 1985:1277):

(11)   the roof *of this house*
(11a) *?*this house's* roof

Such constraints on transformability, however, are not of a principal nature. They appear to be rule-governed and can be explained through a number of conditioning factors. In this paper, an attempt will be made to analyse the influence of these conditioning factors from a corpus-linguistic perspective.

2.   Conditioning factors

Various factors which influence the variation of genitive and *of*-construction have been discussed in previous approaches. These factors operate on different levels of linguistic description and may therefore be expected to differ in the kind as well as in the power of influence. In the present analysis, I will focus

on the following factors: from a semantic point of view, the **lexical class of the modifier (N$_1$)** is held to be an extremely influential factor. In this context it is usually assumed that *of*-constructions are associated with entities that do not show any traits of personality, whereas genitives are usually used with modifiers that designate animate entities (cf. for example Curme 1931:75). On the syntagmatic level, the choice between 'N$_1$'s N$_2$' and '*the* N$_2$ *of* N$_1$' is influenced by the kind of **semantic relationship** which is expressed by the construction. It is, for example, acknowledged by most scholars that possessive relationships are usually expressed by the genitive (cf., for example, Sinclair 1990:129). Syntactically, considerations of **weight** and **structural complexity** will most probably show their influence. Hence, heavy modifiers, for example, can be expected to favour *of*-constructions whereas heavy heads might lead to genitives (cf. Biber et al. 1999:304).

The influence of **information status** will not be examined in this study. Although this factor has been shown to be decisive with regard to a variety of syntactic phenomena (see for example Kaltenböck (2000) on *it*-extraposition and Arnold et al. (2000) on heavy-NP shift and dative alternation), it has been shown to be only of secondary importance with regard to the variation of genitive and *of*-construction (cf. Altenberg 1980:170 and Jahr-Sorheim 1981; see, however, Biber et al. 1999:305f. and Standwell 1990 for a discussion of the influence of information status).[3]

2.1 The lexical class of the modifier

Many scholars regard the lexical category of the modifier (N$_1$) as one of the most powerful conditioning factors with regard to the choice of either genitive or *of*-construction. It seems to be generally accepted that the choice depends on the degree of personality assigned to the modifier or on "the degree to which [the modifier] tends towards human reference" (Leech et al. 1994:60). Thus, many grammarians claim that the genitive is favoured with nouns which denote human beings whereas the *of*-construction is, apart from some exceptions, usually regarded as the only choice with concrete or abstract inanimate nouns (cf. Jucker 1993:126; Quirk et al. 1985:322f.; Biber et al. 1999:302f.).

To a certain extent, then, the use of the genitive can be neatly captured by hierarchies based on the degree of 'personality' that can be assigned to each class. Among the many approaches of this kind Quirk et al.'s (1985:314) *gender scale* figures most prominently.[4]

		GENDER CLASS	EXAMPLE
	personal	a. male	*brother*
		b. female	*sister*
		c. dual	*doctor*
Animate		d. common	*baby*
		e. collective	*familiy*
	non-personal	f. higher male animal	*bull*
		g. higher female animal	*cow*
		h. lower animal	*ant*
inanimate		i. inanimate	*box*

Figure 1. The gender scale (cf. Quirk et al. 1985:314)

Quirk et al. (1985) claim that those modifiers favour "the genitive [...] which are highest on the gender scale [...], i.e. 'personal' nouns (particularly those referring to human beings and higher animals) and collective nouns with personal gender characteristics" (p. 323). However, they add that certain kinds of inanimate nouns quite frequently take the genitive (p. 324). A more detailed analysis of such instances is provided by Dahl (1971): the genitive is increasingly used with inanimate nouns since these may evoke the idea of their constituent human beings or "a notion of human beings since they occupy an intermediate status between personal and non-personal nouns (cf. Quirk et al. 1985:324). Hence, *the government's decision* is understood to be the decision which was made by the individuals that constitute the government.

There are, however, inanimate nouns that are of a dual nature in that they show collective as well as inanimate characteristics. With geographical names and nouns, Dahl (1971:147) distinguishes between nouns which are used in a political or sociological sense and nouns which are used in a purely geographical sense. Whereas the former often evoke the notion of people connected with the noun, the latter do not. In which of these senses the modifier is used often becomes apparent from the context. In the examples below (cf. Quirk et al. 1985:1277), the head noun indicates whether the modifier is to be understood in a purely geographical (example (12)) or rather in a sociological sense (13):

(12)   China's map

(13)   China's economy

Similar considerations partly hold true for names of buildings and places such as *school*, *museum*, etc., as some of these might evoke the notion of a group of people closely connected to them. In a similar way, we often connect titles of

newspapers or periodicals with the editorial staff or the publisher(s), i.e. with people 'behind the scene' (Dahl 1971:158).

A special category is assigned to the sun, the planets and other celestial bodies, which usually take the genitive (Dahl 1971:156). In contrast to the categories mentioned above, items of this category can be described as having a personality of their own. This is most probably due to their remoteness from earthly affairs, their proximity to God and their godly status in ancient religion. Thus, celestial bodies were extremely prone to personification in poetry, from where this personified use has also been introduced into other kinds of texts.

Dahl assigns a further category to machines and means of locomotion. Due to the technical precision of modern machines, they have become almost independent of human control, thus having acquired a personality of their own: "as an equivalent of the real personification traditionally attached to such words as *ship*, *boat*, and *vessel* one could speak of a kind of "technical personification" in connection with the words *rocket* [and] *computer*"(Dahl 1971:155).

From what was said above, it follows that the distribution of genitive and *of*-construction seems to be best explained by Quirk et al.'s gender scale with slight modifications along the lines of Dahl's (1971) findings; it seems reasonable to create the following four subcategories of inanimate nouns:

a) Inanimate semi-collective nouns: those nouns that may evoke the idea of 'human beings behind the scene' but do not necessarily do so. This will include the following of Dahl's categories: geographical names and nouns, buildings and places, newspapers and periodicals.

b) Inanimate personified nouns: those nouns that are traditionally conceived of as having a personality of their own, i.e. the sun, the moon, the stars and other celestial bodies, and nouns like *ship*, *boat* and *vessel*. Machines and means of locomotion will also be included since these might be regarded as having personality due to their technical precision and their independence of human beings.

c) Inanimate nouns of time and measure: *last week's decision*, *a day's work*, *today's news*, etc. These nouns may take the genitive (Quirk et al. 1985:324) without showing any traits of personality whatsoever.

d) Inanimate non-personal nouns: this category will include the remaining nouns, i.e. inanimate nouns that do not belong to either of the three categories above: *box*, *tyre*, *lamp*, *street*, *bomb*, etc.
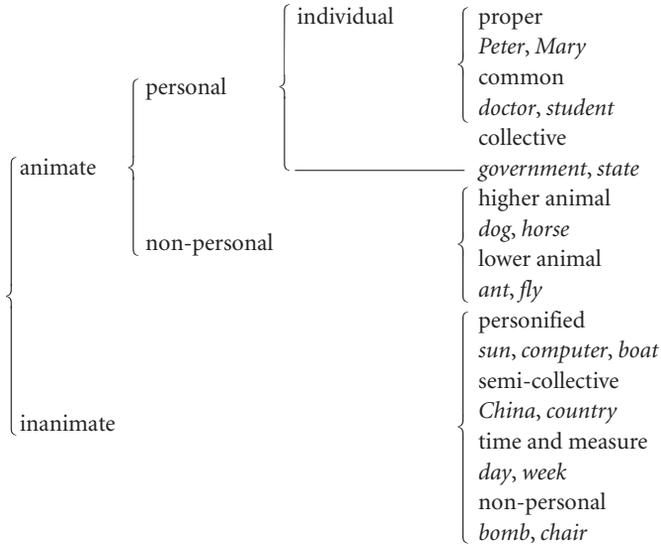
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                              ┌ individual    ┌ proper
                              │               │ Peter, Mary
                  ┌ personal ─┤               │ common
                  │           │               │ doctor, student
                  │           │               │ collective
        ┌ animate ┤           └───────────────┘ government, state
        │         │                           ┌ higher animal
        │         │                           │ dog, horse
        │         └ non-personal ─────────────┤ lower animal
        │                                     └ ant, fly
        │                                     ┌ personified
        │                                     │ sun, computer, boat
        │                                     │ semi-collective
        └ inanimate ──────────────────────────┤ China, country
                                              │ time and measure
                                              │ day, week
                                              │ non-personal
                                              └ bomb, chair
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Figure 2. The personality scale

Furthermore, I will distinguish between proper nouns and common nouns with regard to individual personal nouns. These considerations lead to the hierarchy shown in Figure 2, which I will call the personality scale.

2.2 The semantic relationship

Early categorisations of the genitive meanings can be regarded as attempts to apply the categories of Latin or Ancient Greek to Modern English. Thus, Poutsma (1914: 40ff.), for example, distinguishes six meanings of the genitive ('possessive', 'origin', 'subjective', 'objective', 'appositive' and 'of measure'), all of which form a part of the genitive categories of Ancient Greek and Latin. The obvious advantage of classifications of this kind is the fact that they, despite being fairly simple, capture most of the genitive meanings (Altenberg 1982: 153). However, the question remains as to whether the semantics of the English genitive is appropriately described by categories found in ancient languages.

Quirk et al. (1985: 321) claim that "the meaning expressed by the genitive can best be shown by sentential or phrasal analogues." They offer a list of eight genitive meanings and try to relate traditional categories to paraphrases (Quirk et al. 1985: 321f.):

a.   POSSESSIVE GENITIVE: *Mrs Johnson's* passport

  Mrs Johnson has a passport

b.   SUBJECTIVE GENITIVE: *her parents'* consent

  her parents consented

c.   OBJECTIVE GENITIVE: *the family's* support

  (...) supports the family

d.   GENITIVE OF ORIGIN: *the girl's* story

  the girl told a story

e.   DESCRIPTIVE GENITIVE: *a women's* college

  a college for women

f.   GENITIVE OF MEASURE: *ten days'* absence

  the absence lasted ten days

g.   GENITIVE OF ATTRIBUTE: *the party's* policy

  the party has a (certain) policy

h.   PARTITIVE GENITIVE: *the baby's* eyes

  the baby has (blue) eyes

Shumaker (1975) completely dispenses with traditional categories and classi-fies the genitive meanings on the grounds of sentential or phrasal paraphrasing alone. She suggests the following fourteen categories (1975: 73–80):

1. Zunser's hymn: the hymn that Zunser produced
2. Their advice: They advised[5]
3. Her amazement: Someone/Something amazed her
4. Her tormentors: the ones who torment her
5. Their Hebrew lesson: The Hebrew lesson they study
6. His abruptness: He is abrupt
7. Miss Taylor's coffee break: the break Miss Taylor spent drinking coffee
8. Halsey's grocery: the grocery that Halsey owns
9. Her patient's closet: the closet that her patient uses
10. Hazel's head: the head that is part of Hazel
11. Your PTA: the PTA of which you are a member
12. Esteban's doctor: the doctor of whom Esteban is a patient
13. Detroit's long cold streets/tomorrow's weather: the long cold streets in Detroit/the weather for tomorrow
14. Miscellaneous

There is no need to discuss each of the fourteen categories in detail. It is, however, obvious that this system leads to a far more elaborate classification of genitive meanings than traditional approches. *Her patient's closet* (9) and *Esteban's doctor* (12), for example, would most probably be regarded as instances of possessive genitives in traditional categorisations although *a closet* is not as readily conceived of as being possessible as *a passport* (*Mrs Johnson's passport*); the same applies to *Esteban's doctor*. Furthermore, instances like *Miss Taylor's coffee break* do not seem to fit in any of the traditional categories.

The advantage of the paraphrasing system, then, lies in the fact that it is not based on a limited number of fixed categories derived from some ancient language but that it may be adapted to any language. Furthermore, paraphrase groups may be further subdivided or incorporated into a more general group, depending on the semantic specificity desired. This renders paraphrasing an extremely flexible (although, of course, not completely objective) means of categorising genitive meanings. However, as traditional systems capture most of the genitive meanings, they can serve as a convenient basis for a new categorisation. I will therefore take Quirk et al.'s combined traditional paraphrasing system and subdivide some of the categories further, according to the insights we have gained from Shumaker (1975).

The most obvious weakness of Quirk et al.'s system is that different genitive types have the same paraphrase (cf. Durieux 1990: 15). Possessive, attributive and partitive genitives are all paraphrased by 'X has Y'. The classification used in this study will provide different paraphrases for different meanings. Another point of criticism is the missing distinction between 'possession' and 'kinship'. 'Kinship' might be regarded as a special instance of 'possession', but two distinct categories seem useful (and will be applied) since 'kinship' implies a higher degree of human involvement than 'possession'. Furthermore, I will distinguish between possession proper and a relationship that can be better described as 'having sth./so. at one's disposal' and 'making use of sth./so.'. 'Possession' implies an animate possessor and an inanimate concrete thing in possession, whereas the new category describes possessive relationships that can be described as neither proper possession nor as kinship. Thus, we have reached a fairly specific subdivision of what Quirk et al. would regard as 'possession'. Furthermore, with this new category we have reduced four of Shumaker's categories to one: the examples *Esteban's doctor*, *the patient's closet*, *their Hebrew lessons* and *Miss Taylor's coffee break* (all representing a different category in Shumaker's system) are perfectly well described by the paraphrases 'X has Y at their disposal' or 'X makes use of Y'.

Shumaker (1975:79) further distinguishes constructions which "contain a headword that is located in space or time by the modifier", such as *Detroit's cold streets*, which would be paraphrased by *the cold streets in Detroit*. I will include a similar category as examples of this kind do not fit into any of the categories discussed so far.

The above considerations lead to the following categorisation of genitive meanings. The expressions in brackets will be used as a more convenient way of referring to the different categories; *X* is used to designate the modifier, *Y* designates the head, *Verb(X)* stands for *verb corresponding to X*, *Adj(X)* stands for *adjective corresponding to X*:

1. **X is kin to Y** (Kinship)
    Peter's father – Peter is kin to his father

2. **X has (a/..) Y** (Possessive)
    Peter's car – Peter has a car

3. **Y is part of X** (Partitive)
    Hazel's head – the head is a part of Hazel

4. **X Verb(Y)** (Subjective)
    Her parents' consent – her parents consented

5. **so. Verb(Y) X** (Objective)
    The boy's release – so. released the boy

6. **X has Y at their disposal, X makes use of Y** (Disposal)
    Peter's doctor – Peter has the doctor at his disposal

7. **(the) Y in X, (the Y for X), ...** (Time & Space)
    Detroit's cold streets – the cold streets in Detroit
    Tomorrow's weather – the weather for tomorrow

8. **X is Adj(Y)** (Attribute)
    The victim's courage – the victim is courageous

9. **X produces/tells/writes ... Y** (Origin)
    The general's letter – the general wrote a letter

2.3   Distribution of weight and the influence of postmodification

We may assume that two kinds of influence are active on the syntactic level: according to the end-weight principle a heavily expanded modifier (N_1) would favour *of*-constructions whereas an expanded head (N_2) would take the geni-

tive. Thus, (14b) would be more acceptable than (14a), (15a) more acceptable than (15b) (cf. Quirk et al. 1985:1281):

(14a) His nasty but beautiful 19-year-old daughter's arrival

(14b) The arrival of his nasty but beautiful 19-year-old daughter

(15a) His daughter's arrival from Hamburg, where he lived during the sixties

(15b) ?The arrival from Hamburg, where he lived during the sixties, of his daughter

However, although both of the examples (14a) and (15b) violate the end-weight principle, it is only (15b) which would be regarded as unnatural or unacceptable. This is due to the fact that the examples in (14) and (15) show different kinds of expansion. In (14) the modifier *daughter* is expanded to the left by premodifying items, whereas in the examples under (15) the head *arrival* is postmodified by a prepositional phrase (*from Hamburg*) and an additional postmodifying non-restrictive relative clause (*where he lived during the sixties*). As the examples show, postmodification is usually both longer and structurally more complex and can therefore cause syntactical problems which might lead to discontinuity and ambiguity of reference. Hence, premodification may be expected to differ considerably from postmodification in conditioning force (cf. Altenberg 1982:76–78). Both types of expansion will therefore be treated separately.

Considerations of weight are of course important with both pre- and post-modification. However, the latter, in addition to simply adding to the weight of either head (N_2) or modifier (N_1), also exerts a further (and fundamentally different) kind of influence. On the level of the genitive or the *of*-construction, N_2 functions as the head of a noun phrase, which is either premodified by the genitive form of N_1 ('N_1'*s* N_2') or postmodified by an *of*-phrase that contains N_1 ('*the* N_2 *of* N_1'). However, N_1 and N_2 are noun phrases themselves. Within the larger construction ('N_1'*s* N_2' or '*the* N_2 *of* N_1'), both N_1 and N_2 may be realised as complex noun phrases, that themselves consist of a head noun followed by postmodifying material. For the ease of processing, the post-modification should immediately follow the head. On the other hand, how-ever, the hearer expects the head nouns of N_1 and N_2 to be in the vicinity of each other. The choice, then, between genitive and *of*-construction will for the most part be dependent on the extent to which both of the above requirements are met. This could be termed *the proximity principle*, i.e. related constituents should be in the proximity of one another. With a postmodified N_1, then, an

of-construction would be natural (16), whereas a postmodified N_2 would usually favour the genitive (17). The corresponding variants (16a) and (17a) are less acceptable since the heads of N_1 and N_2 are further apart:

(16)   the **car** [of the **man** that is talking to you]

(16a) [the **man** that is talking to you's] **car**

(17)   **Peter's** [**brother** who lives in France]

(17a) [the **brother** who lives in France] of **Peter**

However, 'deviant' examples are attested where the vicinity of head and postmodification within N_1 or N_2 is maintained at the expense of the vicinity of the heads of N_1 and N_2 in the genitive or the *of*-construction, and vice versa: a postmodified N_1 might lead to a group genitive;[6] postmodified N_2s may either lead to split or parenthetic genitives:

>Group genitive (N_1+ N_1-postmodifcation + 's + N_2):
>
>>the man in the corner's beer
>
>Split genitive (N_2 + *of* + N_1 + N_2-postmodification):
>
>>the translation of the book into English
>
>Parenthetic genitive (N_2 + N_2-postmodification + *of* + N_1):[7]
>
>>the translation into English of the book

It is reasonable to assume that the degree of acceptability of these deviant constructions depends on the kind of postmodification involved.

For the purpose of this study the three major kinds of postmodification, i.e. prepositional phrases, non-finite clauses and finite clauses (Quirk et al. 1985: 1239), will be taken into account. Furthermore, instances of apposited or coordinated heads and modifiers will be considered.

Whereas the influence of postmodification of N_1 or N_2 will be examined in terms of different kinds of postmodifying structures, the effect of premodification will be described in terms of weight, i.e. length in number of words. In particular, I will use a measure that is suggested by Altenberg (1982: 79–84): each graphic word that precedes the head and the modifier as premodifying will be counted separately. The only exception to this is the definite article in front of the head in an *of*-construction since this is obligatory. Thus, *the car of John*

will be regarded as a construction without premodification. Some examples are given below:

(18)   the arrival of my beautiful daughter
           head + xxmodifier

(19)   my daughter's long expected arrival
           xmodifier + xxhead

(20)   the car of the most honoured and most respected president
           head + xxxxxxmodifier

3.   The data

The data were taken from a subcorpus of the BNC which covered in equal proportion the three text categories 'imaginative', 'natural and pure science' and 'world affairs'. Of each of the above categories 10 texts were chosen randomly.[8] The first 1,500 words of each text entered into the subcorpus, totalling 45,000 words. In a first step, all instances of genitive *-s* or preposition *of* were singled out with the help of SARA. From this set of constructions those were deleted that were not interchangeable (see Section 1). 698 instances of transformable constructions remained out of which 519 (74.4%) were *of-* and 179 (25.6%) genitive constructions. All instances have been analysed with regard to the four factors discussed above, i.e. 'lexical class of the modifier', 'semantic relationship', 'kinds of postmodification' and 'syntactic weight of premodification'. To explore the influence of these factors, the chi-square test has been used.

4.   Results

4.1 The lexical class of the modifier

Table 1 and Diagram 1 below show the distribution of genitive and *of*-construction among the lexical classes of the modifier.

It is important to note that almost half of the observed data (47.1%) belong to the lexical category 'non-personal'. This partly explains the high percentage of *of*-constructions (74.4%) in the corpus material as this is the most natural choice for non-personal nouns (324 out of 329 instances). 62% (324

Table 1. Genitive vs. *of*-construction dependent on the lexical class of the modifier

	's	of	Row total
proper name	74	13	87
	85.1%	14.9%	12.5%
common noun	46	45	91
	50.5%	49.5%	13.0%
collective	5	35	40
	12.5%	87.5%	5.7%
higher animal	4	6	10
	40%	60%	1.4%
lower animal	1	10	11
	9.1%	90.9%	1.6%
personified	12	16	28
	42.9%	57.1%	4.0%
semi-collective	17	40	57
	29.8%	70.2%	8.2%
time & measure	15	30	45
	33.3%	66.7%	6.4%
non-personal	5	324	329
	1.5%	98.5%	47.1%
Column total	179	519	698
	25.6%	74.4%	99.9%

out of 519) of all *of*-constructions fall into this category. Further and more detailed information is provided by Diagram 1 where the distribution of the two constructions for each lexical class is depicted on a per cent scale.

The chi-square test shows that the lexical categories 'proper name' and 'common noun' deviate significantly ($p < 0.001$) from the corpus norm ('s/*of* = 25.6%/74.4%). We can therefore conclude that in these two lexical classes the genitive is preferred over the *of*-construction. This preference is extremely strong with proper names. Here, the degree of animateness and personality is strongest and the high proportion of genitives is not surprising. *Of*-constructions usually only occur with heavy modifiers:

(21)   the gardening notebook of Radio 5's Richard Jackson (A0G)[9]

(22)   the autobiography of the poet James Kirkup (CDS)

(23)   the assassination of General Konstantin Benin (ECK)

Only three instances of *of*-constructions with a 'naked' proper-name modifier occurred. In these cases, however, the modifiers are biblical names (*the people of*
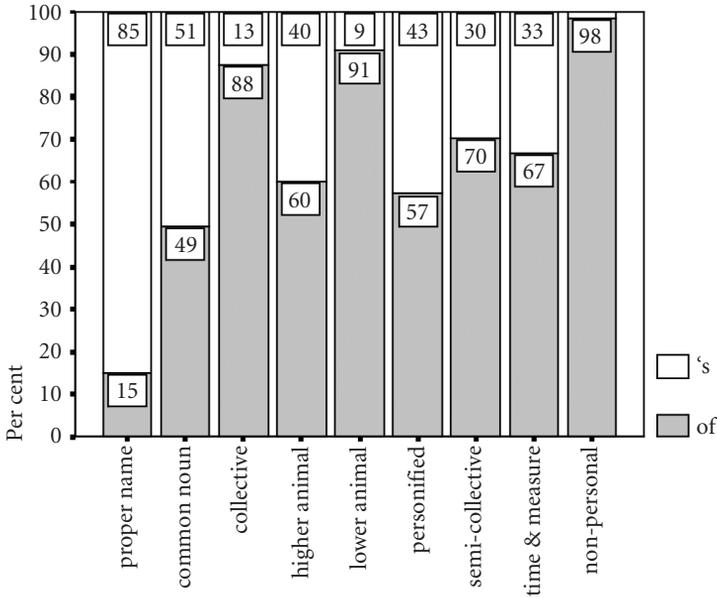
Diagram 1. Genitive vs. *of*-construction dependent on the lexical class of the modifier

GOD (twice), *the manner of David*), which tend to avoid the genitive (Altenberg 1982: 126).

The preference for genitives is considerably lower for personified nouns but still significant (p<0.05). In this context, it is interesting that most personified modifiers occur with genitives as well as with *of*-constructions:

(24)   the train's replacement (B1E)

(25)   the path of the train (CE9)

(26)   the Mercedes' progress (ECK)

(27)   the back of the Mercedes (ECK)

(28)   the sun's heat (A75)

(29)   the light of the Sun (A75)

(30)   the earth's surface (B1E)

(31)   the daily spinning of the Earth (A75)

The only lexical class which shows a significant preference for *of*-constructions (p < 0.001) is the category 'non-personal'. Genitives only occur with head-

heavy constructions similar to the examples below. With the first two examples a slight notion of animateness can also be felt:

(32)   nature's own living pest controllers (A0G)

(33)   a river's aquatic life (A3Y)

(34)   that term's list of the morning lectures for the first-year undergraduates (A0F)

The remaining five categories do not seem to have any noticeable effect on the choice of construction. Still, the extremely high proportion of *of*-constructions within the category 'collective' is quite surprising. An unusually high proportion of extremely modifier-heavy constructions would explain the above phenomenon. However, a closer look at the data shows that less than a quarter of the genitive constructions within the category 'collective' do in fact have an expanded modifier similar to the examples below:

(35)   deputy director of Directorate S, the most sinister division within KGB (ECK)

(36)   the establishment of a supreme representative Imperial Parliament in London (CE7)

(37)   the architects of Fidel Castro's Direccion General de Inteligencia (ECK)

A further possible explanation might be the kind of semantic relationship involved in the construction. Quirk et al. (1985: 325) claim that "in combination with the objective genitive, a non-personal noun results in a less acceptable noun phrase than does a personal noun." As collective nouns maintain an intermediate position between personal and non-personal nouns a high number of objective genitives might provide an explanation. Again only four instances of objective constructions similar to example (38) were observed in the whole category.

(38)   the consolidation of the Empire (CE7)

Hence, semantic factors cannot be taken into account in order to explain the high number of *of*-construction with collective nouns, either.

The only remaining explanation, then, lies in the dual nature of collective nouns. They may either be regarded under the aspect of the "non-personal collectivity [...or] the personal individuality within the group" (Quirk et al. 1985: 316). With regard to the choice of genitive and *of*-construction it seems as if collective nouns tend to be regarded as a non-personal collectivity. Even if

the personal individuality within the group is obvious the collective modifiers often occur with the latter:[10]

(39)   the choices of the British people in 1980 (B1H)

(40)   the self-interested actions of the British state (CE7)

(41)   the reluctance of the central government to take on any new expenditure (A1M)

The present data, then, point to the conclusion that collective nouns tend to be regarded as a non-personal collectivity, at least with regard to the choice of genitive and *of*-construction (cf. also Leech et al. 1994:62 and Jahr 1981:22). It might be worthwhile an investigation if this observation also holds true with regard to the notional concord or the pronoun coreferents of collective nouns.

Partly surprising, too, is the use of genitive and *of*-construction within the category 'semi-collective'. In these cases the distinction of political and social aspects on the one hand and geographical aspects on the other is usually regarded as being decisive with regard to the choice of construction (Dahl 1971:170 and Quirk et al. 1985:1277). The data at hand only partly support this. Examples (42) to (44) fit the above description. In examples (45) to (47), however, we find *of*-constructions although the relation of the head noun to the people living in the country or town is obvious:

(42)   the geography of Britain (B1H)

(43)   the regions of Britain (B1H)

(44)   Britain's industrial rivals (CE7)

(45)   the experiences and practices of mainland Northern Europe (CB6)

(46)   the effective development of a country (CBA)

(47)   the living heart of London (EA5)

To sum up, Diagram 2 below shows the most important results. The lexical classes are arranged according to the proportion of the genitive within each category. Lexical categories which show a significant deviance in the genitive-proportion are written in capital letters.

As the diagram shows, Quirk et al.'s gender scale is supported by the data in that the two left-most categories show a significantly higher proportion of genitives whereas the right-most category shows a significantly higher proportion of *of*-constructions. We can further see that nouns of the category 'personified' usually favour the genitive. This supports the information we find in
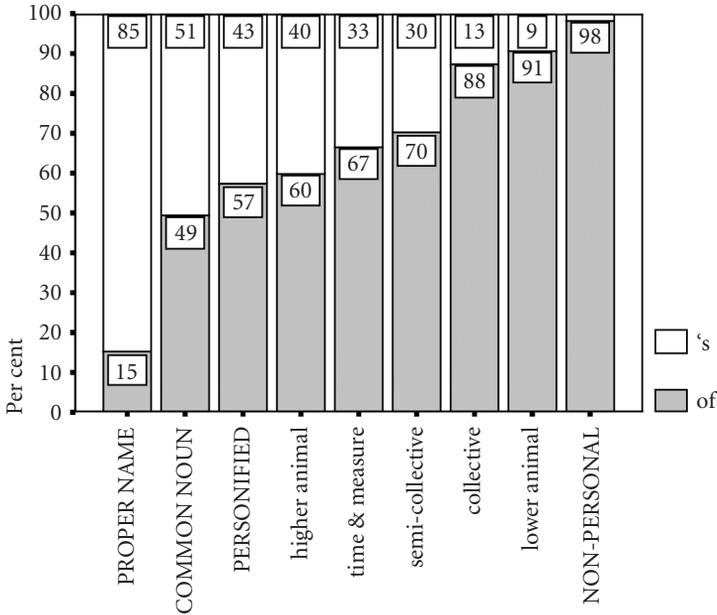
Diagram 2. Genitive vs. *of*-construction dependent on the lexical class of the modifier

most works of reference. The influence of collective nouns and semi-collective nouns on the choice of construction has been overestimated by some scholars (Dahl 1971; Quirk et al. 1985). With semi-collective nouns we do not find any decisive influence at all, whereas collective nouns show a slight tendency to favour *of*-constructions. We might cautiously conclude that nouns of this kind are usually regarded as a non-personal collectivity rather than a group of personal individuals. However, more detailed research is needed in this respect.

4.2 The semantic relationship

Table 2 and Diagram 3 show the distribution of genitive and *of*-construction within the different semantic categories.

The highest relative frequency of genitives is found with possessive relationships (76.1%). The categories 'kinship' and 'disposal', which are closest to the possessive relationship, behave similarly in the choice of genitive or *of*-construction. The relative frequency of the genitive is almost the same for both categories (66.7% and 69.2%). The proportion of genitives in all of these

Table 2. Genitive vs. *of*-construction dependent on the semantic relationship

	's	*of*	Row total
other	7	51	58
	12.1%	87.9%	
origin	32	22	54
	59.3%	40.7%	
attribute	12	89	101
	11.9%	88.1%	
time & space	23	59	82
	28.0%	72.0%	
disposal	9	4	13
	69.2%	30.8%	
objective	1	57	58
	1.7%	98.3%	
subjective	24	100	124
	19.4%	80.6%	
partitive	28	122	150
	18.7%	81.3%	
possessive	35	11	46
	76.1%	23.9%	
kinship	8	4	12
	66.7%	33.3%	
Column total	179	519	698
	25.6%	74.4%	

three categories is significantly higher than in the whole corpus ($p < 0.001$, $p < 0.005$, $p < 0.001$). The proportion of genitives is lower for the category 'origin' (59%), but still significant ($p < 0.001$). In all of the four semantic categories, *of*-constructions are usually restricted to cases where weight and syntactic complexity are relevant:

(48)   the son of Poseidon and Amphitrite (ABC)

(49)   the son of the Royal Bucks secretary (CS4)

(50)   the realms of more important kings (CB6)

(51)   the antics of his pro-am partners (CS4)

The data thus suggest a decisive influence of the four categories 'kinship', 'possession', 'disposal' and 'origin' on the choice of construction. However, the above kinds of semantic relationships are usually closely connected to the idea of a person partaking in the relationship: we usually expect persons to be kin to one another, we usually expect a person to be the possessor of some-
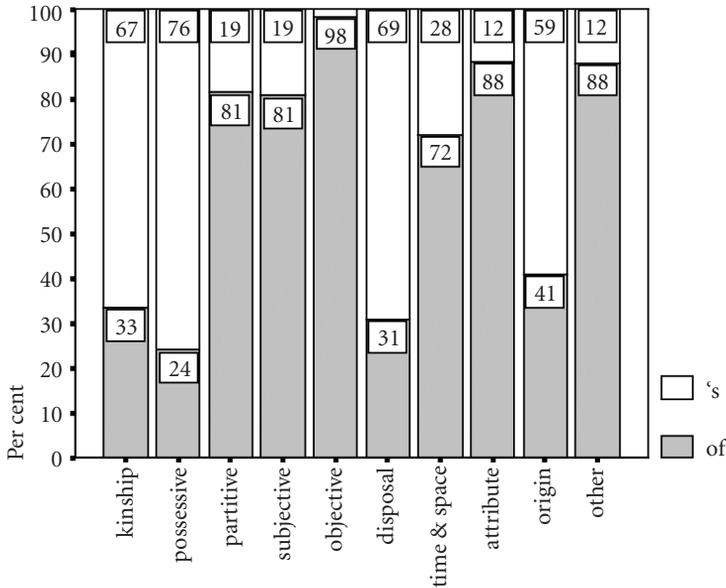
Diagram 3. Genitive vs. *of*-construction dependent on the semantic relationship

thing and so on. The question, then, arises as to whether the influence of the above categories is indirect or direct: does the semantic relationship only impose constraints on the possible modifiers, which, in turn, constrain the use of *of*-constructions, or are these semantic categories of any immediate influence, too?

Diagram 4 below indicates that the modifiers at the top of the personality scale, i.e. personal common nouns and proper names, are usually preferred or even obligatory with the four categories of semantic relationships. However, within the whole corpus, for example, we find that 'only' 50.5% of personal common nouns take the genitive (see Table 1). Within the semantic category 'possessive', however, the relative frequency of genitives with personal common nouns is 75% (Table 3), a significant deviation ($p < 0.05$) from the expected 50.5%.

With proper names the genitive frequency within the whole corpus is 85% whereas with possessive relationships all cases of proper-name modifiers are used with the genitive.[11] These data, then, strongly suggest an immediate effect of the semantic category 'possessive' on the choice of construction. For the remaining three categories, the structure of the data does not give any ev-
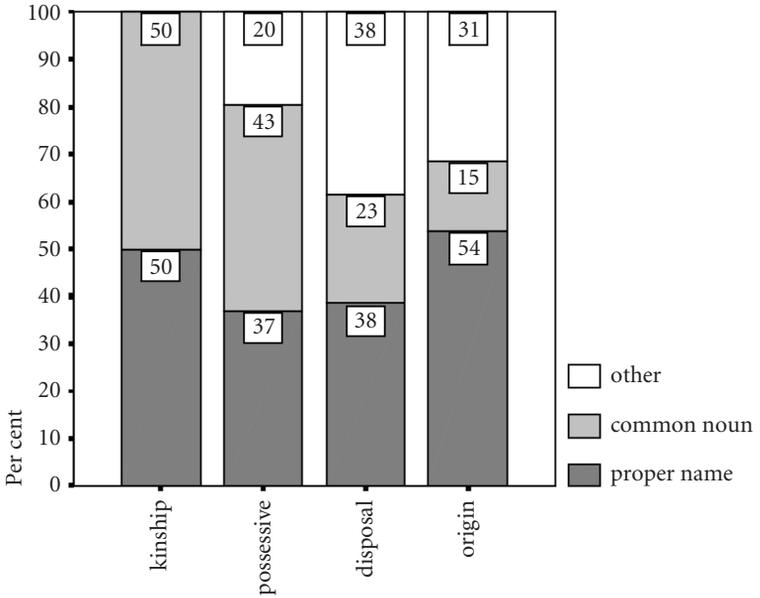
Diagram 4. Lexical class of the modifiers dependent on the semantic relationship

Table 3. Genitive vs. *of*-construction dependent on the semantic relationship and the lexical class of the modifier

Semantic relationship	proper name ’s: 85%, *of*: 15% (whole corpus)		common noun ’s: 50.5%, *of*: 49.5% (whole corpus)	
	’s	*of*	’s	*of*
possessive	17	0	15	5
	100%	0%	75%	25%
kinship	5	1	3	3
	83.3%	16.6%	50%	50%
disposal	5	0	2	1
	100%	0%	66.6%	33.3%
origin	22	5	5	3
	75.9%	24.1%	62.5%	37.5%

idence for an immediate effect of the semantic relationship on the choice of construction. Still, that these categories do influence the choice of construction is supported by the data, the exact nature of this influence, however, cannot be stated.

Two categories of semantic relationship show a significant preference for *of*-constructions: 'attribute' (p < 0.005) and 'objective' (p < 0.001). With the latter, this effect is most obvious. Here, *of*-constructions are almost obligatory (99%), an observation that is found in most works of reference, too (cf. Quirk et al. 1985: 1279). Only one instance of the genitive occurs within an objective relationship. In this case the modifier belongs to the lexical class 'personified':

(52)   the train's replacement (B1E)

Similar to the four categories above, which favour the genitive, the question here is as to whether objective relations influence the choice of construction directly or only indirectly. Within these relations, the modifier is the object of a verbal action that is referred to in the head. Non-personal nouns are intrinsically more likely to be regarded as objects. It might be expected that the high frequency of *of*-constructions with objective relations is mostly due to an extremely high proportion of non-personal nouns within this category. This assumption is in part supported by Diagram 5 since 79% (46 out of 58) of the modifiers within the category 'objective' belong to the lexical class 'non-personal', in which *of*-construction are almost compulsory (cf. Table 1).
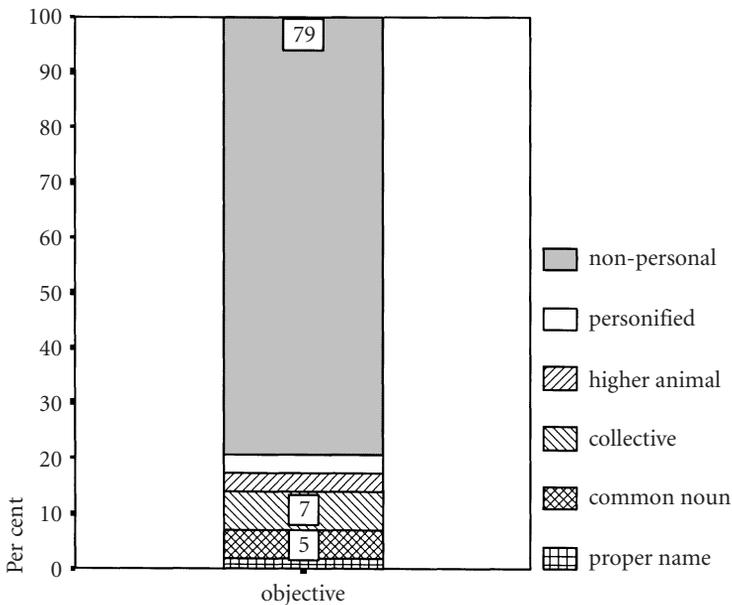

Diagram 5. Lexical class of the modifier within 'objective' relationships

However, a detailed analysis of the modifiers within objective relationships which belong to other lexical classes shows that the semantic relationship 'objective' is also immediately influential. In the 21% of modifiers that belong to lexical classes other than 'non-personal', we only find one instance of the genitive (*the train's replacement* (B1E)). All other modifiers occur with *of*-constructions even if they are proper names or common nouns:

(53)   the training of international terrorists (ECK)

(54)   the assassination of General Kostantin Benin (ECK)

(55)   the replacement of the merchant venturer (CE7)

Similarly to the effect of those semantic categories which favour the genitive, the objective relation, then, influences the choice of construction in two different ways: first, in imposing constraints on the choice of possible modifiers, second, in favouring *of*-constructions even with modifiers which usually prefer the genitive.

To sum up, the statistical analysis of the data at hand shows that the semantic relationship of modifier and head is of decisive influence on the choice of construction. We have found that six out of nine categories ('other' was excluded) are significant. Within the categories 'objective' and 'attribute' *of*-constructions are usually favoured while the categories 'kinship', 'possessive', 'disposal' and 'origin' prefer the genitive. Some of these categories, however, impose constraints on the possible modifiers within the semantic relationship. These constraints further contribute to the effect of the meaning relationship.

4.3 Syntactic Factors

4.3.1   *Postmodification*

Instances of postmodified N_1 or N_2 are relatively rare in the corpus material: 158 out of a total of 698 constructions (23%). Of these, 14 cases do not fit into our categorisation scheme because some of them show minor types of postmodification or instances of multiple postmodification; such cases are rare in comparison to the main types and will therefore be excluded. Table 4 shows the different kinds of postmodification among the remaining 144 cases.

Among the different kinds of postmodification, prepositional phrases are most common. Apposition and coordination are less common but still more

Table 4. Distribution of types of postmodification

Kind of postmodification	Absolute frequency	Relative frequency
N_2 + finite clause	2	1.4%
N_2 + non-finite clause	4	2.8%
N_2 + prepositional phrase	37	25.7%
appos./coord. N_2	14	9.7%
	(57)	(39.6%)
N_1 + finite clause	10	6.9%
N_1 + non-finite clause	7	4.9%
N_1 + prepositional phrase	45	31.3%
appos./coord. N_1	25	17.4%
	(87)	(60.4%)
Column total	144	100%

frequent than postmodification by finite and non-finite clauses. The latter are usually quite complex and may therefore lead to extremely heavy constructions (examples (56) and (57)). Similar problems are hardly ever relevant with the other types of right-branching expansions ((58) to (61)):

(56)   The condition of <u>the market in which it is to be sold</u> (ARY)

(57)   Britain's declining <u>ability to dominate the world either economically or militarily</u> (CE7)

(58)   Your body's <u>suppleness and flexibility</u> (A0J)

(59)   <u>The docks and wharves</u> of London (EA5)

(60)   The resolution of conflicts <u>among genes</u> (AKF)

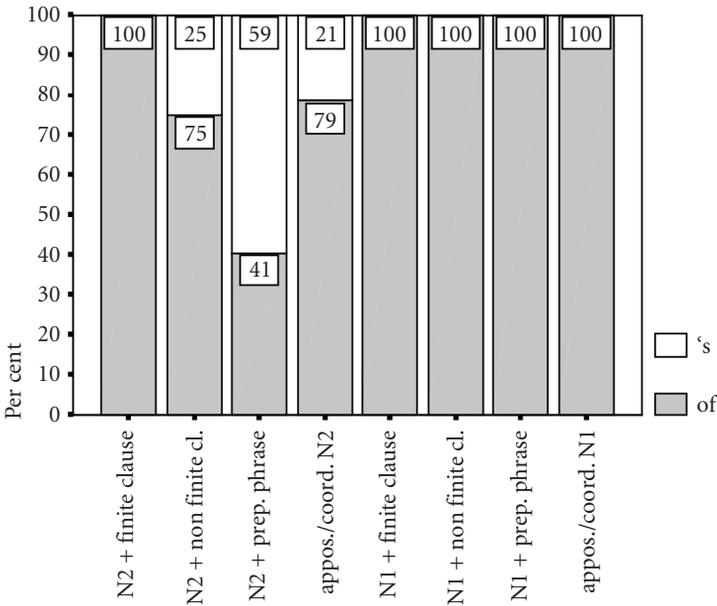(61)   Tomorrow's battle <u>for supremacy</u> (CS4)

Thus, we can recognise a tendency to avoid extremely heavy and complex constructions; considerations of processability seem to be of crucial importance.

4.3.1.1   *Postmodification of the modifier (N_1)*

As Table 5 and Diagram 6 below show, postmodifications of N_1 are of decisive influence on the choice of construction. *Of*-constructions are preferred to the genitive in all of the observed cases, a finding that nicely tallies with Poutsma (1914: 71ff.).

Table 5. Genitive vs. *of*-construction with postmodified modifier (N_1)

Kind of Postmodification	's	*of*	Row total
N_1 +finite clause	0	10 100.0%	10
N_1 + non-finite clause	0	7 100.0%	7
N_1 +prepositional phrase	0	45 100.0%	45
appos./coord. N_1	0	25 100.0%	25
Column total	0 0	87 100.0%	87

Diagram 6. Genitive vs. *of*-construction dependent on the kind of postmodification

Even if the modifier belongs to one of the lexical categories '(personal) proper name' or '(personal) common noun' the *of*-construction is preferred:

(62)   The names of German soldiers who were buried there after their deaths in a prisoner-of-war camp that was established in the area during World War I (CE9)

(63)   The aggressive ardour of the professional golfer who might try to cut the slight dogleg and set himself up for an easier shot into the two-tier green (CS4)

   With the examples above a group genitive would be extremely awkward due to the extraordinary length and complexity of the postmodifying clauses:

(62a) *?The German soldiers who were buried there after their deaths in a prisoner-of-war camp that was established in the area during World War I's names

(63a) *?The professional golfer who might try to cut the slight dogleg and set himself up for an easier shot into the two-tier green's aggressive ardour

Problems of length and complexity of postmodification are usually not as relevant to prepositional phrases. Still, even with modifying personal proper names or common nouns, we only find *of*-constructions. The corresponding genitive is of doubtful acceptability:

(64)   The coming of our friends from the west (ABC)

(64a) ?Our friends from the west's coming

(65)   The authority of the early Kings of Sussex (CB6)

(65a) ?The early Kings of Sussex's authority

Our data, then, show that the *of*-construction (*'the* N_2 *of* N_1') is compulsory with postmodified modifiers. As was already said in Section 2.3., this influence can only in part be ascribed to the end-weight principle: with postmodified modifiers, an *of*-construction is the only possible construction that maintains the vicinity of the heads of N_2 and N_1 as well as the vicinity of the head of N_1 and its postmodifying material. To guarantee maximum processability both requirements have to be met, and '*the* N_2 *of* N_1', therefore, is the preferred construction.

4.3.1.2 *Postmodified Heads (N_2)*
The influence of postmodification of N_2 on the variation of genitive and *of*-construction is less obvious (cf. Table 6 below). A definite statement can only be made in cases of heads with postmodifying prepositional phrases. Here, the frequency of genitives (59.5%) is significantly higher ($p < 0.001$) than in the whole corpus (26.6%).

Table 6. Genitive vs. *of*-construction with postmodified head

Kind of postmodification	*'s*	*of*	Row total
N$_2$ + finite clause	0	2	2
		100.0%	
N$_2$ + non-finite clause	1	3	4
	25.0%	75%	
N$_2$ + prepositional phrase	22	15	37
	59.5%	40.5%	
appos./coord. N$_2$	3	11	14
	21.4%	78.6%	
Column total	26	31	57
	45.6%	54.4%	

In cases of postmodification by prepositional phrase, the genitive is the only choice if the modifier belongs to the lexical classes 'personal proper name' and 'semi-collective noun':

(66)   Harry Dodson's traditional method of pest control (A0G)

(67)   Scotland's history as an independent nation (CDS)

(68)   Britain's European rivals for 'a place in the sun' (CE7)

(69)   The country's leading organisers of mass cycling extravaganzas and cycling holidays including The Great British Bike Ride, and the London to Brighton Ride (A0J)

If lexical restrictions do not hold, the postmodifying prepositional phrase may be detached from the head and put into deferred position after the modifier. In these cases it usually modifies the whole *of*-construction.

(70)   the impact of agriculture on environment (B1E)

(71)   the impact of severe floods on river life (A3Y)

(72)   the responses of living organisms to them (A75)

(73)   the rebirth of plant and animal life in Spring (A75)

Similarly, postmodifications by finite or non-finite clauses modify the whole genitive or *of*-construction.

(74)   the desires of other human beings which may conflict with ours (B1H)

(75)   the reluctance of the central government to take on any new expenditure (A1M)

(76)   the features of Britain mentioned on pages 4–7 (B1H)

(77)   Britain's declining ability to dominate the world either economically or militarily (CE7)

(78)   the original formulation of this belief, which is still accepted by many scholars (CBA)

The only example of appositional head in our corpus occurred with a genitive. The corresponding *of*-construction sounds extremely odd:

(79)   Dawyck Haig's son Alexander (CDS)

(79a) ?the son Alexander of Dawyck Haig

With the head coordinated, the genitive would seem the most natural construction since the heavier constituent within the genitive construction, i.e. the coordinated head, would thus be put in final position. However, of the 14 constructions with coordinated head, only three (21%) occur with a genitive. *Of*-construction are even usually used with those modifiers that belong to lexical classes that allow or even prefer the genitive.

(80)   the occupation, or status, of the first user (B1P)

(81)   the experience and practices of Mainland Northern Europe (CB6)

(82)   the docks and wharves of London (EA5)

(83)   the staff and friends of Greenbank (A0G)

(84)   the narrow cobbled lanes and backstreets of Bermondsay (EA5)

It is difficult to satisfactorily account for this dominance of *of*-constructions in the cases discussed above. However, the data suggest that, with coordinated heads, considerations of weight do not seem to be decisive. With regard to postmodified modifiers we have found that a further factor is important: the proximity of related constituents. This also holds true for coordinated heads, but this requirement is always met since coordinated elements are on the same constituent level and both constituents might function as a head on their own. Hence, both genitive and *of*-construction are equally acceptable:

(85)   your body's suppleness and flexibility (A0J)

(85a) the suppleness and flexibility of your body

(86)   the occupation, or status, of the first user (B1P)

(86a) the first user's occupation, or status

To sum up, the data indicate that postmodified modifiers (N_1) are of decisive influence on the choice of construction. This influence, however, is not only due to considerations of weight but also to considerations of proximity of related constituents. That these considerations are decisive is suggested by the fact that no instances occurred where related constituents were separated. In cases of *of*-constructions with postmodified head, the postmodification is put in deferred position and then modifies the whole *of*-construction. Instances of the so-called parenthetic genitive do not occur with prepositional phrases or non-finite clauses since the *of*-phrase would then be detached from the head ((87a) and (88a)):

   (87)   the impact of agriculture on environment (B1E)

   (87a)?the impact on environment of agriculture

   (88)   the reluctance of the central government to take on any new expenditure (A1M)

   (88a)?the reluctance to take on any new expenditure of the central government

With coordinated heads, however, both kinds of constructions are equally acceptable since the proximity of related constituents is always maintained.

4.3.2   *Premodification*

To estimate the influence of premodification on the choice of genitive or *of*-construction, all instances were categorised according to the weight-difference of modifier (N_1) and head (N_2) (in terms of number of graphic words). A construction with a twofold premodified modifier and a naked head is therefore put into the category '$N_1 + 2$', but the same category is, for example, also assigned to constructions with a threefold premodified modifier and a head with one premodifying item. The following examples might help to illustrate the categorisation (premodifying items are underlined; *the* in front of the head in an *of*-construction was not counted as a premodifying item):

       $N_1 + 2$:   (89)   the old man's face (A0N)
                   (90)   the other girl's admiration (CR6)
                   (91)   the experience of mainland Northern Europe (CB6)
       $N_1 + 1$:   (92)   the spread of arid conditions (B1E)
                   (93)   the drearier aspects of Liberal Party Policy (CDS)
       $N_1 = N_2$:   (94)   the study of surnames (B1P)
                   (95)   Benin's car (ECK)
                   (96)   the barrier properties of the container (ARY)

$N_2 + 1$:   (97)   Harriet's <u>weekend</u> cottage (A0U)
            (98)   the <u>two easternmost</u> houses of <u>the</u> Office (B1D)
            (99)   Benin's <u>little</u> idiosyncrasies (ECK)

Extremely modifier-heavy and head-heavy constructions, such as *the potential of <u>his drab and neglected</u> establishment* (EA5), were not counted separately but included in the categories '$N_1 + 3..$' and '$N_2 + 3..$'. These extremely heavy constructions are quite rare and we may assume that they will behave similarly to constructions of the type '$N_1 + 3$' and '$N_2 + 3$'.

Proper names, titles and names of institutions or countries with more than one word were regarded as premodified nouns: *<u>General Konstantin</u> Benin* (ECK) was, thus, regarded as a twofold premodified noun. Compounds were treated similarly, such as *the stages of <u>web-building</u>* (EUR). Modification by genitive constructions, such as *the validity of <u>Cobden's</u> analysis* (CE7), was also regarded as premodification.

Table 7 and Diagram 7 give a first impression of the frequencies of the different constructions: as the table and the diagram show, 366 (52%) of the observed constructions are modifier-heavy, 218 (31%) of the constructions are balanced and 114 (16%) are head-heavy. According to the end-weight principle we would assume that modifier-heavy constructions favour *of*-constructions while head-heavy constructions show a significantly higher number of genitives. Table 8 and Diagram 8[12] show that this assumption is correct. For the categories '$N_1 + 3..$', '$N_1 + 2$' and '$N_2 + 3..$' the deviation from the corpus norm is significant ($p < 0.005$, $p < 0.05$, $p < 0.01$).

Table 7. Distribution of types of premodification

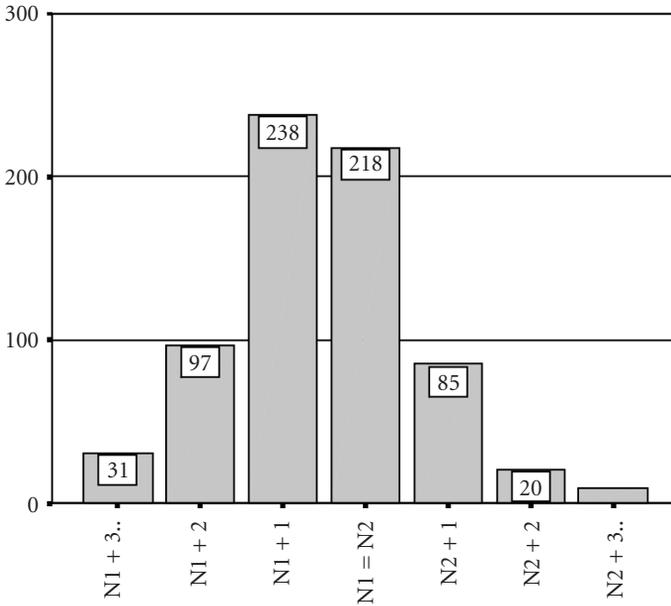| Types of premodification	Absolute frequency	Relative frequency
$N_1 + 3..$	31	4.4%
$N_1 + 2$	97	13.9%
$N_1 + 1$	238	34.1%
	(366)	(52.4%)
$N_1 = N_2$	218	31.2%
$N_2 + 1$	85	12.2%
$N_2 + 2$	20	2.9%
$N_2 + 3..$	9	1.3%
	(114)	(16.3%)
Column total	698	100%

Diagram 7. Distribution of types of premodification

Table 8. Genitive vs. *of*-construction dependent on the weight of the premodification

	's	*of*	Row total
$N_1+3..$	1	30	31
	3.2%	96.8%	
N_1+2	15	82	97
	15.5%	84.5%	
N_1+1	52	186	238
	21.8%	78.2%	
$N_1=N_2$	67	151	218
	30.7%	69.3%	
N_2+1	29	56	85
	34.1%	65.9%	
N_2+2	9	11	20
	45.0%	55.0%	
$N_2+3..$	6	3	9
	66.7%	33.3%	
Column total	179	519	698
	25.6%	74.4%	

Diagram 8. Genitive vs. *of*-construction dependent on the weight of the premodification

The data, then, reveal that the weight of the premodification has a decisive influence on the choice of construction. This influence, however, is most strongly felt with cases of extreme imbalance of weight.

5.   Discussion: processability and human involvement

In this study the variation of genitive and *of*-construction has been analysed with regard to three underlying factors, namely the lexical class of the modifier, the semantic relationship expressed by the constructions, and weight and syntactic complexity. It was an important objective to develop a descriptive framework for each of these factors which, while being sufficient from the viewpoint of linguistic description, would at the same time allow an efficient statistical analysis. With regard to the first conditioning factor a modified version of Quirk et al.'s gender scale, the personality scale, seemed most suitable. To capture the variety of semantic relationships expressed by the two constructions, a paraphrasation system based on traditional categories was applied.

The influence of weight and syntactic complexity was analysed separately for instances of premodification and postmodification. The former could conveniently be described in terms of the number of premodifying items of head and modifier. With the latter, the most common types of postmodification (finite clause, non-finite clause and prepositional phrase) were distinguished from apposition and coordination.

The statistical analysis of the conditioning factors has shown that all of them influence the choice of construction. With regard to the lexical class of the modifier, the analysis essentially supported the ranking of the modifiers as depicted on the personality scale. However, the surprising results for collective modifiers indicated that these, as far as the choice between genitive and *of*-construction is concerned, tend to be regarded as a non-personal collectivity. The influence of the semantic relationship was demonstrated by the fact that six out of nine categories had a decisive influence on the choice of construction. With many of these categories a preference for certain classes of modifiers was observed, which contributed to the immediate effect of the semantic relationship. The impact of premodification was shown to be most decisive with extremely modifier- and head-heavy constructions, which led to a favouring of the *of*-construction ('mod+3..', 'mod+2') or the genitive ('head+3..'), respectively. With regard to postmodification the data showed that a *proximity-principle* is at work, i.e. those constructions are usually favoured which guarantee that related constituents are in the vicinity of one another.

So far the conditioning factors have, for the most part, been analysed in isolation from each other. Some concluding remarks on the relative power of the different factors and the way they interact might therefore be helpful to draw a more comprehensive picture of the variation of genitive and *of*-construction in modern written English. In Table 9, factor levels with decisive influence on the choice of construction have been ranked according to the preference of *of*-constructions. The line in the middle of the table divides those factor levels which lead to a significant deviance from the corpus norm (genitive vs. *of*-construction: 25.6% / 74.4%) in favour of the *of*-construction (upper half) or the genitive (lower half).

The ranking of the factors gives a first impression of their power. Those factors which are at the extreme ends of the hierarchy have the strongest influence on the choice of construction. The pervasive importance of syntactic factors is most obvious with regard to postmodified modifiers, which impose extremely heavy constraints on the choice of construction. These constraints

Table 9. Hierarchy of decisive factors

Factor level	*of* (Rel. Freq.)
postmodified modifier (N_1)	100.0%
non-personal (lexical)	98.5%
'objective' relationship (semantic)	98.3%
N_1+3.. (weight of premodification)	96.8%
'attributive' relationship (semantic)	88.1%
N_1+2 (weight of premodification)	84.5%
'partitive' relationship (semantic)	81.3%
personified (lexical)	57.1%
personal common noun (lexical)	49.5%
'origin' relationship (semantic)	40.7%
preposition N_2 (right-branching)	40.5%
'kinship' relationship (semantic)	33.3%
N_2+3.. (weight of premodification)	33.3%
'disposal' relationship (semantic)	30.8%
'possessive' relationship (semantic)	23.9%
personal proper name (lexical)	14.9%

even overrule powerful lexical constraints as can be seen in examples (63) and (64), here repeated as (100) and (101):

(100)   The aggressive ardour of the professional golfer who might try to cut the slight dogleg and set himself up for an easier shot into the two-tier green (CS4)

(101)   The coming of our friends from the west (ABC)

In these cases, the underlying factor seems to be the requirement of structural and referential clarity, which above has been referred to as the 'proximity principle'. Only if this requirement is met can other factors exert their influence. The lexical class of the modifier shows a decisive influence towards the personal and non-personal poles of the personality scale. With regard to proper names, this factor is only overruled by considerations of weight and syntactic complexity, as the examples above show. Similarly, we find that the occurrence of genitives with non-personal modifiers is restricted to cases of heavy or complex heads, as in example (34), here repeated as (102):

(102)   that term's list of the morning lectures for the first-year undergraduates (A0F)

The influence of weight and syntactic complexity is also strongly felt when semantic relationship that favour the genitive, such as 'kinship' or 'possession', show instances of *of*-construction (examples (103) and (104) ((49), (50)).

(103)   the son of the Royal Bucks secretary (CS4)

(104)   the realms of more important kings (CB6)

Again, if considerations of weight and complexity are not relevant the usual choice with these kinds of relationships is the genitive.

If we look at the results of this study from a more remote perspective, it seems as if the variation of genitive and *of*-construction can to a large extent be described by two more fundamental principles. The discussion in the previous paragraph has shown that considerations of weight and complexity are decisive with a number of instances and may overrule powerful lexical and semantic factors. This influence can be described by the more general term 'processability'. The second factor, i.e. the semantic and lexical aspect, can largely be described in terms of 'human involvement'. This is obvious with the lexical class of the modifier but also holds true for semantic relationship: mostly we think about 'possession', 'disposal' and 'kinship' in terms of our own species whereas, with partitive or objective relationships, which show a preference for the *of*-construction, the notion of associated human beings is usually very faint. In conclusion, therefore, it might be suggested that a possible descriptive framework for the variation of genitive and *of*-construction could be based on the aspects of 'processability' and 'degree of human involvement'.

As to the relative powers of these two factors the data reveal that considerations of 'processability' are more important than the influence of 'degree of human involvement': if, for example, the choice of the genitive led to extreme difficulties of processing, an *of*-construction would be used, regardless of lexical or semantic factors that might indicate genitive. However, instances of heavy modification of head or modifier occur in only 36% of all cases. Although, then, 'human involvement' may not counteract 'processability' in extreme cases, it can exert its influence in almost two thirds of all phenomena, i.e. in those cases where 'processability' is guaranteed by both kinds of constructions ('N_1 '*s* N_2' and '*the* N_2 *of* N_1'). This situation is depicted in Figure 3. The vertical and the horizontal axes show the processability of genitive ('N_1 '*s* N_2') and *of*-construction ('the N_2 of N_1'), respectively. For both constructions, there exist threshold levels, $T_{'N_1 \, 's \, N_2'}$ and $T_{'the \, N_2 \, of \, N_1'}$, below which the respective constructions will be extremely difficult to process. In cases where the pro-
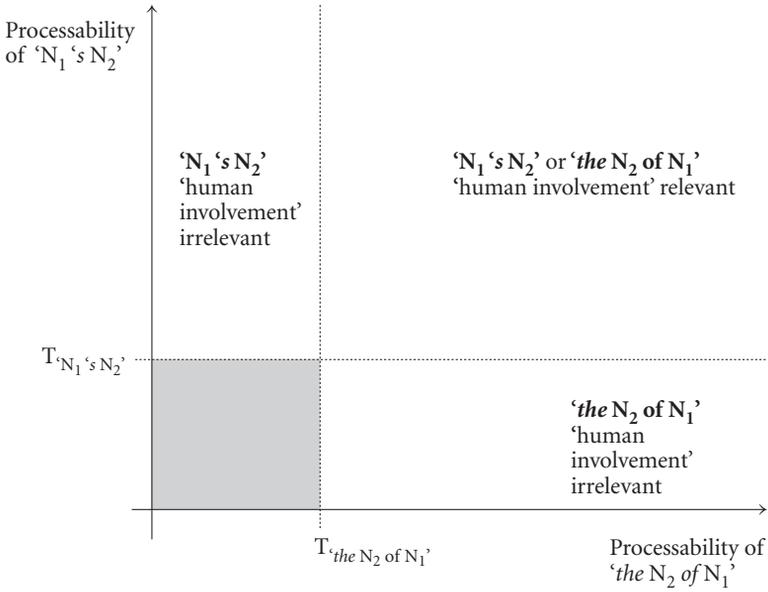
Figure 3. The interaction of 'processability' and 'human involvement'

cessability for one construction is below the threshold the alternative construction will be used, regardless of considerations of 'human involvement'; in such cases, this factor is irrelevant.[13] 'Human involvement', however, is relevant in those cases where the choice of construction does not influence processability.

To sum up: in this article, I have attempted to develop a more general description of the variation of genitive and *of*-construction. Starting off from the study of four isolated factors, two basic underlying principles, 'processability' and 'human involvement' have been identified which, to a large extent, account for the variation of genitive and *of*-construction. However, this description can still be further refined since secondary factors, such as information status, might be integrated into the above framework. These factors will most probably show their influence in those cases where 'processability' is guaranteed by both constructions and where 'human involvement' is not decisive. Instances which would be left unaccounted for by the two major factors might then be explained and an even more detailed description of the variation of genitive *of*-construction could be arrived at.

Notes

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1. Unfortunately, Fries (1940) does not tell what material his observation is based on.

2. The asterisk is used to mark examples as ungrammatical. Examples of doubtful acceptability will be marked by '*?'. A question mark, '?', will be used to indicate awkward usage.

3. The present study concentrates on strictly linguistic factors and how these may influence the variation of genitive and *of*-construction. In a follow-up study I plan to analyse the impact of the extra-linguistic factor 'genre'. In this study I will also explore how the spoken-written distinction bears on the use of genitive and *of*-construction and how this distinction interacts with the factor of syntactic complexity.

4. For a similar approach see Hawkins (1981); for a different approach see Deane (1987).

5. Shumaker's examples (2), (3), (4) and (6), of course, do not show genitive constructions but possessive constructions. However, the semantic categories she wants to exemplify are equally valid for genitives.

6. The following constructions with right-branching modifier are not acceptable in

English (Quirk et al. 1985:1282):   N1 + 's + N2 + N1-postmodification
                                      *the lady's hat who lives in Poland.

7. Parenthetic genitives may seem rather unnatural but as Wieser (1986) has shown they do occur in modern English.

8. See Appendix A for a complete list of the texts that were used.

9. The three-letter code in brackets refers to the BNC-document from which the example is taken. Examples not marked in this way are either taken from the sources indicated in the text or made up by the author.

10. Altenberg (1982:131) describes a similar situation with regard to the use of genitive constructions in 17th century English: "[W]e have the paradoxical situation that, while these collectives undeniably refer to (groups of) human beings, their personal individuality is hardly ever unambiguously brought to light in the material, and we can best describe them as potentially animate. This is supported by their low the GEN frequency in the corpus (22/81 = 27%) [...]."

11. For statistical reasons, the chi-square test does not yield any results here. However, the mere frequency of 100% and the number of cases analysed (17) hint at a direct influence.

12. The distribution of genitive and *of*-construction within the different categories looks almost exactly the same if we neglect the 144 cases of right-branching discussed above.

13. Cases where both constructions are extremely difficult to process will be very rare; the grey area can thus be neglected.

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Appendix A: BNC-texts used

CR6, CS4, ECK, EA5, A0U, A1C, A0R, A0N, A0F, A0L, AKF, AJB, ARY, EUR, A75, ABC, A0G, A1M, A3Y, A0J, B1D, CDS, CE9, B1P, B1H, CBA, CE7, CB6, B1E, A11