

Exocentricity and Silent Nouns as Heads of Compound Formations*

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1. Introduction

One of the characteristics of phrasal structure is its endocentricity; that is, every structure contains a head. The notions of head and endocentricity were already introduced by Bloomfield (1933) and in generative grammar, both notions play a central role in X-bar theory, first proposed by Chomsky (1970). While the head can be defined differently from theory to theory, it is generally accepted that the head is an element that determines the syntactic and semantic properties of the structure. For example, the head of the verb phrase *help you* is the verb *help*, because it determines the categorial and semantic characteristics of the phrase. While the notions of head and endocentricity in syntax are elaborated further (Jackendoff (1977), Chomsky (1981, 1986), Stowell (1981), among others), Williams (1981) first extends the notion of head to the domain of morphology. He defines the head of a complex word as follows:

- (1) In morphology, we define the head of a morphologically complex word to be the righthand member of that word. (Williams (1981:248))

According to (1), the derived word *construction* is a noun with the nominal suffix *-ion* as its head. Similarly, the category of the compound *dry dock* is determined by its righthand member *dock*. This element also determines the semantic property of the whole; that is, a dry dock is a kind of dock. Since both syntactic and morphological structures are endocentric, many researchers including Selkirk (1982), Lieber (1992), and Halle and Marantz (1993) have attempted to assimilate word formation to sentence formation. They hypothesize that words and phrases are formed in accordance with the same principles.

However, not all morphologically complex words have a head. A typical example of such headless morphological constructions is so-called “exocentric compounds,” whose properties have been studied since Bloomfield (1933). To illustrate, observe the well-known examples in (2):

- (2) a. [N [A red] [N head]]
 b. [N [V pick] [N pocket]]

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In (2a), although the category of the compound *redhead* is identical to that of its righthand element *head*, a *redhead* does not denote a kind of head but a person who has red hair. Thus, *head* in *redhead* fails to fully determine the properties of the whole word. The situation is more complicated in the case of *pickpocket* in (2b). As with the case of *redhead*, the compound *pickpocket* has the same category as the righthand member *pocket* but it is not a hyponym of *pocket*; *pickpocket* means a person who steals money. In this sense, *pocket* in *pickpocket* is not a normal head. What complicates the situation is that the lefthand member is not a head either, contrary to the following standard assumption of argument structure. Generally, it is assumed that a verb takes a noun as an argument, projecting a verb phrase. Given that *pickpocket* consists of a verb and a noun that corresponds to the direct object of the verb (cf. *to pick a pocket*), the verb *pick* seems to be a head. However, this is not the case, because the verb *pick* does not function as a head in categorial and semantic terms. The verb *pick* does not determine the category of the nominal compound *pickpocket* and the compound does not refer to the event or action expressed by the verb *pick*. Thus, neither of the two constituents of *pickpocket* behaves as the head of the compound.

The exocentric compounds in (2) indicate that, unlike phrases, words may violate the principle of endocentricity. This difference between words and phrases poses a problem for syntactic approaches to word formation because the approaches hypothesizes that word formation and phrase formation follow the same principles. Thus, one may consider that exocentric compounds provide evidence that words are formed independently of phrases (cf. Kageyama (2010)).¹ The purpose of this paper is to demonstrate that so-called exocentric compounds do not provide evidence for the independence of word formation from phrase formation by arguing that so-called exocentric compounds are not in fact exocentric but endocentric. More specifically, this paper argues that “exocentric” compounds actually have silent variants of semi-lexical categories (Corver (2008)) in head position (cf. Shimada (2013)), and thus such compounds do not have unusual structure. Therefore, “exocentric” compounds do not pose the problem mentioned above for the syntactic approaches to word formation.

It should be noted that some researchers have already argued that compounds that are traditionally considered as exocentric compounds contain compounds that actually have endocentric structure. Among such compounds are “bahuvrīhi compounds” or “possessive compounds.” This paper will first refer to these

¹ It is also pointed out that even when words have headed structures, the heads differ from syntactic heads to some extent. For the related issues, see Haspelmath and Sims (2010:section 7.4).

compounds.

This paper is organized as follows. Section 2 provides a brief overview of some studies where bahuvrīhi compounds are distinguished from “exocentric” compounds. Section 3 clarifies the notion of “exocentricity” based on Scalise et al. (2009). Section 3 also overviews Bisetto and Scalise (2005), who classify compounds into three major types: subordinate, attributive, and coordinate compounds. Based on this classification, section 4 shows in what sense the three types compounds can be (apparently) exocentric. Section 5 accounts for what makes endocentric compounds apparent exocentric ones; attributive compounds can be apparently exocentric because of figurative uses of endocentric compounds; and apparent exocentricity of coordinate and subordinate compounds results from silent heads. Section 6 briefly discusses why language allows such silent heads. Section 7 concludes this paper.

2. Bahuvrīhi Compounds: Figurative Uses of Endocentric Compounds

Bahuvrīhi compounds, which are also known as possessive compounds, are those that denote the possessor of the entity expressed by the compound, as exemplified in (3).

- (3)
- a. birdbrain
 - b. egghead
 - c. hardass
 - d. hardhat
 - e. redhead (= (2a))

As mentioned in section 1, *redhead* does not mean a kind of a head but a person who has red hair. Likewise, *birdbrain* denotes a person whose brain is just like a bird’s, that is, a stupid person. As these examples show, the constituents of the compound do not serve as a semantic determinant. Thus, these compounds are sometimes regarded as exocentric compounds.

However, it has pointed out that these compounds are not exocentric but endocentric (e.g. Bauer (2009:351), Kageyama (2010:section 3.2), Booij (2012:82), among others). What is crucial here is that the compounds in (3) can have literal interpretations in principle. A typical example is the compound *hardhat*, which has the literal interpretation ‘a hat worn by building workers’ and the possessor interpretation ‘a worker who wears a hard hat’ (Lieber (2009:363)). Note that such a duality of interpretation is not unique to compounds; simplex words can also have literal meanings and metaphorical, metonymic, and synecdochic meanings.

Generally, such figurative uses are not assumed to be related to exocentricity. Then, the possessor interpretation of *hardhat*, for example, arises due to the metonymical use of the endocentric compound. We can therefore conclude that bahuvrīhi compounds are not exocentric but endocentric compounds.

3. The Definition of Exocentricity and the Classification of Compounds

3.1. The Definition of Exocentricity

As mentioned in section 1, Williams (1981) defines the righthand element as the head. This definition implies that the righthand element solely determines all of the properties of the compound as a whole. On the contrary, Scalise et al. (2009) propose that different constituents in the compounds can determine the following distinct properties of the compound (see also Namiki (2001)): categorial, morphological, and semantic properties. Under this proposal, a compound can contain three different heads, that is, categorial, morphological, and semantic heads, each of which independently determines the three properties.^{2, 3} Consequently, “the lack of the head” can be interpreted in three ways. Scalise et al. (2009:58-60) define the three types of exocentricity as follows:

² Di Sciullo and Williams (1987:26) propose the notion of Relativized Head, according to which heads in words can differ from feature to feature:

- (i) Definition of “head_F” (read: head with respect to the feature F):
The head_F of a word is the rightmost element of the word marked for the feature F.

Scalise et al. (2009:67) note that their notion of head differs from Di Sciullo and Williams’ (1987). One of the differences is that unlike Scalise et al. (2009), Di Sciullo and Williams (1987) define a head in terms of the position of the head.

³ One might doubt the necessity of assuming both categorial and morphological features because the latter seem to include the former. Scalise et al. (2009:59) show that morphological exocentricity is independent of categorial exocentricity by referring to the following Italian left-headed compound:

- (i) a. [testa_N rasata_A]_N
‘head+shaven = skin head’
b. i [testa rasata]
the-pl.masc head shaven
‘the skin heads’

The category of the compound in (ia) is determined by the lefthand member *testa*, which is feminine singular. However, the morphological features of the whole compound do not coincide with *testa*. As the determiner in (ib) indicates, the whole compound can be masculine plural. This example demonstrates that some compounds can be morphologically exocentric, but not categorially exocentric. Therefore, we need to distinguish between categorial and morphological features.

- (4)
- a. **Categorial Exocentricity**
A compound is categorially exocentric if the constituent in the head position does not impose its categorial features on the whole construction.
 - b. **Morphological Exocentricity**
A compound is morphologically exocentric if the morphological features of the compound are not identical to the morphological features of any of its internal constituents.
 - c. **Semantic Exocentricity**
A compound is semantically exocentric if it denotes a class which cannot be derived from the classes denoted by its constituents.

Let us schematize the three types of exocentricity as follows:

- (5)
- a. **Categorial Exocentricity**
[X Y]_Z, where Z ≠ Y
 - b. **Morphological Exocentricity**
[X_[α] Y_[β]]_{Y_[γ]}, where γ ≠ α or β
 - c. **Semantic Exocentricity**
[X Y]_Y, where [X Y] ⊄ X or Y

The schema in (5a) shows that the lexical category of the whole compound, represented by Z, is not identical to that of righthand member, represented by Y. The underlying assumption here is that the righthand position is a head position in English. The schema in (5b) indicates that the morphological features [γ] that the whole compound has do not coincide with those of constituents represented by [α] and [β]. The schema in (5c) means that the compound [X Y] is not a hyponym of X or Y.

Note that since categorial, morphological, and semantic exocentricity are independent of one another, at most three and at least one type(s) exocentricity can be observed in an exocentric compound. Section 4 shows the distribution of the three types of exocentricity in exocentric compounds. In so doing, the classification of compounds will be useful. The next subsection thus introduces the classification proposed by Bisetto and Scalise (2005), which this paper adopts.

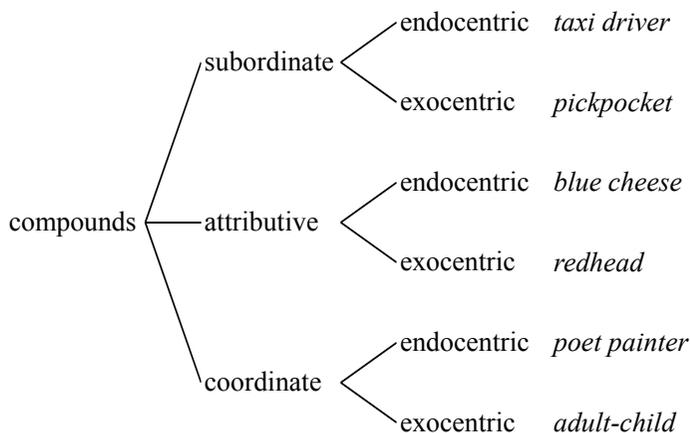
3.2. *The Classification of Compounds*

Bisetto and Scalise (2005) propose their own classification of compounds,

pointing out the problems of classifications suggested by many researchers (e.g. Bloomfield (1933), Bally (1950), Marchand (1969), Spencer (1991), Fabb (1998), Olsen (2001), Haspelmath (2002), Bauer (2001), Booij (2005), among others). One of the most prominent problems in such classifications is the inconsistency of the adopted criteria (Bisetto and Scalise (2005:section 1.3.1); see also Scalise and Bisetto (2009:section 3.2.3)). For example, some researchers assume the following criteria, which are independently applied: the presence or absence of a head, which distinguishes between endocentric and exocentric compounds; and the syntactico-semantic relation between the constituents. According to Bisetto and Scalise (2005), the independent status of the criteria results in the undesirable consequence that the compounds classified on the basis of the syntactico-semantic relation between the constituents are not relevant to the notions of endocentricity and exocentricity. As will be discussed later, regardless of the relationship between the constituents, any compounds can be classified into endocentric or exocentric compounds. Therefore, Bisetto and Scalise (2005) emphasize the necessity of an alternative way to classify compounds.

In order to avoid the problems caused by inconsistent criteria, Bisetto and Scalise (2005) propose a new classification, which is based on homogeneous criteria. Their classification is schematized as follows:

(6) Bisetto and Scalise (2005:326)



Under their proposal, compounds are first classified into three types based on the grammatical relation that links the two constituents of the compound. The possible grammatical relations are subordination, attribution, and coordination.

In subordinate compounds, the constituents are linked by a “complement

relation.” For instance, in the compound *taxi driver*, *taxi* is the complement of the verb *drive*. In attributive compounds, the constituents are tied by a relation of attribution or modification. This relation is well exemplified by the compound *blue cheese*, where *blue* expresses a property of *cheese*. Coordinate compounds consist of the elements connected by a “coordinating” relation. In a typical case, the constituents of coordinate compounds have a relation of conjunctive natural coordination, as in *poet painter*, which means a person who is both a poet and a painter.

It should be noted here that these three relations are found even in “headless” compounds. In the compound *pickpocket*, for example, we can observe a complement relation between the constituents; that is, *pocket* is the complement of the verb *pick*. Likewise, a relation of attribution is observed also in the compound *redhead*, where the adjective *red* modifies the noun *head*. In addition, there are also compounds composed of the coordinated elements, neither of which determines the properties of the whole. For example, the compound *adult-child*, which is a psychiatric term, consists of the coordinated elements *adult* and *child*, but it is headless, in that *adult-child* is not a kind of *child*. Therefore, the three types of compounds are subclassified according to whether they are endocentric or exocentric.

In sum, the classification proposed by Bisetto and Scalise (2005) is uniquely and consistently based on the grammatical relation between the constituents at the first level. At the second level, compounds can be further subdivided by means of the criterion of the presence or absence of a head. According to this classification, there are three types of exocentric compounds. The next section examines the characteristics of the exocentric compounds given by Bisetto and Scalise (2005) and other researchers, and the types of exocentricity (Scalise et al. (2009)) observed in them.

4. The Three Types of Exocentricity and Exocentric Compounds

4.1. The Heterogeneous Nature of Exocentric Compounds

After proposing the classification of compounds in (6), Bisetto and Scalise (2005:327-328) show the following examples of the three types of exocentric compounds:

- (7) Subordinate Exocentric Compounds
 - a. cut-throat
 - b. killjoy
 - c. pickpocket
 - d. lavapiatti (lit. wash dishes ‘dishwasher’ (Italian))

- (8) Attributive Exocentric Compounds
- a. freelance
 - b. greenhouse
 - c. greybeard
 - d. long-legs
 - e. loudmouth
 - f. paleface
 - g. white collar
 - h. Kahlkopf (lit. bald-head ‘person with a bald head’ (German))
 - i. auricomus (lit. gold hair ‘golden-haired’ (Latin))
- (9) Coordinate Exocentric Compounds
- a. Austria-Hungary
 - b. mind-brain
 - c. mother-child
 - d. north-east
 - e. Schleswig-Holstein
 - f. candra-ditya-u (moon-sun-DUAL, ‘the moon and the sun’ (Sanskrit))
 - g. elun-ai (‘adult and child’ (Korean))

Recall here that Scalise et al. (2009) show that there are three types of exocentricity: categorial, morphological, and semantic exocentricity. In light of this distinction, we can observe different types of exocentricity in the compounds in (7)-(9). For example, the compound *cut-throat* in (7a) shows two types of exocentricity. First, it is semantically exocentric in that it is neither a kind of *cut* nor a kind of *throat*; instead, it means ‘murderer.’ Second, it is also categorially exocentric, because the (de)verbal element *cut*, which seems to select its direct object *throat*, is expected to determine the category of the compound but it is nominal. On the other hand, the compound *greenhouse* in (8b) shows a different pattern of exocentricity. Since its category coincides with the righthand nominal member *mouth*, it is endocentric categorially. However, its semantic property does not correspond to *house*; that is, *greenhouse* does not express a kind of *house*, but a building for growing plants. Thus, *greenhouse* is exocentric only semantically. The heterogeneous nature of exocentricity observed in *cut-throat* and *loudmouth* raises the following questions: Which type(s) of exocentricity can be observed in exocentric compounds and is there any relationship between the types of exocentricity and those of compounds? Answering these questions will refine our understanding of the “exocentricity.” With this in mind, we will examine which part(s) of exocentricity can be observed in

each of the compounds in the next subsection.

Before proceeding, it should be noted that attributive exocentric compounds include bahuvrīhi compounds, which are introduced in section 2; the compounds in (8c-i) denote possessors. Although we have already concluded that bahuvrīhi compounds are not exocentric compounds, the next subsection takes them in consideration for a comparison purpose.

4.2. *The Types of Exocentricity in Exocentric Compounds*

The tables in (10), (11), and (12) show in what sense the subordinate, attributive, and coordinate exocentric compounds referred to in the literature are exocentric. The examples are collected from Don (2009), Lieber (2009), Scalise et al. (2009), Haspelmath and Sims (2010), and Booij (2012).⁴ In the tables, the presence and absence of the exocentricity are marked by the notations ‘✓’ and ‘*’, respectively. Note that morphological exocentricity in English is not computable, which is indicated by the notation ‘-.’

(10) Subordinate Compounds

English

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
a.	<i>cutpurse</i>	[V N] _N	(✓) ⁵	-	✓
b.	<i>cut-throat</i>	[V N] _N	(✓)	-	✓
c.	<i>killjoy</i>	[V N] _N	(✓)	-	✓
d.	<i>pickpocket</i>	[V N] _N	(✓)	-	✓
e.	<i>spoilsport</i>	[V N] _N	(✓)	-	✓

⁴ This paper is mainly concerned with the exocentric compounds whose output category is a noun. For the other types of exocentric compounds in various languages, see the studies referred to above.

⁵ The subordinate exocentric compounds in English in (10a-e) are not categorially exocentric in terms of position because their category is identical to the right-hand member. However, there are selectional relations between the constituents and the verbal elements are arguably responsible for the selection. Given this fact, it is plausible to assume the left-hand members as heads in these compounds. If so, the category of the whole compound does not coincide with that of the left-hand member, and thus these compounds are also categorially exocentric.

Italian

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
f.	<i>asciuga-capelli</i> lit. dry hair 'hair dryer'	[V N] _N	✓	? ⁶	✓
g.	<i>lava-piatti</i> lit. wash dishes 'dishwasher'	[V N] _N	✓	?	✓
h.	<i>porta-bagagli</i> lit. carry luggage 'trunk'	[V N] _N	✓	?	✓
i.	<i>porta-lettere</i> lit. carry letters 'postman'	[V N] _N	✓	?	✓

Spanish

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
j.	<i>limpia-botas</i> lit. clean boots 'shoeshine'	[V N] _N	✓	✓	✓
k.	<i>corta-úñas</i> lit. cut nails 'nail clipper'	[V N] _N	✓	?	✓
l.	<i>lanza-cohetes</i> lit. launch rockets 'rocket launcher'	[V N] _N	✓	?	✓

(11) Attributive Compounds

English

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
a.	<i>birdbrain</i>	[N N] _N	*	-	✓
b.	<i>egghead</i>	[N N] _N	*	-	✓
c.	<i>freelance</i>	[A N] _N	*	-	✓
d.	<i>greenhouse</i>	[A N] _N	*	-	✓

⁶ Based on the survey of various exocentric compounds in various languages, Scalise et al. (2009:63) state that "whenever a compound is semantically exocentric, it is also morphologically exocentric." The validity of this statement is partially confirmed by the compounds in (10j), (11, m, n, p). Given this generalization, we predict that the compound *asciuga-capelli* shows morphological exocentricity as well (though the literature do not state so explicitly). However, as Scalise et al. (2009:60) themselves point out, the Spanish compound *media naranja* in (11q) shows that it is semantically exocentric but categorially and morphologically endocentric, as shown in (i).

- (i) la [media_A naranja_{Nsg.fem}]_{Nsg.fem}
the half orange
'Mr./Mrs. Right'

This example requires further investigation of the relationship between semantic and morphological exocentricity. The notation '?' in the tables indicates this point.

e.	<i>greybeard</i>	[A N] _N	*	-	✓
f.	<i>hard hat</i>	[A N] _N	*	-	✓
g.	<i>long-legs</i>	[A N] _N	*	-	✓
h.	<i>loudmouth</i>	[A N] _N	*	-	✓
i.	<i>paleface</i>	[A N] _N	*	-	✓
j.	<i>redhead</i>	[A N] _N	*	-	✓
k.	<i>white collar</i>	[A N] _{N/A}	*/(✓) ⁷	-	✓

Dutch

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
l.	<i>half-bloed</i> lit. half blood 'half-breed'	[A N] _N	*	✓	✓
m.	<i>spleet-oog</i> lit. slit eye 'people of Chinese appearance'	[A N] _N	*	✓	✓
n.	<i>zwart-hemd</i> lit. black shirt 'fascist'	[A N] _N	*	✓	✓

German

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
o.	<i>kahlkopf</i> lit. bald head 'bald-head'	[A N] _N	*	?	✓

Italian

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
p.	<i>testa rasata</i> lit. head shaven 'skin head'	[A N] _N	*	✓	✓

Spanish

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
q.	<i>media naranja</i> lit. half orange 'Mr./Mrs. Right'	[A N] _N	*	*	✓

⁷ The compound *white collar* is categorially exocentric when it is used as an adjective, because the right-hand member is not an adjective but a noun. According to the *Oxford English Dictionary* (2nd edition, on CD-ROM), the nominal expression *white collar* occurs for the first time in 1919, but it is not a compound but a phrase, as shown in (ia). Its compound form appears in 1921, as shown in (ib).

- (i) a. ... they are allowed to wear a white collar ...
 b. Urban chain restaurants have accustomed white-collar boys and girls to tasty viands, albeit in limited amounts.

These examples show that the compound was categorially exocentric at least in the early stage of its usage.

Latin

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
r.	<i>auricomus</i> lit. gold hair 'golden-haired'	[A N] _N	*	?	✓

(12) Coordinate Compounds⁸

English

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
a.	<i>Austria-Hungary</i>	[N N] _N	*	-	✓
b.	<i>mind-brain</i>	[N N] _N	*	-	✓
c.	<i>mother-child</i>	[N N] _N	*	-	✓
d.	<i>pass-fail</i>	[V V] _N	✓	-	✓

Mordvin

	Example	Structure	The Types of Exocentricity		
			Categorial	Morphological	Semantic
e.	<i>penč.t'-vakan.t</i> lit. spoon plate 'cutlery'	[N N] _N	(double headed)	✓	✓

The distribution of the three types of exocentricity in the exocentric compounds can be summarized as follows:

(13) Subordinate Exocentric Compounds

- a. [X Y]_Z, where [X Y] $\not\subset$ X or Y
e.g. *pickpocket*
- b. [X_[α] Y_[β]]_{Z[γ]}, where [X Y] $\not\subset$ X or Y
e.g. *limpia-batas* (Spanish)

(14) Attributive Exocentric Compounds

- a. [X Y]_Y, where [X Y] $\not\subset$ X or Y
e.g. *greenhouse*

⁸ Scalise et al. (2009:61) list the following Spanish compound as an example of exocentric compounds:

- (i) poeta pintor 'poet painter'

However, I do not include this compound in exocentric compounds because both of the two constituents serve as semantic and categorial (overt) determinants. Semantically, the compound in (i) means a person who is simultaneously a poet and a painter. Categorially, the compound is a noun and its members are also a noun. By contrast, as will be shown in section 5.2, the constituents of *Austria-Hungary* do not function as heads; *Austria-Hungary* is not something that is simultaneously Austria and Hungary. Therefore, the compound in (i) should be treated differently from exocentric coordinate compounds.

- b. $[X_{[\alpha]} Y_{[\beta]}]_{Y_{[\gamma]}}$, where $[X Y] \not\subseteq X$ or Y
 e.g. *half-blood* (Dutch)
- (15) Coordinate Exocentric Compounds
- a. $[X_1 X_2]_X$, where $[X_1 X_2] \not\subseteq X_1$ or X_2
 e.g. *Austria-Hungary*
- b. $[X_{1[\alpha]} X_{2[\beta]}]_{X_{[\gamma]}}$, where $[X_1 X_2] \not\subseteq X_1$ or X_2
 e.g. *penč.t'-vakan.t* (Mordvin)

In subordinate exocentric compounds, all of the three types of exocentricity can be observed, as schematized in (13b). In English, the two types of exocentricity, that is, categorial and semantic exocentricity, can be observed, as represented in (13a). Attributive exocentric compounds are always endocentric categorially in English and other languages like Dutch, as shown in (14). In coordinate exocentric compounds, while the category is identical to both of the constituents, semantic exocentricity is observed. In some cases, this type of compound also shows morphological exocentricity, as in (15b).

In what follows, we will reconsider the “exocentricity” in the compounds, based on the English compounds observed in this section. Note that since morphological exocentricity is inherently unobservable, it is excluded from the consideration.

5. Reconsideration of “Exocentric” Compounds

As stated in section 1, headless structures of words can be problematic for the syntactic approaches to word formation. This paper argues that “exocentric” compounds are not problematic by showing that they have in fact endocentric structure. The following subsections deal with attributive, coordinate, and subordinate exocentric compounds.

5.1. *Figurative Uses of Endocentric Attributive Compounds*

Let us first consider the exocentricity of the attributive exocentric compounds. As represented in (16), which is repeated from (14a), the compounds in question are usually endocentric categorially but exocentric semantically. Thus, we need to consider where their semantic exocentricity comes from.

- (16) Attributive Exocentric Compounds
 $[X Y]_Y$, where $[X Y] \not\subseteq X$ or Y
 e.g. *greenhouse*

As noted in section 4.1, attributive exocentric compounds include bahuvrīhi compounds. In fact, among the compounds in (8), the following compounds denote possessors of the entities to which the compounds literally refer:

- (17) birdbrain, egghead, greybeard, long-legs, loudmouth, paleface, white collar

Thus, semantic exocentricity in these compounds comes from metaphorical, metonymical, and synecdochic uses of endocentric compounds.

I argue that the same is true of the other English compounds in (8), which are shown in (18).

- (18) a. freelance
b. greenhouse

Along with bahuvrīhi compounds, these compounds also have figurative meanings and/or involve figurative expressions. The compound *freelance* in (18a) literally means ‘mercenary.’⁹ Based on this meaning, it can metaphorically express a person who works without being employed by a particular organization. In the compound *greenhouse*, meaning a building for growing plants, *green* has the figurative meaning of ‘plant’ and *house* is synecdochically used to denote buildings in general. In this way, the semantic exocentricity in these compounds comes from figurative uses of an endocentric compound (in *freelance*) and of simplex words (in *greenhouse*). Consequently, we can conclude that the “semantic exocentricity” of attributive exocentric compounds emerges because of the figurative uses of headed compounds.

This conclusion implies that when an element is a categorial head, it is also a semantic head. This is compatible with the principle proposed by Scalise et al. (2009). Based on their survey of exocentric compounds, Scalise et al. (2009:62) propose the following principle concerning interaction between categorial and semantic exocentricity:

- (19) If a constituent is a categorial head, then it must also be a semantic head.

The schema in (16) shows that attributive exocentric compounds follow this principle. A consequence of this principle is that there are no compounds

⁹ More precisely, this meaning is also figurative because in the compound, *lance*, which literally means ‘spear,’ metonymically denotes ‘mercenary.’

containing a categorial head that is not a semantic head, as schematized in (20).

- (20) a. * $[X Y]_Y$, where $[X Y] \not\subset Y$
 b. * $[X Y]_X$, where $[X Y] \not\subset X$

One might point out that coordinate exocentric compounds seem to violate this principle (cf. (15)). Taking this as a starting point, the next subsection examines the “exocentricity” observed in coordinate exocentric compounds.

5.2. *Silent Heads in Coordinate Compounds*

The schema in (21), repeated from (15a), give an impression that coordinate exocentric compounds are categorially endocentric, because the category of the compound is identical to its constituents. If they are categorially endocentric, then the principle in (19) requires the righthand or lefthand element to be a semantic head. However, as we have observed in section 4, it is not the case.

- (21) Coordinate Exocentric Compounds
 $[X_1 X_2]_X$, where $[X_1 X_2] \not\subset X_1$ or X_2
 e.g. *Austria-Hungary*

For example, *Austria-Hungary* is clearly not a type of *Hungary* or a type of *Austria*. It refers to a nation that consists of the two nations *Austria* and *Hungary*. Both of them do not solely determine the semantic properties of the whole, although the righthand and lefthand elements have the same category as the whole. That is, the righthand and lefthand elements, either of which seems to be a categorial head, are not a semantic head. This situation is inconsistent with the principle in (19).

Then, what determines the semantic properties of coordinate exocentric compounds? If a semantic determinant is simultaneously a categorial head, the undesired situation does not occur. Based on Shimada (2013), I argue that coordinate exocentric compounds have phonologically null heads which are silent variants of semi-lexical or grammatical nouns, and that such silent heads are semantic and categorial determinants. Semi-lexical nouns are semantically light nouns. According to Emonds (2000:9), English has semi-lexical nouns such as *one*, *self*, *thing*, *stuff*, *people*, *other(s)*, *place*, *time*, *way*, *reason*, etc. Corver (2008) argues that such semi-lexical nouns can be silent (see also Kayne (2005, 2007)). Based on these studies, Shimada (2013) proposes that a certain type of coordinate compounds has the following structures, where the nouns in small capital letters indicate phonetically null elements:

- (22) a. [Austria-Hungary [NATION]]
 b. [Aol-Time-Warner [COMPANY]]
 c. [Hewlett-Packard [COMPANY]]

(Shimada (2013:85), with slight modifications)

The existence of silent nouns is confirmed by the fact that they can be exchanged for overt counterparts (Corver (2008)). According to Shimada (2013), in addition to *Hewlett-Packard*, the expression *Hewlett-Packard Company* is also found in a web search. Therefore, *company* in (22) can be considered as a semi-lexical noun. Based on this analysis, I argue that the other coordinate exocentric compounds also have silent nominal heads.

The existence of such heads is not so strange given that the interpretation of certain types of coordinate compounds depends on the environment where they are embedded. According to Olsen (2001:298), relational nominals such as *agreement*, *competition*, *differences*, *game*, *relation(ship)* etc. require “a complex argument whose component parts stand in the ‘between’ relation” to these nouns. Thus, in the expression *Tennessee-Arkansas game*, for example, the embedded compound *Tennessee-Arkansas* serves as an argument of the relational nominal *game*; as a result, *Tennessee-Arkansas game* means a ‘game’ between Tennessee and Arkansas. Olsen (2001:299) also shows that collective terms like *combination*, *pair*, *partnership*, *team* etc. denote a collection of elements and such elements can be specified by the constituents of the compounds. For example, *man-wife team* is a ‘team’ made up of a man and his wife. The semantic dependencies of the relevant compounds can also be observed in the examples in (23), both of which contain the same compound *father-son*.

- (23) a. father-son relationship (Olsen (2001:298))
 b. father-son combination (Olsen (2001:299))

In (23a), the head *relationship* forces the ‘between’ interpretation of *father-son*, and so (23a) can be paraphrased as *a relationship between a father and his son*. In (23b), on the other hand, the head *combination* forces the collective reading of *father-son*, and thus (23b) expresses a combination consisting of a father and his son (see also Lieber (2009:360)). Likewise, the silent head in a coordinate exocentric compound gives an appropriate interpretation to the overt N-N combination in the non-head position. For example, in [*Austria-Hungary* [NATION]], the silent head *NATION* requires a collective reading of *Austria-Hungary*.

Under this analysis, the categorial and semantic properties of coordinate

exocentric compounds are determined by the silent nouns. This means that such compounds actually contain heads.

5.3. *Silent Heads in Subordinate Compounds*

Let us now consider subordinate exocentric compounds, which seem to show both categorial and semantic exocentricity, as represented in (24), repeated from (13a).

- (24) Subordinate Exocentric Compounds
 $[X Y]_Z$, where $[X Y] \not\subseteq X$ or Y
 e.g. *pickpocket*

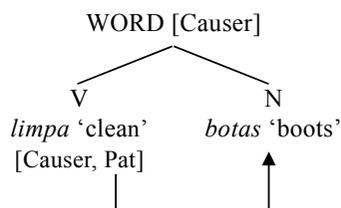
These compounds are no longer exocentric if we extend the proposal in the previous subsection; namely, subordinate exocentric compounds also have silent nouns, which serve as semantic and categorial heads in the compounds.

Under this proposal, the compound *pickpocket* has the following structure:

- (25) $[[[pick]_V [pocket]_N]_V PERSON]_N$

In this structure, the silent noun *PERSON* is responsible for categorial and semantic properties of the whole structure. It allows the compound to acquire the meaning of an agent or a causer of the event expressed by the verbal part (i.e. $[pick\ pocket]_V$). This interpretation is clearly obtained by extending Scalise et al.'s (2009) analysis of Romance exocentric compounds, which have left-hand headed structures alongside phrases. To illustrate, let us observe the following structure of the Spanish compound *limpia-botas* 'shoeshine':

- (26)



(Scalise et al. (2009:71))

According to Scalise et al. (2009:71), the verb has two semantic features, the Causer feature and the Patient feature (represented by Pat in (26)), and the latter is satisfied when the noun is selected as an argument of the verb. In contrast, since “inside the

compound no second noun which can be interpreted as an agent is introduced” (Scalise et al. (2009:71)), the Causer feature percolates to the highest node and it is read by syntax, giving rise to the interpretation of an agent. I argue that a silent noun is introduced as a “second noun,” and it satisfies the Causer feature in a head position, thus being interpreted as an agent. The structure assumed here is as follows:¹⁰

$$(27) \quad [\text{PERSON} [[\textit{limpia}]_V [\textit{botas}]_N]_V]_N$$

Under this analysis, we can appropriately assign all semantic features that the verb has to arguments.

The existence of the null head in the subordinate exocentric compounds is well-motivated by Japanese counterparts. The Japanese N+V compound *kutu-migak-i* in (28a) means ‘shoeshine,’ which corresponds to the Spanish compound *limpia-botas* ‘lit. clean boots, shoeshine.’ If this compound also has the silent variant of a semi-lexical noun as with the case of *limpia-botas* (and English *pickpocket* type compounds), then it has the structure [[N+V]_V Ø]_N. Given that the silent noun can be replaced with the overt counterpart as mentioned above, it is predicted that the silent element can be overtly realized. This prediction is confirmed by the example in (28b), where *-ya* ‘monger’ occurs in the head position.

- (28) a. *kutu-migak-i*
 shoes-polish-INF
 ‘shoeshiner’
 b. *kutu-migak-i-ya*
 shoes-polish-INF-monger
 ‘shoeshiner’

These examples demonstrate that *-ya* is a semi-lexical noun in Japanese and its silent

¹⁰ Emonds (2000:386, note 16) states that Romance V-N compounds may have the following structure, which is the same as the one proposed here:

- (i) [[Ø]_N [[*casse*]_V [*croûte*]_N]_V]_N ‘break-crust, snack’ (French)

He points out that this structure is similar to a phrasal subject-verb-object pattern, which reflects their meanings. Given the left-hand headedness in Romance compounds, he argues that the empty “subject” noun in (i), which is represented by Ø, is the head.

My analysis in this paper differs from Emonds’ in that it is a silent variant of semi-lexical nouns that fills in the head position. Thus, my analysis is an extended version of Emonds’ analysis.

counterpart is employed in the compound *kutu-migak-i*.¹¹ Therefore, the existence of the silent head in the subordinate exocentric compounds is empirically supported by the Japanese example.¹²

¹¹ One might assume that the compound *kutu-migak-i* means the event of polishing of shoes and that it is metonymy that gives rise to the meaning of a person engaged in the event. It is true that *kutu-migak-i* has the eventive meaning. Note that the same analysis is applied in such a case. More precisely, the silent noun *EVENT*, instead of *-YA*, is employed as a head, as represented in (i).

- (i) *kutu-migak-i-EVENT*
shoes-polish-INF-EVENT
'polishing of shoes'

In (i), the silent noun *EVENT* serves as a head and determines the categorial and semantic properties of the compound. It is possible that the compound containing *EVENT* in (i) is metonymically interpreted. In any case, what is crucial here is that the silent nouns are in the head position.

The presence of the silent nouns in *kutu-migak-i* is supported given Shimada's (2013) analysis of deverbal nouns in Japanese. In Japanese, the inflected form *-i-* of verbs known as "renyookai" (adverbial form) can be used as nouns, as represented in (iia). Based on Chae's (2010) observation that *hasir-i* in (iia) means the way of running, Shimada (2013) argues that in (iia), *hasir-i* has the null semi-lexical noun *KATA* 'WAY' as a head, as represented in (iib).

- (ii) a. *hasir-i*
running- INF
'the way of running'
b. *hasir-i-KATA*
running-INF-WAY
'the way of running'

(Shimada (2013:85))

Under this analysis, *hasir-i* is no longer simplex; rather, it is a compound (Shimada (2013:85)). Note here that the compound in (i) also contains an inflectional form *-i-*. Thus, it is plausible to assume that the compound in (i) contains silent nouns as a head. If so, the deverbal nouns like *hasir-i* and the "exocentric" compounds like *kutu-migak-i* are grouped together.

¹² Recall from section 5.2 that silent elements can be exchanged for overt counterparts. If *PERSON* is a semi-lexical noun, then it should be overtly realized. However, according to a native English speaker, the expressions in (i) are ungrammatical (*A cutthroat person* is grammatical when *cutthroat* functions as an adjective, meaning 'fierce and intense.' The sentence *He is cutthroat*, in which *cutthroat* occurs without any articles, indicates that *cutthroat* can be used as an adjective.).

- (i) a. * a cutpurse person
b. * a killjoy person
c. * a pickpocket person
d. * a spoilsport person

The ungrammaticality observed in (i) raises a question: Why does a *PERSON* cannot be overtly realized? At present, I do not have a clear answer, but I just point out one possible account: silent elements might not necessarily have overt counterparts. For example, Harves and Myler (2014) argue that the negative polarity item *yet* in (ii) is licensed by a silent adjectival predicate with negative implicative semantics.

- (ii) John is yet to eat dinner. (Harves and Myler (2014:213))

The discussion so far has shown that the coordinate and subordinate compounds that show apparent exocentricity have endocentric structure headed by silent nouns. Consequently, the relevant compounds can no longer be considered as indicating peculiarity of structures of words. Then, the question arises whether silent heads are, in turn, peculiar or not. The next section shows that silent heads are rather consistent with the system of Universal Grammar.

6. Silent Heads and Universal Grammar

Zwicky (1993) observes that non-heads (“dependents,” in his terminology) and heads are different in that the former, which are syntactically “accessory,” can be omitted but the latter are always required. Note that this observation does not imply that heads must always be phonetically overt. Actually, they can be covert. Emonds (2000) considers that covert heads conform to a general structural tendency, which argues for the innateness of Universal Grammar. First, Emonds (2000:100) argues that “language is better designed if heads are less salient than arguments.” This is because “the presence of the latter is not predictable on general grounds,” but the former are obligatorily required by Universal Grammar and thus are “the *expected* constituents within a given domain.” In the domain of X^0 , the less salience of heads can be observed in the stress pattern of compounds; typically, the lefthand element is stressed but the righthand element (i.e. the head) is not in English, as exemplified by *blackboard*.

Moreover, Emonds (2000:100) points out that the structural obligatoriness even allows heads to be silent (see also Emonds (2000:section 9.2)). If so, silent heads in the subordinate and coordinate “exocentric” compounds we have considered so far are not peculiar elements in language. Rather, they indicate that language is well-designed.

7. Conclusion

This paper examined whether so-called exocentric compounds serve as evidence for the independence of word formation from phrase formation. To answer this question, following Scalise et al.’s (2009) definition of the notion of exocentricity and adopting Bisetto and Scalise’s (2005) classification of compounds, this paper showed what kind of exocentricity can be observed in subordinate, attributive, and coordinate compounds. Along with Bauer (2009), Kageyama

Although the authors point out a possible candidate which can be dismissed, they “have not yet been able to find an overt counterpart of such predicate in English” (Harves and Myler (2014:237)). It is not clear whether there is actually an overt counterpart or not. If the overt counterpart does not exist, the examples in (i) seem to suggest that the compounds contain a semi-lexical element that is used only covertly. I leave this issue for future research.

(2010), and Booij (2012), this paper argued that among the three types, the exocentricity of attributive compounds (e.g. *redhead*) comes from figurative uses of endocentric compounds. In addition, extending Shimada's (2013) analysis, this paper argued that coordinate and subordinate "exocentric" compounds (e.g. *Australia-Hungary* and *pickpocket*, respectively) have heads in the form of silent elements, which are phonetically null variants of semi-lexical categories (see also Corver (2008)), and that their "exocentricity" can be attributed to such silent heads. Under the proposed analysis, so-called exocentric compounds are, in fact, endocentric. Therefore, we can conclude that the existence of apparent exocentric compounds does not signify the difference in possible structures between words and phrases. Additionally, this paper showed that the silent nouns functioning as heads of compound formations are not peculiar elements in language because they can be considered as an indication of the innateness of Universal Grammar.

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