On the Dual Nature of English Genitive Compounds[*]
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1. Introduction

   Chomsky (1970) proposed a grammatical system that includes two components generating words and phrases, respectively.   One component is syntax, which is responsible for phrasal structure, while the other one is morphology, which is responsible for word structure.   The two components are invisible to each other. This grammatical architecture has enabled some morphologists to consider that phrasal or syntactic rules cannot operate on the internal parts of words.   For example, topicalization cannot apply to the non-head *morphology* of the compound *morphology lecture*:

   (1)   *Morphology, she would never give a ____ lecture.   (Spencer (2005:78))

A compound is a word unit composed of two or more words.   Therefore, it is made at morphology, which means that internal structures of compounds cannot be manipulated by syntax.

   However, this is not the end of the story.   There is a compound that allows syntactic operations.   It is called genitive compounds:

   (2)   women's magazine, children's hour, poor man's caviar, etc.

The compound is created by two nouns with the linker -*'s*.   This linker is often called a linking element and has no semantic load (Mukai (2008)).   Take *women's magazine* for example.   In this compound, *women* and *magazine* are linked by -*'s*.   The compound means 'a magazine for women' but not 'a magazine that some women have.'   The meaning of *women's magazine* shows that genitive compounds have compositional meanings.   Given that compositionality of meaning is one of the phrasal characteristics, genitive compounds appear to be phrases but not compounds. If they have phrasal structure, they are subjected to syntactic rules.

   This prediction appears to be borne out.   The compounds in question undergo some syntactic operations:

   (3)   Mary likes reading women's magazines, but Alice likes reading men's ones.

(4) A: I'm looking for a book on grammar.
     B: Is this the one you mean?

(Quirk et al. (1985:387))

The sentence in (3) shows that the genitive compound *men's magazines* allows *one*-replacement.   The head nominal *magazines* is substituted for *ones*.   The sentence in (4) illustrates that the operation is a syntactic one.   It applies to the noun phrase *book*.   Moreover, genitive compounds also allow nominal deletion:

(5) It is not a men's magazine, but a women's ~~magazine~~.
(6) The first expedition to the Antarctic was quickly followed by another two ~~expedition to the Antarctic~~.   (Quirk et al. (1985:900))

The data in (6) shows that the noun phrase *expedition to the Antarctic* undergo es nominal deletion.   It is shown in (5) that the syntactic operation applies to the genitive compound *women's magazine*, the head constituent of which is omitted. Note that compounds in general do not show the same behavior as genitive compounds.   *One*-replacement and nominal deletion cannot apply to synthetic compounds:

(7) a. *Ken is a bus driver and John is a truck one.
     b. *He is not a bus driver, but a taxi ~~driver~~.

   Given the data in (3) and (5), one might object to the view of genitive compounds as words and say that they are simply phrases.   This is wrong because genitive compounds are similar to words in that they become the head of another compounds:

(8) a. airport room
     b. airport men's room

(Shimamura (2014:96))

Shimamura (2014) proposes a criterion for compoundhood; that is, some expression is a compound if it functions as the head of a compound.   Taking this criterion into consideration, let us observe whether the genitive compound *men's room* can be the head of a compound.   Take *airport room* for example.   According to Shimamura, it is a compound and the head can be substituted with *men's room*, as shown in (8b).
   Moreover, the word status of genitive compounds is guaranteed by the linker

-*'s*.   This element does not carry possessive meaning which genitive phrases like *Tom's hat* show.   As mentioned in (2), *women's magazine* does not express the possessive relation.   The linker simply combines the two nominals.   Since it has the combining function but does not carry any semantic load, it is called a linking element (Mukai (2008)).   Ralli (2008) argues that linking elements function as markers of compoundhood.   Although Ralli does not claim -*'s* to be a linking element, I assume with Mukai (2008) that it is one of the linking elements.   It hence assures compoundhood of expressions in (2).

So far, we have observed that genitive compounds have both word and phrasal statuses.   Such compounds with a dual role can be explained in theory that does not discriminate words from phrases.   One of such frameworks is Distributed Morphology (Halle and Marantz (1993, 1994), Embick and Noyer (2007), Embick and Marantz (2008), Embick (2015)).   This paper is based on this framework and aims to explain the dual role of genitive compounds.[1]

The organization of this paper is the following.   Section 2 introduces the framework of Distributed Morphology, particularly focusing on the notion of word.   Section 3 shows, based on this framework, that there are two ways of compounding proposed by Zhang (2007) and Harley (2009) and demonstrates that the two approaches to compounds cannot be extended to genitive compounds.   Section 4 argues that there is another way of compounding, namely compounding at a component on the PF side called Morphology.   The proposal will explain why genitive compounds have compositional meanings and allow *one*-replacement and nominal deletion.   Section 5 will show consequences of my proposal.   Section 6 concludes this paper.

2.   Framework

2.1.   The Brief Introduction of Distributed Morphology

The core ideas of Distributed Morphology are given in Embick and Marantz (2008).   According to them, "Distributed Morphology is a syntactic, piece-based, realizational approach to morphology […]" (Embick and Marantz (2008:4)).

In the framework of Distributed Morphology, every expression, whether words or phrases, is built in syntax, which means that syntactic operations like Merge and Agree operate on formal features to create some expression.   This is a 'syntactic' approach to morphology.

In relation to this approach, Embick and Marantz (2008:4) claim that primitive units are terminal nodes.   Distributed Morphology considers a terminal node to be a

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[1] For the notions of word and compound in Distributed Morphology, see sections 2.1.3 and 3.1, respectively.

morpheme.　It hence takes a 'piece-based' approach to morphology.

　　　With respect to other features irrelevant to syntax, they are introduced into the derivation after syntax.　One of them is a phonetic feature.　Phonetic features are not triggers for syntactic operations.　Given the fact, terminal nodes are assigned their phonological forms after syntax.　This is called a 'realizational' approach to morphology.

2.1.1.　The Grammatical Architecture

　　　The above mentioned core ideas are schematically illustrated as in (9).

(9)　The grammar
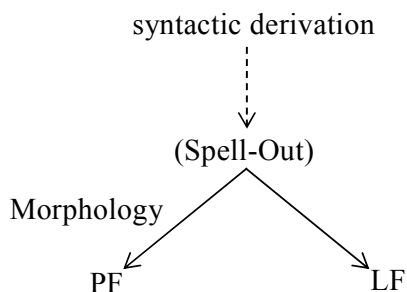
(Embick and Marantz (2008:5))

A derivation proceeds as follows.　First, syntax manipulates features to make some configuration.　Second, the configuration undergoes Spell-Out and is sent to PF and LF.　Third, on the way to PF, it is provided some phonological forms at Morphology. Fourth, LF interprets the semantics of the configuration.　The component is responsible for structural semantics or a meaning that is inferred from a syntactic structure.　For example, the structure [$_{TP}$ Mary [$_{vP}$ loved John]] denotes that the agent Mary did an act of loving the theme John at some past time.　In contrast to structural semantics, there is conceptual semantics or a meaning that is not inferred from a syntactic structure.　The opaque meaning is relevant to Encyclopedia, a component which is situated after LF.　For example, in the case of 'Mary loved John,' Encyclopedia identifies Mary and John, and clarifies the meaning of the act of loving. In addition, the component operates on idioms like *kick the bucket* to get the special meaning 'die.'

2.1.2.　Two Types of Morphemes

　　　There are two types of terminal nodes or morphemes in the framework: functional morphemes and Roots.　These are defined as in (10a) and (10b),

respectively.

(10) Terminals

    a.   Functional morphemes are composed exclusively of nonphonetic features, such as [past], [pl], or the feature (or features) that make up the determiner node D of the English definite article *the*.

    b.   Roots make up the open-class or "lexical" vocabulary. They include items such as √CAT, √OX, and √SIT.

(Embick and Marantz (2008:5))

Functional morphemes correspond to functional categories in the familiar sense. Since they do not have phonological forms in syntax, they must receive some phonological forms at Morphology. For example, the feature [past] receives /-t/ in the context of *leave*. In other contexts like *hit* and *quit*, the same feature is realized as /-Ø/. The other realization of the feature is /-d/, which functions as an elsewhere form (e.g. *love*, *kick*, among others).

In contrast, Roots have certain phonological forms from the beginning. However, they do not have any formal features and as a result, they are category-neutral. They need some categories in order to be interpreted both at Morphology and LF/Encyclopedia. The functional morphemes assigning lexical categories to Roots are categorizers such as *n*, *v*, and *a*. For example, *n* combines with a Root to create a noun. Likewise, *v* yields a verb and *a* yields an adjective. In this paper, I assume with Harley and Noyer (2003:469) that a Root is categorized when the nearest categorizer c-commands the Root.[2]
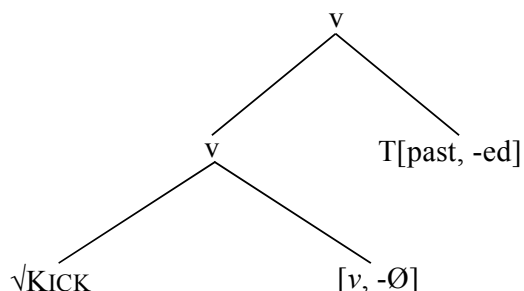
Given the two types of morphemes, the structure of *kicked* is shown in (11).

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[2] This paper defines the notion of c-command as follows:

(i) C-Command
    α c-commands β iff
    (i)   α is a sister of β or
    (ii)   α is a sister of γ and γ dominates β.

(Hornstein et al. (2005:366))

(11)

```
                              v
                      ┌───────────┴───────────┐
                      v                   T[past, -ed]
               ┌──────┴──────┐
            √KICK          [v, -Ø]
```

(Embick and Marantz (2008:5))

Syntax builds the structure of *kicked* by merging √KICK, *v*, and T[past]. The Root is c-commanded by the categorizer, which leads to the verbalization of the Root. The resultant structure is sent to Morphology and there, the functional morphemes receive certain phonological forms. The categorizer *v* is realized as *-Ø* and T as *-ed* in the context of √KICK.

2.1.3. The Notion of Word

As shown in 2.1, Distributed Morphology considers a morpheme to be a terminal node. This means that a word is not a primitive unit in the framework. It raises a question of how the notion of word is derived. Embick and Marantz (2008:section 2.2) give an answer to this question. They consider that "multiple terminal nodes that are packaged as one complex head by the syntax or PF are 'one word' in an informal way of speaking […]" (Embick and Marantz (2008:7)). For example, the terminal nodes in (11) are first separate constituents in syntax. Due to head movement, they are lumped together and become a single complex terminal node. It is this node that corresponds to a so-called word.

3. Compounds in Distributed Morphology

Linguists basing themselves on the framework of Distributed Morphology have dealt with inflection and derivation. However, as Harley (2009:130) comments, there has been few studies on compounds, although compounds are a good testing ground for the framework. Among the studies, this section introduces two analyses. Let us first redefine a compound.

3.1. The Notion of Compound

In 2.1.3, it was shown that a word is defined in structural terms. Likewise, the notion of compound can be defined in structural terms, as given in (12).

(12)   Compound: A word-sized unit containing two or more Roots.

<div align="right">(Harley (2009:130))</div>

Based on the definition of compounds, a complex terminal node composed of two or more Roots corresponds to a compound.   For instance, the synthetic compound *truck driver* consists of the two Roots, √TRUCK and √DRIVE, and two *n*'s, one of which is realized as -*Ø* and the other of which is as -*er*.   The four morphemes are lumped together.   The resultant structure is a complex terminal node including the two Roots. It is interpreted as a compound at Morphology and LF/Encyclopedia.   The immediate question is how to assemble them together.   One way of assembling morphemes together is proposed by Harley (2009), which is overviewed in the next subsection.

3.2.   The Incorporation Analysis

Harley (2009) takes the definition of compounds into consideration and proposes that a compound is created by incorporating terminal nodes into one.   Let us illustrate the process of incorporation by using *truck driver* as an example.

First, the Root √TRUCK is combined with *n* to create *n*P.   At the same time, the Root moves to the categorizer.   As a result of this incorporation, the complex head is created.

(13)
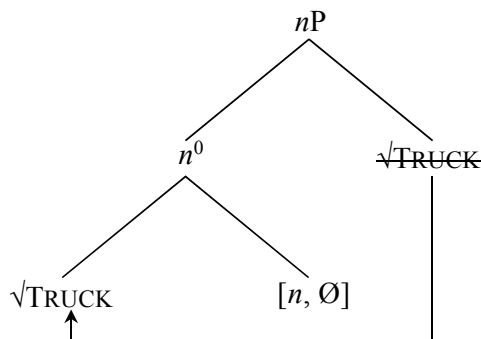
'*x*^{0}' stands for a word in a traditional sense.   For example, *n*^{0} in (13) corresponds to the noun *truck*.

As a second step, another Root √DRIVE is merged with *n*P.[3]   Subsequently, the complex head moves to √DRIVE, as a result of which a larger complex head is built.

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[3] Harley assumes that some Roots can select their arguments.   In (14), the Root √DRIVE selects [$_{nP}$ √TRUCK *n*] as its argument.   Her assumption about Roots is irrelevant to my argument.

(14)

```
                                        √P
                                       ╱  ╲
                                      ╱    ╲
                                     ╱      ╲
                                    ╱       nP
                                   ╱       ╱  ╲
                                  ╱       ╱    ╲
                                  √      n⁰     ╲
                                 ╱ ╲    ╱ ╲
                                ╱   ╲  ╱   ╲
                              n⁰   √DRIVE
                             ╱ ╲ ↖
                            ╱   ╲  ╲_____
                        √TRUCK  [n, Ø]
```
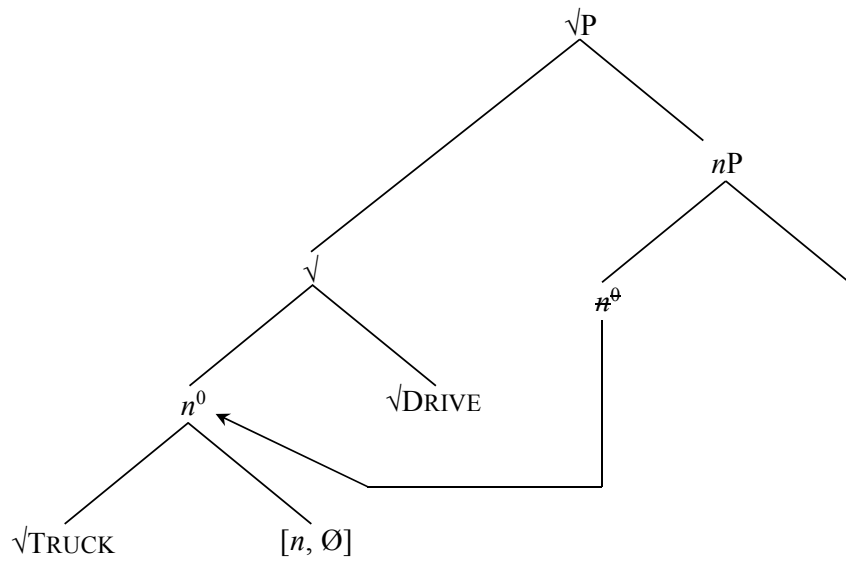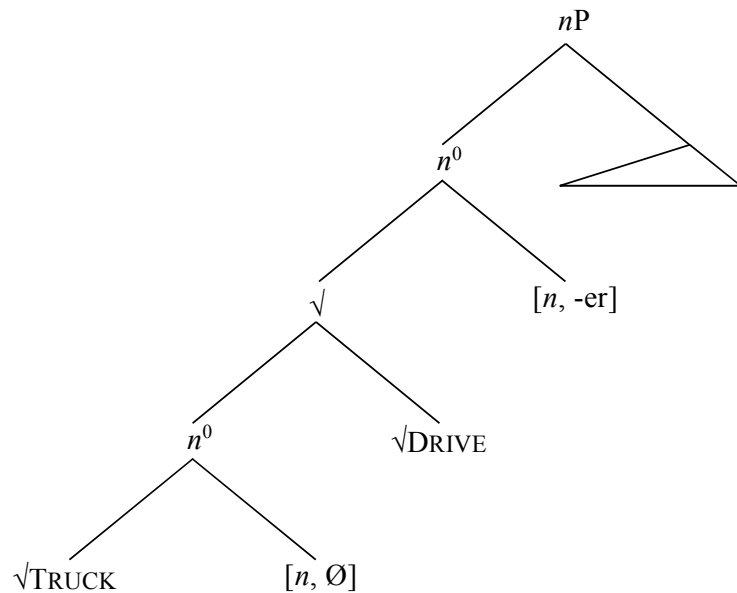
Finally, the resultant structure merges with another *n*.   Afterward, the incorporation of the complex head in (14) into the categorizer occurs.
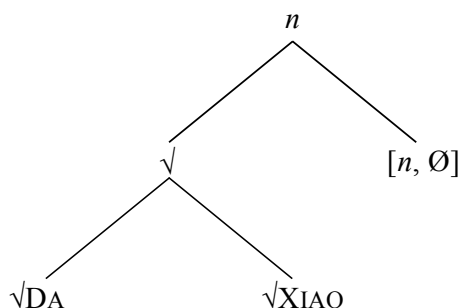
(15)

```
                                        nP
                                       ╱  ╲
                                      ╱    ╲
                                     n⁰     ╲
                                    ╱  ╲    ╱╲
                                   ╱    ╲  ╱__╲
                                  √    [n, -er]
                                 ╱ ╲
                                ╱   ╲
                              n⁰   √DRIVE
                             ╱ ╲
                            ╱   ╲
                        √TRUCK  [n, Ø]
```

In (15), all morphemes are combined into one complex terminal node.   This node contains √TRUCK and √DRIVE.   *Truck driver* is hence interpreted as a compound.

3.3. The Root-Merger Analysis

Another way to create compounds is suggested by Zhang (2007). Focusing on lexicalized compounds, she argues that a lexicalized compound is built by direct merger of two Roots. She analyzes the Chinese exocentric compound *da-xiao* (lit.) big-small 'size' to be a complex head composed of the two Roots √DA and √XIAO. This is schematically shown in (16).

(16)

```
                        n
                       / \
                      /   \
                     √    [n, Ø]
                    / \
                   /   \
                 √DA   √XIAO
```

Elements subject to syntactic operations must have categorial features. It means that category-neutral Roots do not undergo any syntactic movement operations. This prediction is supported by the fact that one of the constituents of a compound cannot be moved, as shown in (17):

(17) a.   Tamen yixiang fu-ze.
            they always carry-duty
            'They are always responsible.'
      b.   *Tamen yixiang lian ze dou fu.
            they always even duty also carry
            Intended: 'They are always even responsible.'

                                                        (Zhang (2007:176))

In (17a), the expression *fu-ze* is a lexicalized compound. The sentence (17b) shows that *ze*, one of the constituents, cannot be preposed. According to Zhang's analysis, the ban on extraction from the compound is explained by the lack of categorial features in the constituents of a lexicalized compound.

3.4. Application of the Two Analyses to Genitive Compounds

Harley (2009) applies Incorporation to compounds like synthetic compounds, while Zhang (2007) explains lexicalized compounds by direct merger of Roots. The two analyses can capture a large number of compounds. The remaining task is to

account for genitive compounds.   In this subsection, I will show that genitive compounds, unlike compounds that are handled by Halrey (2009) and Zhang (2007), have a phrasal status.   It will be also shown that its phrasal property is cumbersome for Zhang (2007) and Harley (2009).   Let us review the phrasal behavior of genitive compounds, as shown in section 1:

(18)   a.   Mary likes reading women's magazines, but Alice like reading a
            men's ones.   (= (3))
       b.   It is not a men's magazine, but a women's ~~magazine~~.   (= (5))

The data in (18) demonstrate that genitive compounds undergo syntactic operations like *one*-replacement and nominal deletion.   Given the fact that constituents of a compound do not undergo syntactic operations (cf. Bresnan and Mchombo (1995)), genitive compounds are in part phrases.

3.4.1.   *Application of the Root-Merger Analysis to Genitive Compounds*

It is obvious that the Root-merger analysis cannot be extended to genitive compounds.   For one thing, genitive compounds are compositionally interpreted. For example, the genitive compound *women's magazine* means 'magazine for women.' Since the linker *-'s* is semantically empty, the meaning is derived compositionally from the two nouns.   Recall that the Root-merger analysis is used to capture opaque meanings of lexicalized compounds.   Furthermore, unlike the lexicalized compound, the genitive compound undergoes syntactic operations.   Therefore, we cannot apply the Root-merger analysis to genitive compounds.

3.4.2.   *Application of the Incorporation Analysis to Genitive Compounds*

Unlike the Root-merger analysis, the Incorporation analysis can explain why genitive compounds have compositional meanings, because it is used to derive synthetic compounds with compositional meanings.   However, it cannot be used to explain the phrasal behavior of genitive compounds.

Let us first show how the structure of synthetic compounds proposed by Harley (2009) capture their semantic compositionality.

(19) $[_{n0}$ $[\sqrt{}$ $[_{n0}$ $\sqrt{\text{TRUCK}}$ $n]$ $\sqrt{\text{DRIVE}}]$ $n]$ (= truck driver)

Note that each Root is categorized.   This means that each categorized Root is interpreted at LF, which means that each one has a compositional meaning.   In (19), the *n* attached to $\sqrt{\text{TRUCK}}$ is interpreted as THING and that attached to $\sqrt{\text{DRIVE}}$ as

ACTOR.   Due to the semantics of the nominalizers, the structure means 'a person who does something to a thing' at LF.   After its structural meaning is interpreted, the structure is sent to Encyclopedia.   This component determines what Roots denote within the limits of syntactic structures.   For example, the nominalized Root *truck* in (19) can be considered as "a large vehicle that is used to transport goods by road" (COBUILD[5th]), but it cannot show other meanings like a truck-shaped thing.   In addition, the nominalized Root *driver* in (19) means 'someone who drives something' in this case.   Given that Incorporation is a kind of Merge, which only combines elements, the structure is interpreted at LF only as the composition of the two nominalized Roots; namely, 'someone who drives trucks.'[4]

Based on this process of the semantic interpretation, semantic compositionality of genitive compounds can be explained.   Suppose that genitive compounds are derived by Incorporation, as shown in (20).

(20)   driver's license: $[_{n0} [_{\sqrt{}} [_{n0} \sqrt{\text{DRIVE}} \ n] \ \sqrt{\text{LICENSE}}] \ n]$

The *n* combined with $\sqrt{\text{DRIVE}}$ means ACTOR and that combined with $\sqrt{\text{LICENSE}}$ means THING.   Accordingly, the structure in (20) is interpreted at LF as 'a thing associated with an actor'.   Suppose that the linking element -'s does not exist in the structure and it is inserted at Morphology.   Morphemes introduced there do not affect meaning (cf. Embick and Noyer (2007)).   After Encyclopedia defines the Roots in (20), the whole meaning of the structure is determined; that is, it means 'a license associated with a driver.'

Harley's analysis is useful for semantic compositionality of genitive compounds.   However, it cannot explain why genitive compounds undergo some syntactic operations including *one*-replacement.   To show it, let us introduce Harley's view of *one*-replacement as an element replacing *n*P:

(21)   a.   ?*The student of chemistry and this one of physics sit together.
       b.   That student with short hair and this one with long hair sit together.
                                                        (Harley (2009:134))

Harley points out the difference in grammatical status between *of chemistry* or *of physics* in (21a) and *with short hair* or *with long hair* in (21b).   The former ones are arguments of $\sqrt{\text{STUD}}$, while the latter ones are adjuncts that modify the *n*P *student*.

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[4] Some might say that the compound *truck driver* has more meanings.   For example, it can mean "someone who drives a truck as their job."   However, according to COBUILD[5th], this meaning is conveyed by the derivative *trucker*.   I do not know why the derivative can show such special meaning.

According to Harley, the structures of *student of chemistry* and *student with short hair* are the following.[5]

(22) a. $[_{nP}$ $[_{n0}$ √STUD$_i$ n^0] $[_{\sqrt{P}}$ √~~STUD$_i$~~ $[_{DP}$ chemistry]]]
   b. $[_{nP}$ $[_{nP}$ student] $[_{PP}$ with short hair]]

(Harley (2009:134-135), with slight modification)

Note that the structure in (22a) includes one *n*P, whereas that in (22b) has two *n*Ps. Harley argues that the difference in the number of *n*Ps leads to the difference in behavior of *one*-replacement. According to her, the anaphoric *one* targets an *n*P. Therefore, in (22a), the replacement of *student* is disallowed, while in (22b), it is allowed. In this paper, I will henceforth follow the analysis.

Given Harley's analysis of *one*-replacement and the structure of genitive compounds in (20), it turns out that genitive compounds do not undergo *one*-replacement. However, this prediction is not borne out, as given in (23):

(23) Mary likes reading women's magazines, but Alice likes reading men's ones.   (= (3))

It is hence inappropriate to apply the Incorporation analysis to genitive compounds.

In sum, we have observed that the two types of analyses cannot be used to explain genitive compounds. The reason behind this is that the genitive compound has both word and phrasal statuses. To explain this nature of genitive compounds, I will propose the third way to create compounds; that is, compounding at Morphology.

4. Proposal
4.1. Compounding at Morphology
In this paper, I adopt Harley's definition of compounds, as shown in (24).

(24) Compound: A word-sized unit containing two or more Roots.   (= (12))

This definition does not state which components perform compounding. We have already observed that syntax manipulates morphemes and lump them together. However, this does not necessarily mean that only syntax is responsible for bundling morphemes into one. In fact, Embick and Noyer (2001) propose a way of packaging separate terminal nodes at Morphology. Moreover, Siddiqi (2009) suggests that at

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[5] The morpheme *of* is inserted at Morphology to meet the Case requirement of the DP *chemistry*.

the same component, certain compounding operations are carried out.

   Taking the proposals of Embick and Noyer and Siddiqi, I propose that genitive compounds are derived at Morphology.   First, let me demonstrate their syntactic structure.

(25)

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              fP
             /  \
           nP    \
          /__\   / \
               f    nP
              /    /__\
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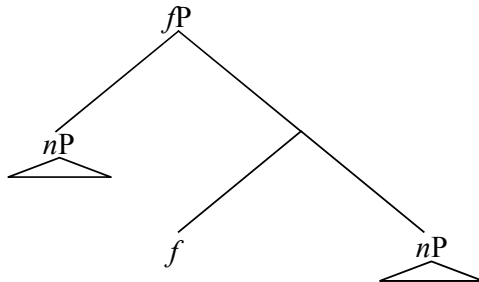
There are two things to be noted in the structure.   One is the morpheme f. According to den Dikken (2006), lexical items cannot merge with each other without the aid of functional items.   Given his remark, it turns out that genitive compounds have some functional morpheme.   It is the linking element -'s that links two nouns. I assume with Okubo (2014, 2017) that f is one of the functional morphemes and represents the [EPP].   This feature is realized as the linker -'s.   The other thing to be noted is the nominal constituents nPs.   In this paper, I assume that the constituent nP corresponds to NP.   The two nPs in the syntactic structure are connected by f; one is the complement of fP and the other is its specifier.   Given the phrasal status of nPs, fP, composed of two nPs, is also a phrase.   The constituents of the structure are separate from each other.

   Based on the definition of compounds, the structure cannot be interpreted as a compound at Morphology or LF/Encyclopedia.   As already observed, the semantics of genitive compounds are similar to that of phrases, which means that operations to combine separate constituents into one are not required in syntax.   Accordingly, some bundling operation is necessary to change a phrasal structure into a word structure at Morphology.

(26)
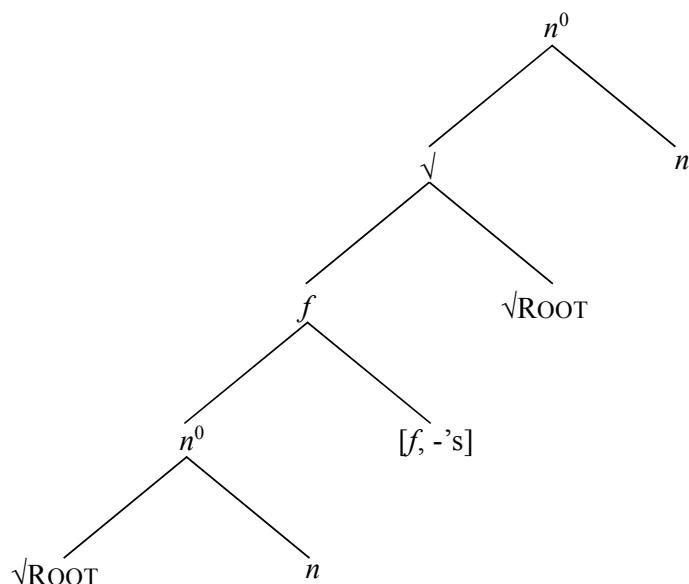
After the structure in (25) is sent to Morphology, it undergoes compounding there. The operation is similar to Incorporation. According to Embick and Noyer (2001), the movement operation is however sensitive to adjacency. Incorporation applies to terminal nodes or head constituents. It can skip elements occupying specifier positions. For example, if Incorporation applies to the head X of [$_{XP}$ YP [X ZP]], the head moves to the higher head while skipping YP. In contrast, the movement operation at Morphology cannot skip such constituents. In the above mentioned example, the head X cannot skip over YP. Although the movement operation at Morphology is different from Incorporation in that regard, the two operations are similar in combining separate morphemes into one. As a result, the syntactic structure is modified as in (26). Since there are two Roots in one terminal node, the structure corresponds to a compound.

One might doubt the validity of my proposal. However, it is natural that there is some compounding process at Morphology, given the fact that Japanese has compounds created at a phonological component or postsyntactic compounds, as shown in (27):

(27) a. [yooroppa:ryokoo]-tyuu
         [Europe:travel]   (Shibatani and Kageyama (1988:460))
     b. *[yooroppa:nonbiri:ryokoo]-tyuu
         Europe:leisurely:travel   (Shibatani and Kageyama (1988:462))

Shibatani and Kageyama (1988) argue that postsyntactic compounds are derived from their phrasal counterparts. For instance, the postsyntactic compound in (27a) comes from the phrase [[yooroppa-o ryokoo]-tyuu] 'while traveling in Europe.' According to Shibatani and Kageyama, simultaneously of the particle drop, compounding applies to the phrase. There is a difference in pronunciation between postsyntactic compounds and compounds such as lexicalized and synthetic ones. Shibatani and Kageyama points out that there is a pause between the constituents of a postsyntactic compound, as the colon in (27a) denotes. This pause is not observed in lexicalized and synthetic compounds. In contrast, postsyntactic compounds share lexical integrity properties with lexicalized and synthetic ones. For example, the compound in (27a) disallows syntactic interruption, as shown in (27b). Based on Shibatani and Kageyama (1988), I would like to consider postsyntactic compounds to be a case of compounding at Morphology.

In the rest of this section, I will explain why genitive compounds have compositional meanings and can undergo *one*-replacement and nominal deletion.[6]

4.1. Compositional Meaning

In this paper, we have observed the three types of compounds: the lexicalized, synthetic, and genitive compounds. Unlike the lexicalized one, the synthetic and genitive ones have rich structures. The richness of structures means that the interpretation of meaning mostly relies on LF, a component interpreting structural or compositional meaning. In contrast, poorness of structures means that there are few elements that LF can interpret. In this case, Encyclopedia, a component interpreting conceptual or special meaning, takes much responsibility for interpreting meanings.

As shown in (25), the genitive compound has a phrasal structure, which means that it is built by Merge but not by Incorporation. Roots included in the structure are interpreted by Encyclopedia, but their interpretations are constrained by categorizers. Take *women's magazine* for example (the structures of *women* and *magazine* are simplified).

(28)   [*f*P [*n*P women] [*f* [*n*P magazine]]]

In (28), each *n*P has a compositional meaning. They are linked by the semantically

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[6] The astute reader might find that this paper does not deal with a case where syntactic movement operations like topicalization apply to a genitive compound. As already shown in (1), it is said that a compound cannot undergo the operations. Even though the compound in (1), *morphology lecture*, is a compound composed of two nouns, section 5 will demonstrate that such type of compounds is similar to genitive compounds in that the former type of compounds allow *one*-replacement and nominal deletion. This similarity between the two types hence indicates that genitive compounds disallow syntactic movement operations. It is beyond the scope of this paper to verify this possibility.

empty functional morpheme *f*. The structure in (29) is hence compositionally interpreted at LF; that is, 'a magazine associated with women.' In fact, the compound *women's magazine* is used to mean 'a magazine for women.' The precise relation between the two *n*Ps is determined by a context where the genitive compound is used.

The context-dependent nature of semantics of genitive compounds is supported by the fact that a genitive compound is interpreted differently with respect to contexts. For example, *man's car* is interpreted as given in (29):

(29) A man's car is …
    a.   a car designed for men
    b.   a car with a system which is operated only by men.
    c.   a car made by using processes in which only men participate

The interpretation in (29a) is the most typical one. According to my informant, the one in (29b) is appropriate if the genitive compound is used in a context where there is some system used only by men. In addition, my informant says that the one in (29c) is acceptable if the genitive compound is uttered in a context where there are some processes which men but not women can participate in.

4.2. One-Replacement

This subsection explains the fact that genitive compounds can undergo nominal deletion:

(30) Mary likes reading women's magazines, but Alice like reading men's ones.
    (= (3))

This can be explained by the proposed structure of genitive compounds. Recall Harley's analysis of *one*-replacement. The anaphoric *one* replaces *n*P. Based on this analysis, the fact that genitive compounds allow *one*-replacement is explained.[7]

4.3. Nominal Deletion

Another problem that the present proposal can solve is that nominal deletion applies to genitive compounds:

(31) It is not a men's magazine, but a women's ~~magazine~~.   (= (5))

_____

[7] The present proposal predicts that we can replace the non-head of a genitive compound. For example, we might say *one's magazine*, instead of saying *woman's magazine*. To check the correctness of this prediction is beyond the scope of this paper.

Based on the fact that nominal deletion applies to NP, I assume that nominal deletion applies to *n*P. Given this assumption, it turns out that nominal deletion apply to genitive compounds.[8]

5. Consequences

5.1. *Similarities between Genitive Compounds and Non-Lexicalized NN Compounds*

The fact that meanings of a genitive compound vary with respect to contexts reminds us of N(oun)N(oun) compounds. Take *pontoon bridge* for example. It can be variously interpreted as shown in (32):

(32) pontoon bridge
      a.   bridge supported by pontoons
      b.   bridge floating on pontoons
      c.   bridge made of pontoons
      d.   pontoons in the form of a bridge

(Lees (1960:123))

This context-dependent nature of meanings implies that NN compounds are derived through the same process of deriving genitive compounds. If it is on the right track, the former type can undergo nominal deletion and *one*-replacement. This prediction is borne out by the following data:

(33) "That's a gunshot [wound].   This is shrapnel."   (CNN)
(34) "Paula Hancocks met in South Korea with the North's first openly gay defector."   (CNN)

The utterance in (33) is given by one of the medics in the context in which he checks wounds of a soldier. It is obvious that the utterance is relevant to the wounds. It means that he does not have to utter the word *wounds*. Therefore, in (33), he utters *gunshot* or *shrapnel*, instead of saying *gunshot wound* or *shrapnel wound*. In (34), *Korea* of *North Korea* is deleted. In this context, it is clear that the topic is related to South Korea and North Korea. Accordingly, we know that *North* refers to *North Korea* even if *Korea* is not uttered. Given the data in (33)-(34), we can argue that

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[8] In Okubo (in prep.), I give another explanation to (29).   Based on Corver and van Koppen (2009), a genitive compound has a focus projection and there is an agreement between the non-head and the Foc head.   As a result of this agreement, the complement of the Foc head, namely the head of the genitive compound, is deleted.   Although this analysis is technically different from the analysis submitted in this paper, they are similar in arguing that nominal deletion applies to *n*Ps.

NN compounds are identical with genitive compounds in respect of the process of compounding.

This argument is supported by the fact that NN compounds allow *one*-replacement, as given in (35):

(35) a. There were mills dotted all over the landscape, watermills and wind ones.

b. There were mills dotted all over the landscape, windmills and water ones.

(Bauer (1998:77))

Watermill and *windmill* in (35) are NN compounds. In (35a), *windmills* undergo es *one*-replacement and the head constituent is replaced with *one*, while in (35b), *watermills* undergo es the same operation and its head is replaced with the anaphoric element.

I take (33)-(35) into consideration and suggest that NN compounds are built by the same process as with genitive compounds. The following is the structure of *pontoon bridge*. [9, 10]

(36) pontoon bridge

a. $[_{fP} [_{nP} \text{pontoon}] [f [_{nP} \text{bridge}]]]$

b. $[_{n0}[\sqrt{[_f[_{n0}} \sqrt{\text{PONTOON }} n] f] \sqrt{\text{BRIDGE}}] n]$

The syntactic structure in (36a) is tantamount to that of genitive compounds. It is sent to Morphology and there, it undergoes compounding, as shown in (36b). The difference between the two types is the phonological form of *f*. Unlike the genitive

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[9] If NN compounds include *f* and this morpheme consists of the same feature set as with genitive compounds, there is a competition between two vocabulary items, as shown in (i).

(i) a. $f \leftrightarrow \text{-'s}$
b. $f \leftrightarrow \emptyset$

To avoid this problem, we have to consider that the *f* of genitive compounds has a different feature set from that of NN compounds. One might claim the difference in realization of *f* to be a piece of evidence for Okubo's (in prep.) analysis. As mentioned in note 8, Okubo argues that *f* corresponds to Foc. His proposal means, in the present context, that *f* is minimally composed of [Foc] and [EPP]. If this is correct, the difference shown above is attributed to the ingredients of *f*. For instance, the *f* of the genitive compound consists of [Foc] and [EPP], while that of the NN compound is composed only of [EPP]. Although this is an interesting possibility, pursuing this is beyond the scope of this paper.

[10] The view that NN compounds are derived from NPs is supported by Nishimaki (2015), although he adopts a different framework from mine. See Nishimaki (2015) for detailed information.

compound, *f* is realized as Ø in the NN compound.

5.2. *Deriving Lexical Integrity Effects: The Ban on Syntactic Interruption*

As introduced at the beginning of section 4, the movement operation at Morphology is sensitive to adjacency.

(37) [$_{XP}$ X [$_{YP}$ ZP [Y …]]]

In this configuration, the operation in question cannot move Y to X because ZP intervenes between the two elements.

This property of the movement operation entails that no elements are inserted between the constituents of genitive and NN compounds.   This is borne out by the following data:

(38) a. *a bird's new nest
      b.   a new bird's nest
      c. *children's new clothes
      d.   new children's clothes

(Biber et al. (1999:295))

(39) a. *water wild bird
      b.   wild water bird
      c. *jelly floating fish
      d.   floating jellyfish
      e. *rain tropical forest
      f.   tropical rain forest

(Plag (2003:160) with slight modification)

The data in (38) show the impossibility of inserting an adjective between the constituents of a genitive compound.   For instance, the adjective *new* cannot reside between the constituents of *bird's nest*, as shown in (38a).   Likewise, the data in (39) illustrate that an NN compound does not allow an adjective to intervene its constituents.   For example, we can say *wild water bird*, as shown in (39b), but cannot say *water wild bird*, as shown in (39a).   The data in (38) and (39) are explained by the structure in (40).

(40) [$_{fP}$ *n*P [*f* [$_{AP}$ A *n*P]]

The syntactic structure is sent to Morphology, where it undergoes compounding.

First, *-'s* is suffixed to the first *n*P.   Consequently, it becomes part of the *n*P.   Due to this suffixation, *-'s* is invisible to compounding.   Second, the other *n*P is combined with the first *n*P to create a genitive compound.   However, as shown in (40), there is an adjective intervening *n*Ps.   The intervening element blocks the application of the movement operation.   This explains the ungrammaticality of (38a, c) and (39a, c, e).

5.3. *Ways of Creating Roots*

In this paper, we have observed that genitive compounds are derived by the interaction of syntax with Morphology.   Syntax manipulates formal features to build a phrasal structure, while the structure is modified at Morphology into a word structure.   This process explains the fact that genitive compounds allow certain syntactic operations.

The remaining issue is the word property of genitive compounds; namely, they can be the head of another compound:

(41)   airport men's room   (= (8b))

This fact poses a question to my analysis.   In my analysis, the syntactic structure of genitive compounds is changed to that of a word at Morphology.   Given that structure building takes place in syntax, it is not possible for the resultant compound to merge the *n*P *airport*.   The question is how to derive (41) with maintaining the present analysis.

To solve the problem, I adopt Harley's (2009) analysis of phrasal compounds. A phrasal compound is a compound with the phrasal non-head, as shown in (42):

(42)   These aren't your standard <u>stuff-blowing-up effects</u>. (Harley (2009:129))

The underlined part in (42) is a phrasal compound.   This is composed of the non-head *stuff-blowing-up* and the head *effects*.   Clearly, the non-head looks a phrase. The occurrence of a phrase in a compound is prohibited in general (Botha (1981)). To avoid the problem, Harley proposes that the structure that corresponds to the non-head is changed into a Root after it is transferred to post-syntactic components.   In (42), the syntactic structure of the phrase *stuff blowing up* is built and after it is sent to post-syntactic components, it is brought back into syntax.   In syntax, it functions as a large Root √STUFF-BLOWING-UP.

Adopting Harley's analysis, I suggest that if a genitive compound is used as the head of another compound, it is brought back into syntax and re-used as a Root.   Let us explain the data in (41).

(43) [*n*P airport [*f*P *f* [*n*P *n* √MEN'S ROOM]]]

First, the *n*P *men's room* is built in syntax.   Second, it is sent to post-syntactic components.   After that, it is interpreted at each component.   Third, it is sent back to syntax and there, it is re-used as the large Root √MEN'S ROOM.   Fourth, this large Root is merged with *n* to create *n*P.   Finally, the *n*P is combined with *f* and the *n*P *airport*, and the resultant structure is sent to Morphology, where the resultant structure undergoes compounding.   As a result, the compound *airport men's room* is obtained.

    One of the pieces of evidence supporting the Root status of *men's room* is that the expression is interpreted as 'a bath room' but not 'a room associated with men in an airport.'   This special interpretation occurs because *men's room* loses its syntactic structure and it cannot be interpreted at LF.   My analysis predicts that genitive compounds have opaque meanings whenever they function as the head of another compound.   To confirm whether this prediction is correct or not is beyond the scope of this paper.[11]

6.   Conclusion

    Within the framework of Distributed Morphology, Zhang (2007) argues that lexicalized compounds are created by the direct merger of Roots.   In addition, Harley (2009) analyzes the synthetic compound to have richer structure than the lexicalized compound.   She suggests that the former type of compounds is created by Incorporation.

    In this paper, I proposed another way for building compounds: *compounding at Morphology*.   In other words, a syntactic structure first corresponds to a phrasal one, but after it is sent to Morphology, terminal nodes in the structure are packaged into one by an Incorporation-like operation, as a result of which the resultant structure is interpreted as a compound.   Based on this proposal, I explained the dual nature of genitive compounds.   In one respect, they behave like words and in another respect, they behave like phrases.

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[11] If opaque meanings result from changing phrasal elements to Roots, we have to ask how it is different from Zhang's approach to opaque meanings.   One of the differences between the two approaches is underlying structures.   Zhang assumes that bare Roots are merged to create a complex Root and this large Root is categorized, which results in special meanings.   In contrast, I suggest that categorized Roots are combined to make a phrase that is sent to Morphology and re-used as a Root.   The difference between the two approaches implies that opaque meanings gained from the structure of genitive compounds are more transparent than those from the structure of lexicalized compounds.   I thank Ryohei Naya for pointing this possibility out.

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