A Functor Treatment of *such*: A Corpus-based Approach*

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Abstract

The conflicting syntactic and semantic properties of the expression *such* give a challenge to most grammatical treatments. Based on a careful corpus examination, we attempt to provide a uniform treatment in which *such* is taken to be a 'functor' selecting its grammatical dependents. We claim that its different uses thus hinge on how these dependents are realized.

It is true that every language employs a limited set of lexical categories and constructions, but there exist also many lexical expressions whose distributions cannot be pinned down to only one peculiar lexical category. The multi-function of *such* implies that grammar (or language learners) not only refers to lexical categories, but also utilizes grammatical functions.

Key words: such, functor, head-functor phrase, construction, HPSG

1 Introduction

The expression *such* is well-known for its multi-function uses. In particular, its conflicting syntactic and semantic properties give a challenge to most grammatical treatments. It is generally assumed that two main uses of *such* are a predeterminer and a pronoun, as exemplified from ICE-GB (International Corpus of English, Great Britain) examples in (1):

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(1) a. **Such** a system can be operated on a conventional computer. <ICE-GB:W2A-032 061:1>

b. But you know **such** is life. <ICE-GB: S1A-003 126:1>

As shown here, *such* can either be used as a predeterminer or a pronoun (Quirk *et al.* 1985). It is, however, not difficult to notice that *such* can also appear in determiner or adjectival positions as illustrated in (2):

(2) a. I'm normally oppressed by **such** paintings. <ICE-GB: S1B-018 171:1>

b. Many **such** parents will be tempted to wash their hands of their responsibilities. <ICE-GB:W2C-007 080:2>

In this paper, based on the corpus examples we identified from the ICE-GB and BNC (British National Corpus), we attempt to provide a uniform treatment for *such* in all cases. In particular, we propose to assign a supertype lexical category called *adnominal* to *such* and treat it as a 'functor' selecting its grammatical dependents. We will show that its different uses follow from how these dependents are realized.[1]

2 Distributional Possibilities: Corpus Findings

From the one million word corpus of ICE-GB, we identified total 929 instances of *such*. Of these instances, 618 (66.5%) are from written texts while 311 instances (33.5%) are from spoken texts, indicating that *such* is preferred in the written context.[2] We have noted that *such* can be canonically used as a predeterminer or a pronoun, as exemplified again in (3) and (4):

(3) a. I would imagine that nobody has done **such** a thing. <ICE-GB:S1B-023 005:1>

b. From **such** an event, a phobia may arise. <ICE-GB:W1A-017 079:2>

[1] As the corpus search, we mainly use the one million word corpus ICE-GB with a supplementary corpus BNC.

[2] The ICE-GB consists of a million words of spoken and written English, which are made up by 300 spoken and 200 written texts.

(4) a. **Such** is the case with cycles in the British Dinantian(Lower Carboniferous), reviewed in Walkden(1987).
<ICE-GB:W2A-023 080:1>

b. **Such** is their awareness of the foaming discontent in the ranks.
<ICE-GB:W2C-003 060:1>

When *such* is used as a predeterminer and combines with a countable noun, it must have the indefinite article *a*:

(5) a. **Such** a vehicle must remain a long-term ideal.
<ICE-GB:W2B-035 096:1>

b. *__Such__ vehicle must remain a long-term ideal.

Such cannot combine with a definite NP (Bresnan 1973, Siegel 1994):

(6) a. **Such** a plan might run into opposition from the American army.
<ICE-GB:W2E-004 047:2>

b. *__Such__ the/this/that/my plan might run into opposition from the American army.

In addition to the two basic uses, we also observe that *such* can appear in the determiner position:

(7) a. **Such** men and women have felt the pressure of what France Surname called the wretched of the earth. <ICE-GB:S2B-047>

b. **Such** large scale features result in metamorphism due to the intense heating... <ICE-GB:W1A-020 062:2>

In the determiner position, *such* can occur either with a plural or an uncountable noun head (Spinillo 2003). Consider the followings:

(8) a. **Such** prisoners have said they're suffering from severe food shortages ... <ICE-GB:S2B-005 050:1>

b. He feels at ease with **such** people, which is not true of all Indian politicians... <ICE-GB:W2B-011 013:1>

c. **Such** behaviour helps the root to wriggle through the soil...
<ICE-GB:W2A-025 026:1>

Such can also occur in the canonical adjective position: [3]

(9) a. The V12 engine was the first **such** unit to be put on sale by BMW... <ICE-GB:W2B-037 024:1>

b. the only/other/second/biggest **such** dog (Siegel 1994)

The adjectival use of *such* can be further observed with its use with a quantifying determiner as given in (10) (de Mönnink 1996, 2000):

(10) a. On all **such** occasions, he adopts a passive role as sufferer or victim. <ICE-GB:W2B-006 093:1>

b. In the English universities, there is no **such** life. <ICE-GB:W1A-018 080:2>

c. It was well placed in any **such** battle. <ICE-GB:W2C-017 053:3>

d. Many **such** parents will be tempted to wash their hands of their responsibilities. <ICE-GB:W2C-007 080:2>

e. Currently, there are six **such** platforms stationed above the Equator. <ICE-GB:W2A-037 061:1>

Considering the traditional wisdom, the use of *such* after a quantifier in these examples indicates its adjectival flavor (cf. Siegel 1994). The ordering of the quantifier and *such* cannot be reversed as in (11), further supporting the adjectival use of *such*:

(11) *__Such__ all/no/any/some/six books

Related to these adjectival uses, the BNC corpus gives us rather unexpected examples as illustrated in (12):

(12) a. There was no foreseeable possibility of a **such** a scheme. <BNC A8X 960 >

b. Sickness wasn't a **such** a crucial issue. <BNC H5D 178>

[3] In the ICE-GB, we found only one instance where *such* follows the cardinal, the BNC provides about 245 instances of such a case.

As pointed out by Wood (2002), one may treat the double uses of the indefinite article as mistakes or dialectal uses. However, note that *such* can be further followed by a quantifier like *no* or *any*:

(13) a. Without promotion, there is no **such** a thing anymore. <BNC HCX 352>

b. Anything doesn't give you any **such** a look ahead information. <BNC KRM 262>

Even though such peculiar examples do not exist in the balanced corpus ICE-GB, we found a dozen instances in the BNC and thousands of instances in the Google.[4]

One intriguing property of the expression *such* is that it can also be linked to another syntactic element. In particular, *such* can be used in special multi-word combinations. For example, *such as* can function as an apposition marker, while *such that* as a subordinating conjunction (Altenberg 1994):

(14) a. Crops **such as** cereals and vegetables for sale <ICE-GB:W2B-027 058:1>

b. What we 're looking for is to design for these forces **such that** the vertical elements are able to withstand the load. <ICE-GB:S2A-025 031:1>

Such can be also linked to *as*-phrase/clause or *that*-clause in a discontinuous position:

(15) a. ... all sorts of curious activities took place, none of which I would go into in **such** a distinguished audience **as** this. <ICE-GB:S2A-045 087:1>

b. It can keep on electing **such** a ludicrous government **as** we have had for the last ten years? <ICE-GB:W2B-014>

c. We reconstruct prosodies in **such** a way **as to** express contrastivity over domains. <ICE-GB:S2A-030 083:1>

[4]In the BNC, we identified 14 instances of *a such a*,7 of *no such a* and 2 of *any such a*. In the Google, surprisingly we found more than one million instances for the sequence of the indefinite article or quantifiers and *such*.

(16) a. Cezanne would have found colour for the figure and the background and everything else and not **such** a sort of tonal device **that** you've used. <ICE-GB:S1B-008 158:3>

b. ... it had expanded and grown to **such** scale **that** his staff couldn't manage a business of this size.
<ICE-GB:S2A-070 067:1>

These examples indicate that *such* can be linked to more than one element. Of course the second linked element is also limited. For example, we cannot replace *as* with *that* or *which* even if either of these can function as a relative pronoun:

(17) *... such a ludicrous government which we have had for the last ten years.

Based on our search on the ICE-GB, we can summarize the frequency of *such* according to its usage type as given in (18):

(18) Frequency of *such* Types in the ICE-GB:

Types	Frequency (%)
Predeterminer	201 (21.6%)
Determiner	260 (28.0%)
Pronoun	33 (3.6%)
Adjectival	50 (5.4%)
such as	303 (32.6%)
such that	15 (1.6%)
such...as	34 (3.7%)
such...that	27 (2.9%)
Idiomatic expressions	6 (0.6%)
Total	929 (100%)

As seen in the table here, *such* is commonly used either in the predeterminer or the determiner position. The most frequently used type is the apposition marker. The discontinuous *such...as XP* includes the type where the XP is realized as NP, *as*-comparative clause with a gap, or *to*-infinitival VP. The discontinuous type *such...that* includes cases where *that*-clause introduces a relative clause with a syntactic gap or a complete result sentence. Idiomatic expressions include instances like *such as it is* and *such and such a day at a certain time*.

3 Differences between Identifying and Intensifying *Such*

As noted by Bolinger (1972) and others, *such* is not semantically uniform: it has basically two different functions: identifying and intensifying. Identifying *such* denotes 'something of X identity', while intensifying *such* has the meaning of 'the sense of X magnitude'. These two different usages can be observed from the following corpus examples:

(19) a. (I recommended *an independent system for the investigation of complaints against the police.*) I did appreciate that **such** a system might well be beyond our resources... <ICE-GB:S2B-037 066:1>

b. I have **such** a thin skin. I'm always terribly easily hurt. <ICE-GB:S1A-031 108:1>

The identifying *such* in (19a) has a defining referent in the context. On the other hand, the intensifying *such* in (19b) has a gradable element in the NP, referring to degree of quality.

As noted by Altenberg (1994) and de Mönnink (1996,2000), these two semantic types also display syntactic differences. The first difference we can observe is that identifying *such* can co-occur with a quantifier like *no*, but intensifying *such* cannot. This is why *such* in (20) only has the function of identifying, not of intensifying:

(20) a. Any **such** policy could lead to a great deal of inconvenience for those who are travelling overseas... <ICE-GB:W2E-008 028:2>

b. There are no **such** plans. <ICE-GB:S1B-057 097:1>

An additional difference comes from the type of syntactic element that *such* is discontinuously linked to (Altenberg 1994, Wood 2002). Observe the following identifying and intensifying examples, respectively:

(21) a. The ductility is present in **such** structures **as** are built in steel or reinforced concrete modern engineered structures. <ICE-GB:S2A-025 017:1>

b. Cezanne would have found colour for the figure and the background and everything else and not **such** a sort of tonal device **that** you've used. <ICE-GB:S1B-008 158:3>

c. Adjustments have taken place on **such** a scale **as to** ensure that the rate of unemployment in various parts of the United Kingdom... are now lower even than the national average in this country. <ICE-GB:S1B-055 087:1>

(22) a. .... causing *such* serious injury that the hand had to be amputated. <ICE-GB:W2A-018 096152:1>

b. Wrapping wire many times around a worker's hand causing **such** serious injury **that** the hand had to be amputated. <ICE-GB:W2A-018 096:1>

As observed in (21), identifying *such* is postmodified by a relative *as*-clause or a relative *that*-clause. Most of all, *as to*-clause, expressing purpose, occurs only with identifying *such* (Altenberg 1994). Intensifying *such* in (22a) generates the meaning of 'scalar equality' (cf. Huddleston and Pullum 2002). In (22b), intensifying *such* is canonically linked to the result *that*-CP clause.

4 Previous Analyses

There have been basically two analyses for *such*: multi-function and uniform analyses. In the former anlaysis (Altenberg 1994, de Mönnink 1996,2000, Quirk *et al.* 1985), *such* is taken to work either as a determiner, adjective, adverb, or pronoun whereas in the uniform analysis (Huddleston and Pullum 2002, Spinillo 2003), it functions as an adjective in all cases.

As we have noticed that variant syntactic and semantic functions of the expression *such* make it hard to assign one uniform categorial status to *such*. For example, we cannot simply assume that *such* is a predeterminer as in Quirk *et al.*(1985) since it can follow a mutually exclusive predeterminer:

(23) a. The debator has failed to do **all such** things... <ICE-GB:S2A-069 008:1>

b. **Both such** beliefs would be highly dangerous... <BNC EEK 820>

In addition, as we have already seen, *such* can also follow a quantifier indicating *such* cannot be easily taken to be a determiner either:

(24) a. There is **no such** thing as a popular tax. <ICE-GB:S2B-030 123:4>

b. Her Cabinet colleagues will seek to divert her from **any such** intention. <ICE-GB:W2E-004 081:3>

c. The scholastics would have recognized **some such** distinction. <BNC ABM 915>

It is also syntactically and semantically different from typical determiners: it can occur in the pre-indefinite article position and refers not to a specific object in the context, but to something similar to that, which is easily understood by the following comparison of paraphrases between *such* and a determiner:

(25) a. **such** a plan/a plan like that

b. **that** plan/*a plan like that

The expression *such* is also peculiar in that it can be linked to another syntactic element like *as*-or *that*-clause, whose properties no determiner carries.

Considering the semantic functions of *such*, we may assume two different types of *such*. In particular, as proposed by Altenberg (1994), we can assume that intensifying *such* is an adverb whereas identifying *such* is a predeterminer. Intensifying *such* behaves like an adverb in many respects. For example, it can be paraphrased by a degree adverb like *so* (cf. Altenberg 1994, Bresnan 1973, Carlson 1980, Spinillo 2003) and also represents the same distribution order as an adverb like *quite* does:

(26) a. **such** a happy man/**so** happy a man

b. **such** a problem / **quite** a problem

However, there exist many differences between intensifying *such* and degree adverbs. For example, degree adverbs can modify verbs, adverbs or adjectives whereas intensifying *such* can't (Spinillo 2003):

(27) a. He **quite** likes it./*He **such** like it.

b. He did **quite** well./*He did **such** well.

c. It is **so** interesting./*It is **such** splendid.

Identifying *such* behaves like a canonical adjective as we have noted earlier. However, *such* also behaves differently from canonical adjectives. For

example, even identifying *such* precedes an indefinite NP, in which no canonical adjective can appear (**happy a man*). In addition, *such* can modify an NP (fully saturated or intermediate N′), but is different from canonical adjectives in the sense that it does not have descriptive content, cannot appear with degree adverbs (**extremely such books*), and has no comparative or superlative forms (**sucher books/*the suchest books*).

The main issue in accounting for *such* is thus how to capture the multifunctions of its syntactic distribution together with two different semantic differences.

5 A Functor Treatment

How then can we account for the syntactic and semantic complexities of *such*? Our analysis starts with the observation that there exist many similarities between specifiers and modifiers. For example, they both are dependents upon the head. In addition, in Italian, the same agreement mark appears in specifier as well as in modifier:

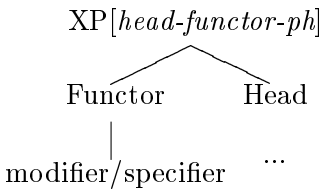
(28)

questa	bella	bambina
this-SG.FEM	beautiful-SG.FEM	child-SG.FEM

'this beautiful child'

Following Van Eynde (2007), Kay and Sag (2009), Kim and Sells (2009), and others, we assume that specifiers and modifiers are functors. More specifically, we assume that English employs the head-functor phrase as one of the well-formed phrasal combinations as given in (29):

(29)



The structure in (29), one of the well-formed structures in English, consists of a functor and a head that the functor selects as a semantic argument. The class of 'functor' thus encompasses both modifier and specifier.

In English, such head-functor combinations are also prevalent in which either a modifier or a specifier combines with its semantic argument:

(30) a. [[$_{\text{F}}$ big] [$_{\text{H}}$ mess]]

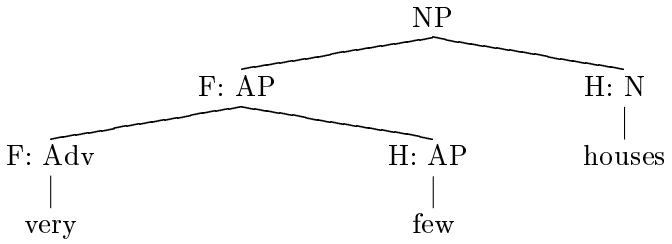
b. [[$_{F}$ the] [$_{H}$ big mess]]

c. [[$_{F}$ very few] [$_{H}$ houses]]

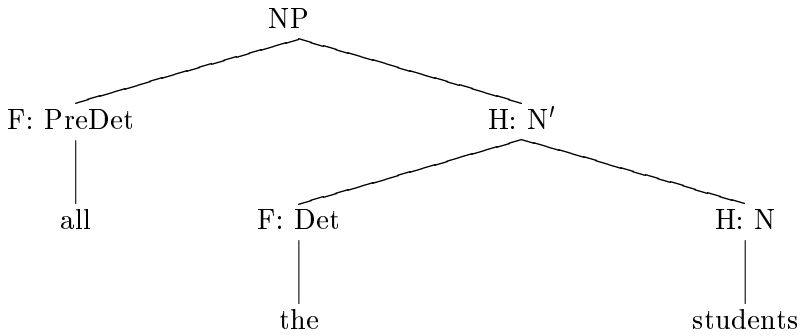
d. [[$_{F}$ all] [$_{H}$ the students]]

For example, (30c) and (30d) will have the following head-functor structures, respectively:

(31)



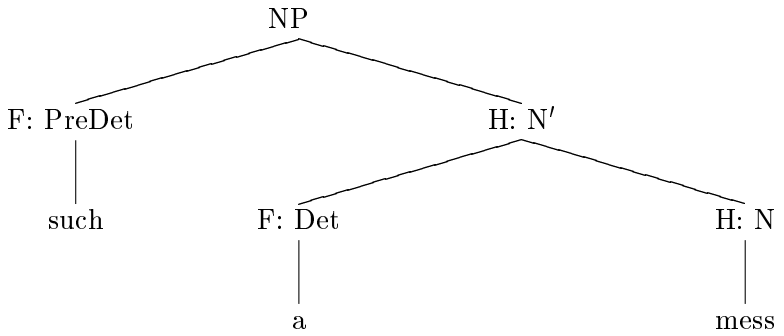
(32)



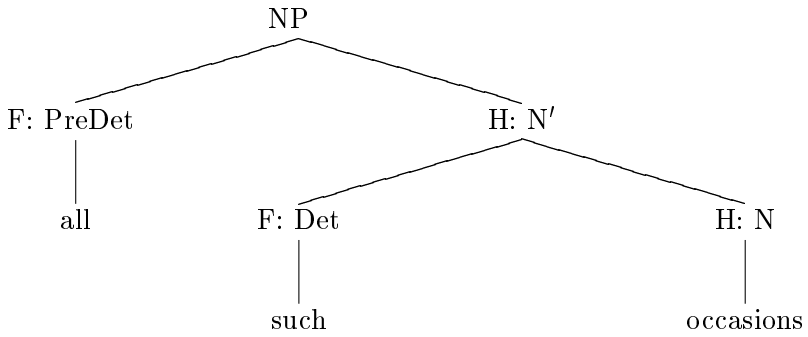
As given here, adverb, adjective, (pre)determiner or even AP are functors that combine with a head, forming a well-formed head-functor phrase.

With the postulation of the head-functor-phrase as a well-formed English phrasal type, we can take all the uses of *such* as instances of *head-functor-ph*:

(33)



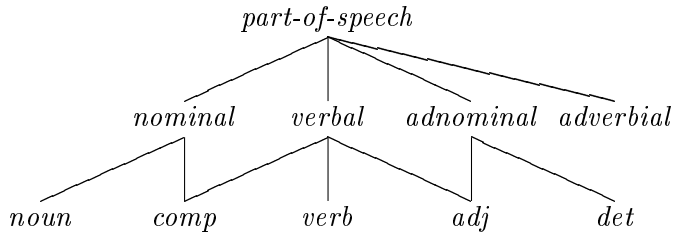
(34)



As represented here, *such* either as a predeterminer or determiner is a functor combining with a head.

One question that follows is then the categorial status of *such*. For this purpose, we introduce the category *adnominal*, which is a supertype of both *adjective* and *determiner* as represented in the following:

(35)



This mutiple inheritannce hierarchy is meant to capture many similarities between lexical categories. As is well-known, the NP and CP behave like a *nominal* element whereas the CP and VP are *verbal* in the sense that they both denote a propositional meaning. Adjectives and determiners behave alike in many languages and are treated as belonging to the identical category. In Korean, for example, adjectives and determiners can both act like a modifier in the prenominal position, showing no ordering restrictions with no complementary distribution:

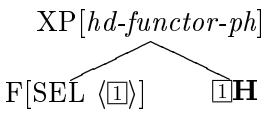
(36) a. chakhan ku haksayng 'the honest student'
honest the student

b. ku chakhan haksayng 'the honest student'
the honest student

Reflecting these, we assume that English also needs a super lexical type *adnominal* encompassing both adjectives and determiners. The word *such* thus belongs to this supercategory *adnominal*.

To put this combinatorial possibility between functor and head, we can represent this combination as the following, using the feature SEL (SELECT):

(37)



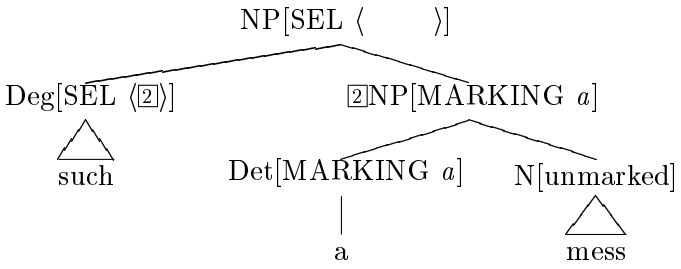
Various functor-like elements are nonhead daughters in a local tree and 'select' their head sister. This in turn means that the expression *such* has at least the following lexical information:

(38)

$$\begin{bmatrix} \text{FORM } \langle such \rangle \\ \text{SYN} \begin{bmatrix} \text{CAT } adnominal \\ \text{SEL } \langle \text{NP[MARKING } a] \rangle \end{bmatrix} \end{bmatrix}$$

There is a feature MARKING which picks out some property of a word or a phrase which other aspects of the constructions may be sensitive to. In most cases, the value of MARKING is *unmarked*. The feature SEL (different from canonical valence features such as SUBJ and COMPS in HPSG) specifies what it can combine with in syntax. This simple lexical entry means that *such* combines with an indefinite NP, as represented in (39):

(39)



In the structure above, *such* combines with an NP marked with the indefinite article *a*. This way of selectional restriction can easily capture why *such* cannot combine with the definite NP:

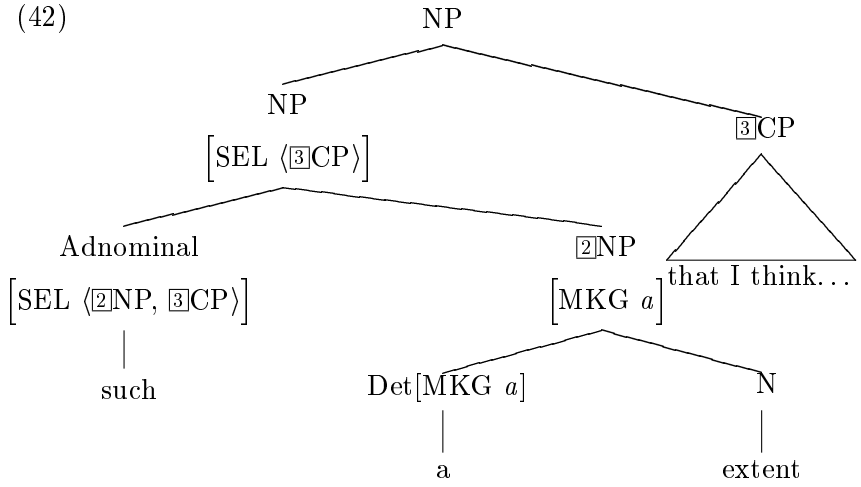
(40) *such the plan, *such this dog, *such my dog..

We have seen that *such* can be also linked to another syntactic expressions like *as* or *that*:

(41)
$$\begin{bmatrix} \text{FORM } \langle \textit{such} \rangle \\ \text{SYN} \begin{bmatrix} \text{CAT } \textit{adnominal} \\ \text{SEL } \langle (\text{NP}[\text{MARKING } a]), (\text{XP}[\textit{as/that}]) \rangle \end{bmatrix} \end{bmatrix}$$

This kind of lexical information will project a structure like the following:

(42)



As represented here, *such* has two dependents: an indefinite NP and a CP. It first combines with the indefinite NP *a mess*, forming a head-functor phrase. The result will once again combine with the resulting CP clause.

All these dependents are optional, implying that *such* can be used alone as repeated here:

(43) a. **Such** is the case with cycles in the British Dinantian(Lower Carboniferous), reviewed in Walkden(1987).
<ICE-GB:W2A-023 080:1>

b. **Such** is their awareness of the foaming discontent in the ranks.
<ICE-GB:W2C-003 060:1>

The present 'functor' analysis thus requires no multi-lexical entries for *such*, attributing the properties of *such* to the interaction of head-functor phrase and lexical properties of *such*. Note that in the present analysis, the distributional flexibility of *such* thus comes from how the value of the feature SELECT is realized. As observed, this way of lexical treatment thus can explain most of the combinatorial and distributional possibilities of *such*. It can also account for examples where *such* is linked to another syntactic

element. Consider examples where identifying *such* is used with the relative clause:

(44) a. Would you follow **such** advice as you give me__ ?

b. ....**such** regulations as the Secretary to the Treasury may prescribe __ .

The *as*-clause above is incomplete in the sense that it misses an element semantically linked to the NP containing *such*. The *as*-clause behaves like a fused relative clause, roughly meaning 'such advice like that which you give me'. A simple way to capture this is that *such* is selecting two dependents: an NP and an incomplete clause with the marker *as*:

(45)
$$\begin{bmatrix} \text{FORM } \langle \textit{such} \rangle \\ \text{SYN} \begin{bmatrix} \text{CAT } \textit{adnominal} \\ \text{SEL } \langle \text{NP}_i, \text{CP}[\text{GAP } \langle \text{NP}_i \rangle] \rangle \end{bmatrix} \end{bmatrix}$$

The gap in the *as*-clause is semantically linked to the head that *such* combines.

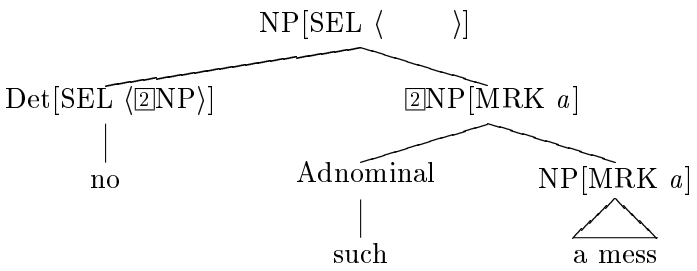
The present analysis also gives us a way of explaining the peculiar distributions of *such* we have seen earlier whose data we repeat here:

(46) a. There was no foreseeable possibility of **a such a** scheme.
<BNC A8X 960>

b. Without promotion, there is **no such a** thing anymore.
<BNC HCX 352>

In the present analysis, the combination of *such* with its head does not close off the NP projection, implying that *such* is just adjectival:

(47)



One remaining issue is how to capture the two different functional uses: identifying and intensifying. Note that depending on context, *such* can be ambiguous. That is, it can be either identifying or intensifying:

(48) a. (Having looked at the factors which precipitated phenomenal growth rates in the NIC is. . .) The first point . . . is the fact that **such *rapid*** growth on a world-wide scale would rapidly exhaust. . . <ICE-GB:W1A-013 021:1>

b. Who can be patient in **such** extremes? (Bolinger 1972)

De Mönnink (2000) mentions that identifying *such* has only a defining referent in the context whereas intensifying *such* has only a gradable element in the noun phrase. *Such* in (48a), therefore, is semantically ambiguous since it has both the defining element and the gradable element. *Such* in (48b) can also be considered ambiguous, since the following noun phrase *extremes* could be considered either gradable or non-gradable as noted by Bolinger (1972). We agree with Spinillo's (2003) point that the syntactic distinction between the two *such*es is not that obvious, and the semantic distinction is not clear cut as well, though existence of the two functions is acknowledged.

6 Conclusion

We attributed the combinatorial as well as distributional properties of *such* to its lexical as well as constructional properties. Their behavior is the results of interactions between their lexical properties and the properties of more general constructions such as head-functor constructions which play an important role in the English grammar.

It is true that every language employs a limited set of lexical categories and constructions, but there exist also many lexical expressions whose distributions cannot be pinned down to only one peculiar lexical category. The multi-function of *such* implies that grammar (or language learners) not only refers to lexical categories, but also utilizes grammatical functions.

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