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journal or publication title	Tsukuba English Studies
volume	34
page range	55-78
year	2015-10-31
URL	http://hdl.handle.net/2241/00149353

Coordinated Compounds in English and Morphological Parameter Setting*

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1. Introduction

A compound is a lexical unit that consists of two or more elements (Bauer (2001:695)). One of its characteristics is its referentiality. Although a compound is composed of more than one element, only one element is referential. According to Olsen (2000:898), the first constituent or the non-head of a compound has no referent distinct from that of the second constituent or the head. For example, the compound *computer industry* cannot refer to both a computer and an industry, but rather refers to an industry concerned with computers. Simply put, *computer industry* denotes a subtype of industries, but not a subtype of computers. In general, a constituent that is referential is identified with the head of a compound.

However, there are compounds all of whose constituents have their own referents. Bauer (2008) calls this type of compounds coordinated compounds. According to Bauer (2008:4), coordinated compounds are defined as “being a new unity made up of the whole of the two entities named.”¹ “New unity” in this statement means a new entity. A typical example of coordinated compounds is the Japanese compound *oya-ko* ‘parents and children’. In this compound, each constituent is referential and functions as a head. The compound is not a subtype of *oya* ‘parent’ or *ko* ‘child’. The other examples of coordinated compounds given in (1) are cited from Bauer (2008):

- (1) a. Punjabi: *bas-kaar* lit. bus-car ‘vehicles’ (Bhatia (1993:320))
 b. Lezgian: *kar-k’walax* lit. job work ‘job, business’
 (Haspelmath (1993:108))
 c. Mandarin: *hòu-báo* lit. thick thin ‘thickness’
 (Li and Thompson (1981:81))

Each compound shown in (1) differs from each other with respect to types of the constituents. In (1a), the referent of the compound is a hypernym of its constituents. Vehicles are hypernym of a bus or a car. In (1b), each

* I am grateful for helpful comments to Yukio Hirose, Nobuhiro Kaga, Masaharu Shimada, Naoaki Wada, and Masaru Kanetani. I also express gratitude to Souma Mori, Ryohei Naya, and Teppei Otake for their careful reading of the entire manuscript. Needless to say, any remaining errors and shortcomings are my own.

¹ Bauer (2008) terms this type of compounds *dvandvas*. Instead of this term, I will use the term “coordinated compounds” for expository purposes.

constituent refers to similar things. The meaning of the first constituent *kar* ‘job’ is similar to that of the second constituent *k’walax* ‘work’. In (1c), the first constituent *hòu* ‘thick’ is an antonym of the second constituent *báo* ‘thin’. The compound as a whole denotes the scale of thickness and its constituents name the two ends of the scale. Although the meanings of the compounds in (1) are different from each other, what is important is that all of their constituents are referential.

Although coordinated compounds occur in genetically distinct languages as shown in (1), not every language allows coordinated compounds. For example, Shimada (2013) adopts Olsen’s (2001) analysis and argues that coordinated compounds are disallowed in English, contrary to Bauer (2008). Bauer claims that in English, *Austro-Hungary*, *Hewlett-Packard*, and *Aol-Time-Warner* are coordinated compounds. According to Shimada, these compounds are what Olsen (2001) calls pseudo-dvandvas.² Pseudo-dvandvas have covert heads, so that the compound *Austro-Hungary* has the following structure:

(2) [Austro-Hungary [NATION]]

‘[NATION]’ represents a covert head that means ‘nation’. The structure in (2) shows that *Austro-Hungary* modifies the covert head; that is, the compound means ‘a nation made of Austria and Hungary’. According to Shimada, pseudo-dvandvas are not coordinated compounds in the sense of Bauer (2008), who claims that true coordinated compounds are not embedded in a larger structure. Since the English coordinated compounds are all pseudo-dvandvas, English does not have coordinated compounds.

The fact that Japanese allows coordinated compounds, while English does not is associated with a morphological parameter on units of word formation. Taking into consideration the fact that Japanese uses a stem to create a word, while English uses a word to create a word, Shimada (2013:93-94) suggests that the presence or absence of coordinated compounds relates to the difference in units of word formation. This is summarized as in (3):

(3) Parametric variation for coordinated compounds

Stem-based languages like Japanese have coordinated compounds, while word-based languages like English do not have them.

² For the more detailed information on Olsen’s analysis, see section 2.4.

This parameter is confirmed by the presence of coordinated compounds in Greek, which is one of the stem-based languages. As Ralli and Karasimos (2009) shows, Greek has coordinated VV compounds like *anigo-klino* lit. open-close ‘open-close’.

According to the parameter setting in (3), there are no coordinated compounds in word-based languages. However, there seem to be coordinated compounds in English:³

- (4) pick 'n' mix, rhythm 'n' blues, rock 'n' roll (OED²)

Each compound in (4) consists of constituents that have the same categories. For instance, *rock 'n' roll* is made of the two nouns *rock* and *roll*. This categorial identity is necessary but not sufficient for identifying the compounds in (4) with coordinated compounds. What is more important is that the constituents of each compound in (4) have equal status with respect to headedness. For example, Collins COBUILD Advanced Learner's English Dictionary 5th edition (COBUILD⁵) defines the compound *rhythm 'n' blues* as ‘a style of popular music developed in the 1940's from blues music, but using electrically amplified instruments’. This definition shows that *rhythm 'n' blues* is a new kind of music, but not a sub-type of blues as well as rhythm. For this reason, it seems to me that the compounds in (4) are coordinated compounds. Henceforth, I will call a coordinated compound that has the element ‘n’ “compounds of the *rock 'n' roll* type”.

It is not the case that the presence of the compounds in (4) immediately rejects the parameter in (3). Comparing the compounds in (1) with those in (4), it is found that the latter require the additional element ‘n’ between constituents. This element does not carry any meanings, as clearly shown in the meaning of *rhythm 'n' blues*. It only links *rhythm* with *blues* to form a compound. Ralli (2008) calls semantically empty elements that have this function linking elements. Considering that the compounds in (4), unlike those in (1), require the linking element, I would like to revise the parameter in (3) in the following way:

- (5) Parametric variation for coordinated compounds (revised)
Stem-based languages like Japanese create coordinated compounds without the aid of linking elements, while word-based languages like

³ According to Collins COBUILD Advanced Learner's English Dictionary 5th edition, all of the expressions in (4) are compounds.

English have to use linking elements in order to create coordinated compounds.

This paper aims to prove this parameter by showing that compounds of the *rock 'n' roll* type are coordinated compounds in the sense of Bauer (2008).

The organization of this paper is as follows. Section 2 introduces the data and makes some comments on them. This section shows that the element 'n' stems from the conjunction *and*, and proves the wordhood of expressions made of two nouns and the element 'n'. Section 3 proves that the expressions are coordinated compounds in Bauer's (2008) sense. Based on the discussion in section 3, section 4 aims to revise the morphological parameter proposed by Shimada (2013) and give two pieces of evidence for the revised parameter. Section 5 shows that the present discussion about coordinated compounds has implications for the framework of Distributed Morphology (Halle and Marantz (1993, 1994), Marantz (2001), Embick and Marantz (2008)). Section 6 concludes the paper.

2. Comments on Compounds of the *Rock 'n' Roll* Type

2.1. *The Origin of 'n'*

As mentioned in the previous section, the element 'n' of compounds of *rock 'n' roll* type functions as a linking element. One of the characteristics of the linking element is its formal recycled status; that is, a linking element borrows its form from another element. For example, the linking element -'s of *woman's magazine* comes from the genitive case -'s. Moreover, *parks department* has the linking element -s, which stems from the plural inflection -s. Given the function of 'n' as a linking element, the same holds true for 'n'. Its form must be identical with another element. What is useful to consider this point is the definition of 'n' in *OED*². According to *OED*², 'n' is a contracted form of the conjunction *and*. This statement is supported by the fact that in *COBUILD*⁵, *rock 'n' roll* and *rhythm 'n' blues* are spelled as *rock and roll* and *rhythm and blues*, respectively.

The fact that 'n' comes from *and* is related to one of the other characteristics of the linking element; namely, the semantically empty property of linking elements. This is clearly shown in the German compound *Liebes lied* 'love song'. In this compound, -s appears to be a plural or possessive morpheme, as is clear in the examples *die Auto-s* 'the car-plural' and *meines Bruder-s* 'my brother-genitive'. However, Bauer (2009:346) points out that it is neither a plural nor a possessive marker because the plural form of *Liebe* is

Liebe-n, while it is inflected as *Liebe-ø* for the possessive. For this reason, Bauer regards *-s* as a semantically empty linking element. Given this background, we have to consider whether *'n'* is semantically empty or not. As we observed in the first paragraph of this section, *'n'* is a contracted form of *and*. Note here that *and* is a functional item. The conventional wisdom about the functional item is that its semantic content is empty, in contrast to that of the lexical item. This means that *'n'*, which is associated with *and*, must be semantically empty. Its semantically empty nature is found in the meaning of *rock 'n' roll*. *COBUILD*⁵ defines *rock 'n' roll* as ‘a kind of popular music in the 1950s which has a strong beat and is played on electrical instruments’. It is clear from this definition that *rock 'n' roll* is not ‘rocking and rolling’ but ‘a kind of music’. As is shown in the meaning of *rock 'n' roll*, *'n'* does not indeed carry any meanings.

2.2. Productivity

According to *OED*², compounds of the *rock 'n' roll* type are often used in commercial contexts, as shown in (6):⁴

- (6) a. Shop
Dog n Suds, Cat 'n' Fiddle, Sick-N-Twisted Brewery
- b. Company
Out 'N' About, In-N-Out Burgers
- c. Product
Dark 'n' Stormy, Big N' Tasty, Big N' Toasted

In (6), *Dog n Suds*, *Cat 'n' Fiddle*, and *Sick-N-Twisted Brewery* refer to the names of shops, *Out 'N' About* and *In-N-Out Burgers* the names of companies, and *Dark 'n' Stormy*, *Big N' Tasty*, and *Big N' Toasted* the names of products. The fact that compounds of the *rock 'n' roll* type are used to name things seems to imply the lexicalized status of the compounds. If compounds of the *rock 'n' roll* type were lexicalized expressions, their productivity might be very low.

However, this is not true, given that we can find many instances that seem to be compounds of the *rock 'n' roll* type in several websites. One sub-type of them is shown in (7):^{5, 6}

⁴ The element *'n'* shows some variations including *N*, *'n*, *n'*, and *n*. Although these variations might be allomorphs of *'n'*, I will not pursue its implications here.

⁵ All examples are collected from <http://allrecipes.com>.

⁶ In section 2.3, I will justify the word status of expressions like ones in (7). I will use

(7) Dish or Meal

roasted beets 'n' sweets, Charleston shrimp 'n' gravy, steak N gravy, easy mac 'n' cheese, baked peaches 'n' cream, eggs n' fries, sausage 'n' kraut, guacamole 'n' cheese, oysters 'n' bacon

These expressions are collected from websites where there are recipes including pictures and directions.⁷ The total numbers of them are 155. They denote names of dishes or meals made out of foodstuffs that constituents of the expressions mean. For example, *steak N gravy* refers to a dish or a meal cooked by using a steak and a gravy sauce (i.e. a steak with a gravy sauce). It is clear that the expressions are coordinated compounds in semantic terms.^{8, 9} Recall that coordinated compounds denote “a new unity made up of the whole of the two entities named” (Bauer (2008:4)). Given this definition, *steak N gravy* can be regarded as a coordinated compound, because it denotes a new dish made with a steak and a gravy sauce.

2.3. *The Word Status of Compounds of the Rock 'n' Roll Type*

As mentioned in section 1, the most important criterion for coordinated compounds is a double-headed property. Compounds of *rock 'n' roll* type thus have to be double-headed if they are real coordinated compounds. In fact, expressions in (7) show that their constituents are referential. For example, *steak N gravy* refers to a steak with a gravy sauce, which means that the constituents of the compound are referential. It is clear that the expressions in (7) can be regarded as coordinated compounds in semantic terms.

However, one might argue against it by claiming that the expressions are phrases rather than compounds; a phrase derived by merging two nouns with the conjunction *and*. To confirm the compound-hood of the expressions, we need some criteria for determining whether the expressions in (7) are compounds or

“expressions” instead of “compounds” to refer to them in this subsection.

⁷ The websites include <http://allrecipes.com>, <http://www.foodnetworkasia.com>, <http://www.recipe.com>, <http://www.tasteofhome.com>, <http://www.seriousseats.com>, <https://www.nutriliving.com>, and <http://www.pbs.org>, <http://www.delish.com>.

⁸ According to my informant, the element ‘n’ of the expressions in (7) is a contracted form of *and*. This insight implies that the expressions are compounds of the *rock 'n' roll* type. For the justification of their word status in formal terms, see section 3.

⁹ The element ‘n’ of the expressions in (7) might be semantically empty, because it allows a wider range of interpretations than *and*. If it had the same meaning as *and*, all of the expressions in (7) would mean ‘X and Y’. This holds true for some compounds, but other compounds show different meanings from them. For example, *oysters 'n' bacon* refers to ‘oysters wrapped in bacon,’ but not ‘oysters and bacon,’ which indicates that ‘n’ does not convey any meaning corresponding to that of *and*.

not. One of the criteria is syntactic agreement. If the expressions are compounds, then they must be single complex words. A single complex word in subject position agrees with a verb and as a result of this agreement, the verb is inflected for singular, as is clearly shown in the contrast (8a) and (8b):

- (8) a. Hatred and evil are their opposite. (COBUILD⁵)
 b. Still no tunes, but a straw poll reveals that the audience is American and that road The Oh Do I Have To are big on the college circuit. (COBUILD⁵)

In (8a), *hatred and evil* is a coordinated phrase composed of the referential nouns *hatred* and *evil*, which agrees with a copular verb. As a result of this agreement, the verb is inflected for plural. *Straw poll* in (8b), in contrast, is a nominal compound whose non-head *straw* has no referentiality, and agrees with the verb *reveal*. As a result of this agreement, the verb is inflected for singular.

If the expressions in (7) had the same status as the phrase in (8a), they would have to be inflected for plural. However, this is not the case, as shown in (9):

- (9) a. Beans 'n Greens is a simple and hearty dish that cooks in no time thanks to the pressure cooker.
 (<http://www.recipeion.com/Pressure-Cooker-Recipes/Beans-n-Greens#5usHBF0dfYwy6u8b.99>)
 b. Paprika Potatoes 'n' Beans is a side dish that serves 4.
 (<https://spoonacular.com/Paprika-Potatoes-n-Beans-379215>)
 c. Beans 'n franks is a quintessentially American dish in which hot dogs are cut up and cooked in the same sauce used to make baked beans.
 (<http://eatmywords365.com/tag/national-beans-n-franks-day/>)

As shown in (9), the subjects agree with the verbs and these verbs are inflected for singular, which means that the subjects have the status of compounds.^{10, 11}

¹⁰ According to my informant, many expressions like the ones in (7) agree with a verb in plural. In his idiolect, *beans-n-franks* takes a plural form of a verb. One possibility is that there is a plural morpheme in the underlying structure and the compound as a whole is plural. However, the morpheme is deleted because of haplology. Thanks to Ryohei Naya for pointing out this possibility.

¹¹ Olsen (2001:304) points out that a sub-type of the coordinated phrases agrees in singular with a verb, as shown in (i):

2.4. Classification

In this subsection, I introduce compounds of the *rock 'n' roll* type that I collected and classify them into three types in terms of the presence or absence of modifiers and ones embedded in a larger structure.

First, the compounds without modifiers are shown in (10):

- (10) steak N gravy, eggs n' fries, sausage 'n kraut, guacamole 'n cheese, bubble 'n' squeak, oysters 'n' bacon, beans-n-franks, greens 'n' beans, steak 'n' bake, cookies 'n' yogurt, catfish 'n' chips, eggs 'n' taters, spaghetti 'n' meatballs, peaches 'n' cream, asparagus 'n' vinaigrette, ham 'n' cheese melts, sausage 'n' sauerkraut, chicken N biscuits, chicken 'n' chips, beans 'n' greens, blueberries 'n' dumplings, chops 'n' kraut, spaghetti 'n' meat sauce, sweet corn 'n' peppers, chicken 'n' peppers, black-eyed peas 'n' pasta

This type of compounds is the simplest one of the three types in that they are formed by merging nouns alone. For example, *steak N gravy* is composed of the two nouns *steak* and *gravy*. The numbers of constituents of such compounds are not limited to just two. There are compounds composed of three constituents, as shown in (11):

- (11) paprika potatoes 'n' beans, rosemary peas 'N' squash, veggie ham 'n' eggs, lemon chicken 'n' rice, ramen pork 'n' peppers, nacho mac 'n' cheese, mushroom steak 'n' linguine, Swiss angel hair 'n' asparagus

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- (i) a. The owner and (the) editor of the Daily Post *were* members of the club.
b. The owner and (the) editor of the Daily Post *was* members of the club.

In (ia), *the owner* and *the editor* are referential, so that the whole noun phrase functions as plural. In contrast, the same expression in (ib) is singular, because *the owner* and *the editor* together refer to one entity. I am not sure whether the data in (ib) is related to the data in (9). However, it is clear from the comparison of the two that the expressions in (9) cannot be formed in the same way as that in (ib) because the former can agree in singular with a verb although all of their constituents are referential. One possibility to explain the difference between (9) and (ib) is that unlike the compounds in (9), the coordinated phrase in (ib) has phonologically null nouns like ONE and it modifies them, as shown in (ii).

- (ii) [ONE [the owner and the editor]]

The structure in (ii) is interpreted as 'one who is the owner and the editor'. In the structure, ONE is the head, so that a verb must agree with the empty noun. For this reason, the copular verb in (ib) is singular.

For example, *paprika potatoes 'n' beans* consists of the three nouns *paprika*, *potatoes*, and *beans*.

Second, the compounds with modifiers are listed in (12):

- (12) roasted beets 'n' sweets, Charleston shrimp 'n' gravy, easy mac 'n' cheese, baked peaches 'n' cream, grandma's chicken 'n' stuffing, mustard greens 'n' beans, Almanzo's fried apples N onions, coconut rice n' peas, sauteed greens n' shrooms, creamy beef 'n' noodles, baked beans n' bacon, sweet-and-sour noodles 'n' pork, hot ham N cheese, grilled peaches 'n' berries, buttery carrots 'n' onions, creamy potatoes 'n' peas, green beans 'n' celery, Easter bunnies 'n' chicks, julienned carrots 'N' onion, baby carrots 'n' broccoli, roasted peppers 'n' cauliflower, quicker barbecued chicken 'n' rice, country pork 'n' sauerkraut, creamy sprouts N noodles, spicy pecans N cranberries, snappy peas 'n' mushrooms

In this type of compounds, there are modifiers observed in front of them. For example, *roasted* of the compound *roasted beets 'n' sweets* modifies the compound *beets 'n' sweets*.

Third, the compounds embedded in the larger structure are given in (13):

- (13) rise 'n' shine juice, fruit 'n' honey granola, pork-n-beans cake, peaches 'N' cream pie, ham 'n' Swiss biscuits, his-n-hers cocktails, sweet 'N' sour meatballs, great 'n' easy gazpacho, fruit n' nut sandwich, cookies 'n' creme fudge, blueberries n' cheese squares, cool 'n' easy pie, pretty peaches 'n' pound cake, blue cheese 'n' fruit tossed salad, bacon 'n' onion carrots, peaches n' cream mousse pie

In this type, coordinated parts are embedded in larger compounds. For example, *fruit 'n' honey granola* consists of the non-head *fruit 'n' honey* and the head *granola*. In this paper, I will omit this type even if the non-heads themselves have coordinated structure and, moreover, the constituents of the non-heads seem to be referential. The reason is that coordinated compounds may not be embedded in a larger structure, as Olsen (2001) and Shimada (2013) point out.

As mentioned in section 1, Olsen (2001) argues that the constituents of the non-heads of compounds like *Tennessee-Arkansas game* are referential because of their heads. For instance, the head *game* of *Tennessee-Arkansas game* is a relational nominal that requires its arguments to stand in the 'between' relation

to the head. Due to this head, the interpretation ‘a game between Tennessee and Arkansas’ is obtained. According to Olsen, this type of compounds is not real coordinated compounds.

Given Olsen’s analysis, it turns out that the compounds in (13) are not real coordinated compounds. This is because the compounds have heads, and these heads function as relational nominals requiring their constituents to stand in the ‘made of’ relation. For example, *Fruit ’n’ Honey Granola* is ‘a granola made of fruit and honey.’ The referentiality of *Fruit ’n’ Honey* of the compound is obtained by the function of the head *Granola*, which means that *Fruit ’n’ Honey* is a kind of pseudo-dvandvas. The same holds true for the other compounds in (13). This is the reason why I omit compounds listed in (13).

To summarize, examples of the first and second classes are shown in the following table.

(14)

EXAMPLE	REFERENT
Steak N Gravy	a steak with a gravy sauce
Eggs n’ Fries	French fries with scrambled egg
Sausage ’n Kraut	sausage slices in sauerkraut
Guacamole ’n Cheese	guacamole with cheese
Bubble ’n’ Squeak	a mixture of cold cooked cabbage and potato
Oysters ’n’ Bacon	oysters wrapped in bacon
Beans-n-Franks	baked beans and sliced frankfurters
Greens ’n’ beans	a salad of greens and beans
steak ’n’ bake	a baked potato and slices of sirloin steak
cookies ’n’ yogurt	creamy fruit yogurt and chocolate chip cookies topped with a mixture of berries
Roasted Beets ’n’ Sweets	roasted beets and roasted sweet potatoes and roasted sweet onions
Baked Peaches ’n Cream	baked peaches with vanilla ice cream
Sauteed greens n’ shrooms	sautéed greens and sautéed mushrooms
creamy beef ’n’ noodles	sautéed beef with cream and noodles
baked beans n’ bacon	baked beans and baked bacon
sweet-and-sour noodles ’n pork	noodles and pork sautéed with sweet-and-sour sauce
Hot Ham N Cheese	baked ham and cheese sandwiches

Grilled Peaches 'n' Berries	grilled peaches and grilled berries
Buttery Carrots 'n' Onions	carrots and onions sautéed with butter
Creamy Potatoes 'n' Peas	potatoes and peas in creamy soup

The number of each class's examples are 10. Each class is separated by the blank line. The upper section contains compounds made of two nouns, while the lower section contains compounds made of adjectives and nominal compounds. What the compounds refer to are described in the right column. The next section proves the status of the compounds listed in (14) as coordinated compounds.

3. The Double-Headed Nature of Compounds of the *Rock 'n' Roll* Type

As discussed in the previous section, the compounds listed in (14) are double-headed in semantic terms. However, one might argue against their double-headed status because there are no formal tests to confirm it. In this section, I will conduct two formal tests; one is modification by adjectives and the other is the visibility of each constituents to proforms.

3.1. *Modification by Adjectives*

First, I would like to show that each constituent of the coordinated compound can be modified by adjectives in front of the compound. Let us take the Japanese coordinated compound *oyako* as a typical example of it:

(15) ririsii oyako lit. manly parent-child 'manly parent and manly child'

It is well known that constituents of compounds do not allow modifications by adjectives. For example, we cannot say **expensive watch maker* 'maker of expensive watches' (Giegerich (2009:183)). By contrast, the coordinated compound *oyako* in (15) allows the modification of the internal constituent *oya*. Internal modifications are one of the characteristics of the coordinated compound.

Based on this formal criterion, compounds of the *rock 'n' roll* type in question have to allow internal modifications if they are coordinated compounds. Their status of coordinated-compound-hood is justified by the following data:

(16) creamy potatoes 'n' peas

According to my informant, the adjective *creamy* can modify each constituent,

so that the compound refers to ‘creamy potatoes and creamy peas’.

3.2. *The Visibility of Each Constituent to Proforms*

Second, I would like to show that each constituent of a compound in question is referential, by using proforms. According to Kageyama (2009:515), one of the characteristics of coordinated compounds is that their constituents can function as antecedents of anaphors, as shown in (17):¹²

- (17) Huu_i - hu_j -wa $tagai_{i,j}$ -o hagemasita.
 [husband-wife]-topic each.other-accusative cheered
 ‘The husband and wife cheered each other up.’

Kageyama claims that each constituent of the Japanese coordinated compound *huuhu* becomes an antecedent of the anaphor *tagai*, which requires two referents.

Bearing this test in mind, let us confirm the status of a compound in question as a coordinated compound by the following data:

- (18) a. To make a delicious steak_i N gravy_j, the quality of both_{i,j} must be as good as possible.
 b. To make a delicious roasted beets_i ’n’ sweets_j, the quality of both_{i,j} must be as good as possible.

What I intend to determine for the examples in (18) is whether the proform *both* refers to both constituents of the compounds, that is, whether *both* in (18a) refers to *steak* and *gravy*, and that in (18b) *roasted beets* and *sweets*. If the sentences in (18) are acceptable, it means that *steak N gravy* and *roasted beets ’n’ sweets* are coordinated compounds. My informant judges the sentences to be acceptable, which means that the compounds are coordinated compounds. Moreover, he mentions that the anaphor *each* can also refer to all of the constituents of the compounds although the sentences become a bit strange. This judgement also supports the view of compounds in question as coordinated compounds.¹³

¹² There are no indices in Kageyama’s original example. I use them for expository purposes.

¹³ Given the presence of various types of coordinated compounds as shown in (1), Ryohei Naya points out the possibility that the test in question is applied only to the subtype of coordinated compounds. To pursue this possibility, more research on compounds of the *rock ’n’ roll* type is needed, so that I just mention it here.

In sum, we have observed that the compounds in (14) are coordinated compounds in Bauer's (2008) sense. Bauer (2008:2) suggests that coordinated compounds are defined as "being a new unity made up of the whole of the two entities named." The compounds in question can be regarded as a new unity because they denote names of dishes or meals. Bauer (2008:4) also suggests that one of the characteristics of coordinated compounds is "that the two elements have equal standing in respect to headedness, at least in semantic terms." This characteristic is found in the compounds of the *rock 'n' roll* type. The constituents of the compounds listed in (14) are referential, which means that the compounds are coordinated compounds in semantic terms. Moreover, this section has revealed that the compounds are coordinated compounds in formal terms, by showing that each constituent of a coordinated compound can be modified by an adjective and can function as an antecedent of a proform.

4. A Morphological Parameter on Units of Word Formation and Compounds of the *Rock'n'Roll* Type

In section 1, I reviewed Shimada (2013), who argues that English, unlike Japanese, does not have coordinated compounds. Shimada's claim is based on the morphological parameter in (19), which is repeated from (3):

(19) Parametric variation for coordinated compounds

Stem-based languages like Japanese have coordinated compounds, while word-based languages like English do not have them.

However, it was clear from the discussion in section 3 that English has coordinated compounds if the linking element 'n' is used. Considering this fact, I would like to revise the formulation in (19), as shown in (20), repeated from (5):

(20) Parametric variation for coordinated compounds (revised)

Stem-based languages like Japanese create coordinated compounds without the aid of linking elements, while word-based languages like English have to use linking elements in order to create coordinated compounds.

According to this formulation, word-based languages as well as stem-based

languages can create coordinated compounds, if linking elements are used.¹⁴

The justification of this morphological parameter is beyond the scope of this short paper. However, there are languages that support the presence of the parameter. One of them is Portuguese. Portuguese belongs to word-based languages. According to Rio-Torto and Ribeiro (2009:281), it has two types of coordinated compounds: one is a coordinated compound with the explicit copulative operator *e*, as in (21a), and the other is a coordinated compound without the operator, as in (21b). The relevant data are given in (21):

- (21) a. *sal e pementa* lit. salt and pepper ‘salt-and-pepper’
 b. *trabalhador-estudante* lit. worker student ‘student worker’
 (Rio-Torto and Ribeiro (2009:281))

In (21a), the copulative operator links *sal* with *pementa*, forming the coordinated compound *sal e pementa*. By contrast, *trabalhador-estudante* in (21b) does not have the operator. The compound in (21b) appears to be a counterexample to the parameter in (20) because it appears to be a coordinated compound without a linking element, which may not be allowed in word-based languages. However, it is clear from the meaning of the compound that the compound refers to a person who is a student and a worker, but does not refer to two persons who are a worker or a student, respectively. By contrast, the compound in (21a) denotes a condiment made of salt and pepper. It corresponds to the coordinated compound *sio-kosyou* ‘salt and pepper’ in Japanese. The fact that the same expression as that in (21) exists in genetically different stem-based languages like Japanese illustrates that the compound in (21a) is a coordinated compound. Assuming that this is correct, I would like to regard the compound as a coordinated compound. Its presence is correctly predicted by the morphological parameter in (20), because Portuguese is one of the word-based languages (cf. Rio-Torto and Ribeiro (2009)).

I would like to close this section by showing that Russian, one of the languages that are both stem-based and word-based, creates coordinated compounds made of two words without any additional elements, while the

¹⁴ My informant points out that *creamy* of *creamy potatoes* ‘n’ *peas* can modify only the first constituent *potatoes*. Note that the Japanese coordinated compound *oyako* does not allow the modification of *oya* alone. The difference between the two languages might be related to the presence or absence of linking elements. Japanese can productively create coordinated compounds without using linking elements, while English uses linking elements to form coordinated compounds. The difference in modification between the two languages hence provides indirect evidence for the parameter variation in (20). However, it is not clear at present what kind of mechanisms yields the difference in modifications.

language uses an additional element that corresponds to *and* in English to form a coordinated compounds made of two words. According to Benigni and Masini (2009:180), the following compounds are coordinated compounds in Russian:

- (22) a. kuplja-prodaža lit. buying-selling ‘buying and selling/contract of sale’
 b. druž’ja-prijateli lit. friends-friends ‘friends’

The referent of the compound in (22a) stands in a superordinate relationship to the meaning of the parts, while the compound in (22b) consists of two synonymous nouns. Russian belongs to stem-based languages, because it usually uses stems to create compounds. Thus, the parameter in (20) correctly predicts that the language can create coordinated compounds without using any linking element.

Although the presence of coordinated compounds without linking elements indicates that Russian is one of the stem-based languages, there is a coordinated compound with the conjunction marker *i*, which indicates the word-based status of Russian, as shown in (23):

- (23) plot’i krov’ lit. flesh-and-blood ‘flesh and blood’
 (Benigni and Masini (2009:177))

This compound has the conjunction *i* that corresponds to *and* in English. Although Benigni and Masini do not mention the label of the compound, I would like to consider it to be a coordinated compound, given that the compound appears to correspond to the coordinated compound *ti-niku* ‘blood and flesh’ in Japanese.

What the compounds in (22) and (23) imply is that Russian has two ways to create coordinated compounds. One is direct attachment of two words, as shown in (22). The other is using a conjunction that connects two words, as shown in (23). What is peculiar to the Russian coordinated compounds involved is that their constituents are words, but not stems. At the present stage, I have no idea of why words are used in creating coordinated compounds. However, it is clear that Russian can form coordinated compounds by using a conjunction, since it is a word-based language as well as a stem-based language. Presumably, the hybrid nature of the language is responsible for coordinated compounds made of words.

5. Implications for Distributed Morphology

So far, we have observed that English has coordinated compounds and the morphological parameter in (20) relates to the presence or absence of coordinated compounds in languages. We also have observed that constituents of compounds of the *rock 'n' roll* type in question are referential, so that we can refer to them by using proforms like *both*, as shown in (24a):

- (24) a. To make a delicious steak_i N gravy_j, the quality of both_{i,j} must be as good as possible. (= (18a))
 b. Ann_i and I_j write to each other_{i,j} every week. (Swan (2005:171))

This behavior of the coordinated compound is reminiscent of a coordinated phrase. It is well known that conjuncts of a coordinated phrase are referential and can then be coreferential with proforms, as shown in (24b). This similarity between the two constructions suggests that coordinated compounds such as (24a) have phrasal status in addition to word status. The question is how to explain the double function of compounds of the *rock 'n' roll* type. In this section, I will show that the present discussion about coordinated compounds has implications for the framework of Distributed Morphology (Halle and Marantz (1993, 1994), Marantz (2001), Embick and Marantz (2008)).

5.1. Coordinated Compounds and the Single Engine Hypothesis

In section 3, we observed that compounds of the *rock 'n' roll* type are coordinated compounds. This was corroborated in semantic and formal terms. In formal terms, each constituent of the compound is referential, as shown in (24a). As discussed in section 3.2, the proform *both* can refer to the two constituents of each compound in (24a). This fact shows that constituents of a coordinated compound are a Determiner Phrase (DP). If so, a coordinated compound is formed by merging two DPs. Taking this into account, the presence of coordinated compounds cannot be predicted in terms of an approach viewing that word formation is performed in a component different from syntax, which is called Lexicalism. In Lexicalism, a word is formed in the word formation component, while a phrase is formed in syntax. Hence, a compound, a sub-type of a word, is created in the word formation component. If this approach were correct, there would be no compounds composed of DPs. However, this is not the case. An immediate question is what a mechanism allowing coordinated compounds is.

The fact that compounds of the *rock 'n' roll* type show syntactic behaviors

supports the Single Engine Hypothesis, one of the leading hypotheses in Distributed Morphology. The hypothesis states that syntax is the only generative component and not only phrases but also words are then created in the same way (cf. Arad (2003), Embick and Noyer (2007)). According to this hypothesis, compounds are created in syntax, so that compounds showing syntactic behaviors are theoretically predicted. One of such compounds is a coordinated compound. DPs are created in syntax. They must be allowed to be constituents of a compound if compounds are formed in syntax. The presence of coordinated compounds supports the Single Engine Hypothesis.

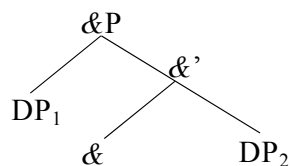
The Single Engine Hypothesis leads us to assume that both words and phrases are formed in syntax. This assumption raises a question of how we distinguish a word from a phrase. In the next subsection, I will deal with this problem in relation to the structure of compounds of the *rock 'n' roll* type.

5.2. *The Structure of Compounds of the Rock 'n' Roll Type*

5.2.1. *The Structural Parallelism between Coordinated Compounds and Coordinated Phrases*

We have observed in sections 2 and 3 that coordinated compounds in question and coordinated phrases (&Ps) similarly behave in two points. One is that the constituents of the two expressions are DPs and the other is that the two expressions include conjunction markers. In this paper, considering these similarities, I suggest that the two expressions have coordinated structure, as shown in (25).

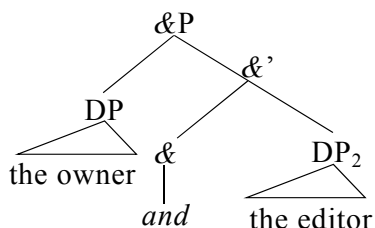
(25)



The structure is derived as follows. First, the functional head &, a source of *and* or *'n'*, merges with DP₂ to form &'. The resultant structure &' is merged with DP₁ to form &P. Let us show sample structures of *the owner and (the) editor* and *steak N gravy*, respectively.

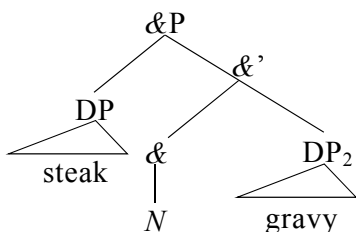
(26) a. the owner and (the) editor

b.



(27) a. steak N gravy

b.



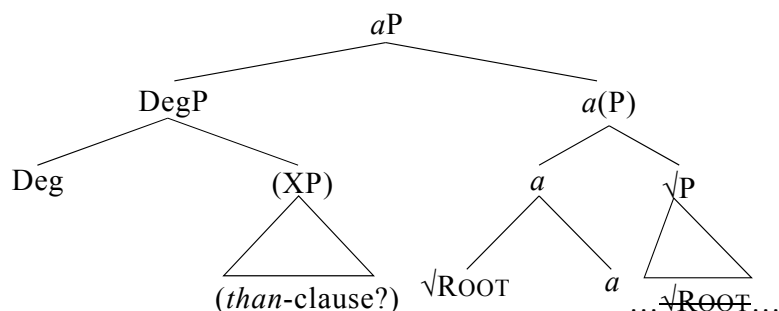
As clearly shown in (26b) and (27b), there are no differences between their structures. If so, the question is what a mechanism that distinguishes a compound from a phrase is. This problem will be solved in the following subsections.

5.2.2. *Morphology and the Distinction between a Compound and a Phrase*

In this subsection, I would like to show the mechanism which formally distinguishes a coordinated compound from a coordinated phrase. To this end, let us review Embick and Marantz's (2008) analysis of comparative adjectives.

Given the Single Engine Hypothesis introduced in section 5.1, structures of words are, in some cases, identical with those of phrases, if structures of the two constructions are composed of the same set of features. One of such cases is English comparatives. According to Embick and Marantz (2008:45), the comparative has the following structure:

(28)



In (28), the head Deg(ree) is related to a gradable interpretation and its form becomes *-er* or *more* and the parentheses around XP indicate that the status of the *than*-clause is irrelevant here. The Root in the structure moves to *a*, but not to Deg. This means that differences between synthetic comparative forms like *smarter* and analytic comparative forms like *more intelligent* cannot be explained by the presence or absence of movement of Roots. If the structure of the synthetic form were the same as that of the analytic form, every adjective would have both forms. However, this is not correct, as clearly shown in the contrast between (29) and (30):

- (29) a. more/most intelligent
 b. smarter/smarter
 (30) a. *intelligent-er/*intelligent-est
 b. *more smart/*most smart

(Embick and Marantz (2008:44))

As (29a) and (30a) show, *intelligent* takes an analytic comparative form, while as (29b) and (30b) show, *smart* takes a synthetic comparative form. It appears to be difficult to explain the difference, maintaining the structure in (28). However, Embick and Marantz (2008:46) solve the puzzle by proposing the following rule:

- (31) *Local Dislocation for comparatives*
 Deg^Adjective → [[Adjective]Deg]
 where Adjective has the relevant phonological properties

According to Embick and Marantz, (31) is a morphological operation that affixes Deg to an adjective when these two elements are adjacent in linear order and the phonological properties of the adjective, e.g. the number of syllables, are

appropriate for the rule. Hence, if the rule applies to the structure in (28), the synthetic form is obtained and if it does not apply, the analytic form is obtained. The contrast between (29) and (30) is thus captured at morphology, the post-syntactic component that is on the side of PF. Morphology interprets and modifies syntactic structure.

Along the lines of Embick and Marantz (2008), I propose that the distinction between a coordinated compound and a coordinated phrase is made in morphology. After the syntactic structure in (25) is built, it is sent to morphology. This component interprets the input structure and determines whether a compounding operation applies to the structure or not. If compounding applies to the structure, coordinated compounds like *steak N gravy* occur, while if the process does not apply to it, coordinated phrases like *the owner and the editor* occur.¹⁵

5.2.3. *Encyclopedia in Distributed Morphology and Coordinated Compounds*

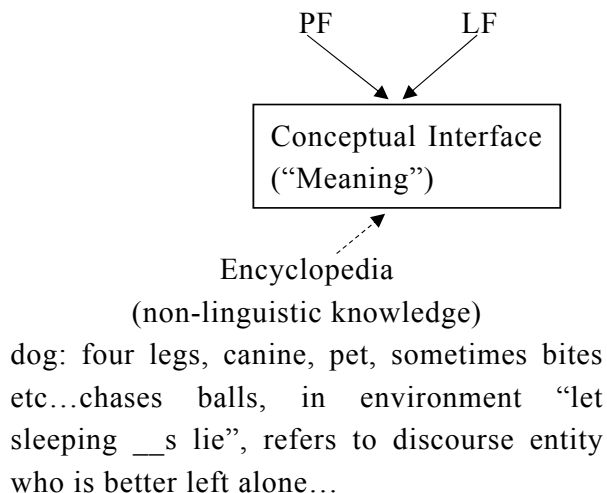
The solution to the problem of the dual nature of the coordinated compounds in question raises another problem. If there is no structural distinction between coordinated phrases and coordinated compounds and if the distinction is made in morphology, which is on the side of PF, it is too late for LF or the CI interface to interpret the structure as coordinated compounds because LF does not interact with PF. There is thus no distinction in meaning between the two constructions. This conclusion seems to be supported by the fact that the coordinated compound shares the same referential status with the coordinated phrase. However, the two constructions are slightly different in meaning, since the coordinated compound, but not the coordinated phrase, functions as a naming unit. The question is how to capture their similarity and difference in meaning.

To answer this question, I would like to introduce the model of Distributed Morphology, which is proposed by Harley and Noyer (2003:465). Their model is illustrated as in (32).¹⁶

¹⁵ The exact formulation of the compounding operation and the nature of its driving force are beyond the scope of this paper.

¹⁶ The model in the original text is more complex than the one in (32). It shows information about when morphosyntactic features like [Det] and [Past] are introduced to the derivation and when phonological forms are assigned to syntactic structures. These information are not necessary to solve the puzzle and are then omitted here. To be precise, morphology precedes PF, but in (32) I lump them together for expository purposes.

(32)



Based on this model, a syntactic structure built in syntax is sent to both PF and LF, as illustrated by the arrows. On the PF side, terminal nodes in the structure are assigned phonological expressions, while on the LF side, structural relations like quantifier scope are computed. After the syntactic structure is thus interpreted, both outputs from PF and LF are interpreted at the Conceptual Interface, where non-linguistic knowledge are assigned to the outputs by the component Encyclopedia. This process is indicated by the broken arrow. What is important here is that the output from PF is also interpreted at the Conceptual Interface, unlike the grammatical model of Chomsky (2000, 2001). This means that PF processes can affect meanings, even though indirectly.

Given this background, let us explain how the coordinated compound is distinguished from the coordinated phrase. First, the structure of coordinated compounds and phrases is formed in syntax, as discussed in the previous section. Second, it is transferred to PF and LF. On the LF side, there is no operations that change meanings of the structure. On the PF side, the structure is interpreted by morphology and as a result, the morphological operation compounding applies to the structure. By this operation, all of the constituents of the structure are lumped together in one terminal node. In Distributed Morphology, one terminal node corresponds to one word (Embick and Marantz (2008:6-7)). The resultant structure is therefore regarded as a complex word. Third, this complex word is sent to Conceptual Interface and there, it is interpreted as a naming unit if there is something in the world that the word can refer to. For example, the word unit *steak N gravy* is sent from PF to Conceptual Interface and at this interface, the word is interpreted as a naming unit because there is a dish in the world that is made of a steak and a gravy sauce.

As shown in (32), both outputs of PF and LF are interpreted together at the Conceptual Interface. This system allows a naming unit to match with outputs of LF. As a result of this matching, a word whose constituents are referential, that is, a coordinated compound, occurs.¹⁷

In contrast to the derivation of coordinated compounds, there is no compounding operation for coordinated phrases. If no compounding operation applies to the structure at morphology, two separate terminal nodes occur. This means that there are two words or a phrase. This phrase is sent to Conceptual Interface and there, it is associated with the output of LF. As a result of this matching, a coordinated phrase occurs.

6. Conclusion

Coordinated compounds are the compounds whose constituents are referential (cf. Bauer (2008)). According to Shimada's (2013) proposal, they are found in stem-based languages, but not in word-based languages. However, this paper showed that even English, one of the word-based languages, can create coordinated compounds by using linking elements. Moreover, we observed that the other word-based languages Portuguese and Russian form coordinated compounds by using conjunctions. The revised parameter proposed in this paper predicts that even word-based languages can create coordinated compounds by using linking elements. To verify the parameter, we have to await future research.

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¹⁷ One might ask a question of why compounding occurs. One possibility is that the linking element 'n' triggers the operation. Embick and Marantz (2008) distinguishes morphemes that directly attach to Roots from those that attach to existing words. The former is called morphemes in root domain and the latter is called those in outer domain. Okubo (2014) argues, based on this distinction between morphemes, that linking elements are classified into those in root domain and those in outer domain. If his classification of linking elements and the present analysis are correct, it turns out that the linking element 'n' occurs in outer domain since it is a morpheme that attaches to existing words. Given this statement, the generalization is that compounding at morphology occurs if a linking element in outer domain exists. To verify this generalization is beyond the scope of this paper.

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