A Distributed Morphology-Based Analysis of Lexical Suffixes*

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1. Introduction

Affixes have been defined as "a type of obligatorily bound morph (Bauer (2004:13))." The most common types of them are a prefix and a suffix. By definition, the latter has abstract meanings in comparison with those of content words. Suffixes certainly have abstract meanings in most cases. However, this does not seem to hold true for such cases as in (1). The examples in (1a) come from Halkomelem and those in (1b) from Coeur d'Alene:[1]

(1) a. -as 'face,' -tses 'hand,' -awtx 'building,' -ikep 'ground,' -elcep 'firewood,' -als 'fruit/round,' -(e)wi:l(s) 'dishes'
(Wiltschko (2009:200))

b. -asq'it 'day, sky, atmosphere,' -ilg^{w}ɛ 'stomach, heart,' -gwil 'hallow object, abdomen, wagon, canoe,' -isq^{w}ɛl 'fish,' -ins 'tooth,' -isčn 'horn, hairline' (Bischoff (2011:3))

Expressions in (1a) and (1b) are peculiar in that they have lexical meanings, although they are bound forms and are attached after some elements, which indicates that they are suffixes. Given this feature, Kinkade (1963) terms them Lexical Suffixes (LSs).[2, 3]

The presence of LSs poses a challenge to the approach that clearly distinguishes an element with a lexical content from that with a functional or grammatical content. For example, lexical items like *cat*, *dog*, etc. are grouped into a different category from suffixes like *-ize*, *-tion*, etc. In this distinction, there seems to be no mixed categories composed of lexical items and suffixes. In other words, in the approach, it is difficult to deal with LSs.

The purpose of this paper is to solve the problem, on the basis of the framework of Distributed Morphology (Halle and Marantz (1993, 1994), Marantz (1997, 2001), Embick and Marantz (2008), among others), which is one

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[1] Both Halkomelem and Coeur d'Alene belong to Salish languages in North America. According to Wiltschko (2009:199), all Salish languages have such affixes as having lexical meanings. In this paper, I mainly focus on such affixes in Halkomelem and Coeur d'Alene.

[2] Carlson (1990) and Galloway (1993) point out the presence of lexical prefixes. This paper deals only with LSs, but this does not mean that this paper's analysis cannot be extended to lexical prefixes.

[3] In this paper, I use a hyphen in order to show that some elements are LSs.

of elaborated versions of the approach mentioned above. The purpose is achieved in the following two steps. First, I argue that LSs are not suffixes but stems that occur only in compounds, so-called compounding stems. Second, I prove that the presence of LSs or compounding stems are explained under the framework of Distributed Morphology. Specifically, I argue, based on the proposal of Okubo (2014), that compounding stems result from checking of a word-version of the EPP feature *f* by a phonologically unspecified Root.

The organization of this paper is as follows. Section 2 briefly looks at six characteristics of LSs: the presence of free forms that are semantically similar to but formally different from LSs, the bound morphemic status, the choice of several hosts, the different behaviors from nouns, the categoryless nature, and the lack of argumenthood. Section 3 introduces theoretical assumptions: the framework of Distributed Morphology, two types of word domains, and a word-version of the EPP feature. Section 4 proposes that LSs are compounding stems. In this section, I suggest that compounding stems result from checking of *f* by incorporating a Root into the head. Section 5 makes clear why the form of LSs is unpredictable from any phonological rules and why the meaning of some LSs tends to be different from that of free forms. In section 6, the proposal is supported by the fact that compounding stems and linking elements are in complementary distribution. Section 7 shows a consequence for two types of approaches to Roots. Section 8 gives a conclusion.

2. The Characteristics of LSs

LSs are found in Salish languages such as Bella Coola, Coeur d'Alene, Halkomelem, Spokane, Upper Chehalis, Wakashan languages such as Nootka, and other northwestern Native American languages. Their numbers are not so large. For example, there are only ninety LSs in Upper Chehalis (Kinkade (1963:353-355)). Although their numbers are small, they are used productively in word formation. The rest of this section shows their characteristics observed by several researchers. I briefly introduce them one by one.

First, it is generally said that LSs have free forms similar in form and meaning to them (cf. Saunders and Davis (1975), Carlson (1990), etc.). Semantically similar free forms are shown in (2):

(2)	a.	-as '-face'	vs.	s'ó:thes 'face'
	b.	-tses '-hand'	vs.	cháléx 'hand'
	c.	-awts '-building'	vs.	lálém 'house'
	d.	-ilep '-ground'	vs.	téméxw 'earth, land'

e. -elcep ‘-firewood’ vs. siyólh ‘firewood’
f. -als ‘-fruit/round’ vs. sth’í:m ‘berry, fruit’
g. -(e)wi:l(s) ‘-dishes’ vs. ló:thel ‘dish’
(Wiltschko (2009:200), (2g) is cited from Galloway (1980))

In (2), the forms in left column are LSs, repeated from (1), and those in right one are free forms. According to Gerdts (1998:94-95), the semantic contents of LSs can be classified into body parts, environmental concepts, cultural items, and human terms. Based on this classification, the semantic content of LSs in (2a, b), (2c, e-g), and (2d) are classified into body parts, cultural items, and environmental concepts, respectively. It is clear from the English translation of LSs that the meanings of LSs correspond to those of free forms.[4] Although there is a semantic connection between the LSs and their free forms in (2), the forms of LSs are completely different from those of their free forms. Given this fact, one might say that there are no free forms corresponding to LSs. However, Wiltschko points out the presence of LSs whose forms are very similar to free forms, as shown in (3):

(3) a. -ínəs ‘-chest, beach’ vs. s-ʔínəs ‘chest’
b. -éqsən ‘-nose, point’ vs. m-éqsən ‘nose’
c. -ələcən ‘-testicles’ vs. m-écen ‘testicle’
d. -épsəm ‘-neck, nape’ vs. t-əpsəm ‘neck, nape’
e. -éləx^{w}θəł ‘-tongue’ vs. t-éx^{w}θəł ‘toungue’
f. -məx^{w} ‘-land, people’ vs. t-éməx^{w} ‘land, earth’
g. -énəs ‘tooth’ vs. y-énəs ‘tooth’
h. -aθən ‘margin’ vs. θ-áθən ‘margin’
(Wiltschko (2009:209), (3h) is cited from Suttles (2004:287f.))

The free forms in (3) differ from the LSs only in the presence of additional consonants such as *s*-, *m*-, *t*-, *y*-, and *θ*-. In addition, the LSs share meanings with their free forms. These facts confirm that LSs have their free forms.

Second, LSs have nominal meanings, although they cannot stand on their own, as clearly shown in (2)-(3). If we use LSs, we have to embed them in complex words, as examples (4)-(6) below illustrate.

Third, according to Wiltschko (2009), LSs can co-occur with hosts that

[4] In (2c, d, f, g), the meanings of LSs do not correspond to those of free forms. Despite the fact, Wiltschko relates the LSs to the free forms. In section 5, I will answer the question of why the meanings of LSs tend to be different from those of free forms.

have diverse categories, as given in (4)-(6):

(4) a. [tale]-áwtxw
money-building
'bank'

b. s-[qo]-áls
Nom-water-fruit
'juicy fruit'

(5) a. [xaws]-ó:lkwlh
new-spirit.dancer
'new spirit dancer'

b. [mímel]-eqel
small-container
'small container'

(6) a. [Ihq'átses]-ówes
five-canoe paddles
'five canoe paddles'

b. [Ihq'átses]-áwtxw
five-building
'five houses'

(Wiltschko (2009:218))

Nominals are selected in (4), adjectives in (5), and numerals in (6), respectively.

Fourth, as Wiltschko (2009) demonstrates, although LSs have some nominal meanings, they differ from nouns in that they disallow possessive and plural markers as well as determiners, as shown in (7)-(11):[5]

(7) te má:l-s
Det father-3.Poss
'his/her father'

(8) *th'exw-xál-s-t-es te Strang
wash-foot-Poss-Trans-3.S Det Strang
intended: 'Strang washed his/someone's foot.'

(9) a. mámele (cf. méle)

[5] The following abbreviations are used throughout this paper: Abs = absolute, Conn = connector, Det = determiner, LE = linking element, Loc = locative, M = male, Nom = nominalizer, Pl = plural, Poss = possessive, Prox = proximal, Prs = present, S = singular, Trans = transitivizer, 1, = 1st person, 3 = 3rd person

child.Pl
'children'

b. q'álemi (cf. q'ámi)
girl.Pl
'girls'

c. swóweles (cf. swíweles)
boy.Pl
'boys'

(10) a. *a'as/*ales (cf. -as)
face.Pl
intended: 'faces'

b. *tsetses/tseles (cf. -tses)
hand.Pl
intended: 'hands'

c. *xexel/xelel (cf. -xel)
foot.Pl
intended: 'feet'

(11) a. íqw'-t-es *(te) Konrad
wipe-Trans-3.S Det Konrad
'He wiped Konrad.'

b. *íqw'-te-es-t-es te Konrad
wipe-Det-face-Tras-3.S Det Konrad
intended: 'He wiped Konrad's face.'

(Wiltschko (2009:202))

According to Wiltschko (2009:202), the first difference between LSs and nouns is that only nouns show possessive morphology in Halkomelem. In (7), *má:l* is a noun and it can bear a 3rd person possessive marker. However, *xál* in (8) is an LS, so that it cannot bear the same marker as *má:l* bears in (7). The second difference is that in Halkomelem, only nouns can be marked for plural by means of reduplication, *-l-* infixation, and vowel change (Wiltschko (2009:203-204)). The three patterns are shown in (9a), (9b), and (9c), respectively. In contrast to nouns, LSs cannot be pluralized by the same patterns, as shown in (10); they cannot undergo reduplication or *-l-* infixation to be pluralized. The third difference is that nouns but not LSs co-occur with determiners in Halkomelem. If nouns are used as arguments of verbs, they must co-occur with determiners, as shown in (11a). In (11b), on the other hand, the LS *-es* cannot be preceded by a determiner since it is not a noun (Wiltschko (2009:204)).

Fifth, LSs cannot determine the category of an entire construction. According to Wiltschko (2009:208), the same LS is found in a complex noun and a complex verb, as shown in (12):

(12) a. [tale]-áwtxw
money-building
'bank'

b. [thíy]-áwtxw
fix-building
'build a house'

(Galloway (1993:216))

(13) a. [sqal]-uc
fruit-mouth
'fruit'

b. [namilc]-uc
?-mouth
'channel opens up'

(Mithun (1997:360))

The expression in (12a) is a complex noun and that in (12b) is a complex verb. Both expressions contain the same LS *-áwtxw*. Given that suffixes generally determine the categories of whole expressions, *-áwtxw* is to determine the categories of the complex words in (12). Moreover, if it determined the categories, the categories of the complex words would be the same. However, the category of (12a) is N and that of (12b) is V. The same situation is found in Bella Coola. Although the LS *-uc* is attached to the nominal *sqal* in (13a) and the verbal *namilc* in (13b), respectively, categories are N in (13a) and V in (13b). The data in (12) and (13) demonstrate that LSs do not have any categories, although they seem to be suffixes.

Sixth, LSs cannot function as verbal arguments, which is related to the fourth characteristic of LSs. Witness the following data:

(14) a. th'éxw-wíl-t-es te ló:thel
wash-dish-Trans-3.S Det dish
'He washed the dish.'

b. th'éxw-wíl-t-es te lepót
wash-dish-Trans-3.S Det pot
'He washed the cup.'

(15) a. th'éxw-xál-t-es te Strang te Konrad
wash-foot-Trans-3.S Det Strang Det Konrad
'Strang washed Konrad's foot/feet.'
lit. 'Strang foot-washed Konrad.'

b. xwmékwáthet-tses-t-es te Martina te Strang
kiss-hand-Trans-3.S Det Martina Det Strang
'Martina kisses Strang's hand.'
lit. 'Martina hand-kisses Strang.'/'Martina kisses Strang on the hand.'

(Wiltschko (2009:211))

(16) cp-u·ɬ-ic ti-yalk-u·ɬ-tx
wipe-round-1/3 Prox-ball-round-Det
'I'm wiping the ball.'

(Mithun (1997:361))

What the data in (14) demonstrate is that although the LS *-wíl* is incorporated into the verb *th'éxw*, it cannot be the verb's argument. The verbs' objects are *ló:thel* in (14a) and *lepót* in (14b), respectively. This situation is also found in other LSs. The other LSs such as *-xál* and *-tses* cannot be verbal arguments, as shown in (15). The objects of the verbs are *te Konrad* in (15a) and *te Strang* in (15b), respectively. Bella Coola LSs behave similarly, as shown in (16). The LS *-u·ɬ* is incorporated into the verb *cp*, but the verb requires *yalk* as its argument. All the data in (14)-(16) point out that LSs lack nominal status.

In sum, LSs are bound morphemes like suffixes, although they have lexical contents. This property poses a challenge to Distributed Morphology (Halle and Marantz (1993, 1994), Marantz (1997, 2001), Embick and Marantz (2008), among others) because of the clear distinction between an element with a lexical content and a functional element like a suffix in the model. Before tackling the problem, in the following section I introduce the framework of Distributed Morphology, two types of word domains, and a word-version of the EPP feature.

3. Theoretical Assumptions

3.1. Distributed Morphology

3.1.1. The Overview of the Model

Embick and Marantz (2008:4) describe Distributed Morphology as "a syntactic, piece-based, realizational approach to morphology." This succinct description captures the essence of Distributed Morphology. Let us outline the characteristics of the model one by one.

Distributed Morphology does not distinguish words from phrases, unlike the lexicalist approach that allows a word to be formed in a different module from syntax. In other words, in Distributed Morphology, not only phrases but also words are formed in syntax. This view is called "the Single Engine Hypothesis" (Marantz (1997), Arad (2003), etc.).

According to the hypothesis, a word is formed by using the same materials for forming phrases. This means that a word has some structure and is hence decomposed into several terminal nodes.[6] In this respect, Distributed Morphology can be regarded as one of morpheme-based theories. Terminal nodes in the model are classified into two types: functional morphemes and Roots. According to Embick and Marantz (2008), these are defined as in (17):

(17) 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))

In Distributed Morphology, every word has a structure built by combining the two types of morphemes.

Although the model is one of morpheme-based theories, it differs from traditional morpheme-based theories in one respect; a terminal node lacks phonological features in syntax (Halle and Marantz (1993), cf. Beard (1995)) and its sound is determined in the post-syntactic component. Accordingly, morphemes in the two types do not have any sounds in syntax. Their sounds are determined based on syntactic environments.

3.1.2. Two Types of Word Domains: Root and Outer

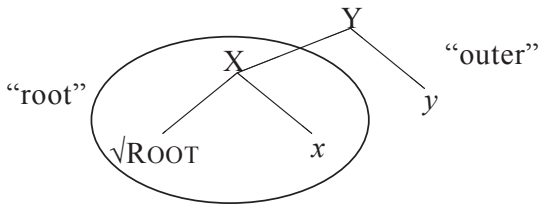
As I mentioned just above, Distributed Morphology adopts the Single Engine Hypothesis. This hypothesis raises a question of how to handle two types of words that are different in morphological productivity and semantic compositionality from each other. One of the two types is derived from morphologically productive rules and has a semantically compositional meaning, whereas the other is derived from morphologically non-productive rules and has

[6] Therefore, 'word' is not a primitive notion in Distributed Morphology (Embick and Marantz (2008:6)). This paper will use it hereafter for expository purposes.

a semantically non-compositional meaning. The two types of words have been explained in the lexicalist approach by stating that morphologically productive words are created by word formation rules whereas morphologically non-productive ones are lexicalized and stored in the lexicon. In Distributed Morphology, every word is built only in syntax, whose rules are productive, so that the presence of words that are derived from non-productive rules makes it difficult for us to form every word in syntax.

The problem is solved by Marantz (2001, 2006), who argues that the differences as to morphological productivity and semantic compositionality are attributed to the structural difference of the two types of words. In particular, Marantz proposes the two places for words; one is called a root domain and the other an outer domain. These domains are schematized as in (18):

(18)



(Marantz (2006:5) with slight modifications)

A root domain is composed of a Root and a categorizer such as *n*, *v*, and *a*, represented as *x* in (18). According to Marantz (2001), word formation from Roots is non-productive and the resulting word has a semantically non-compositional meaning because the meaning of a Root is not fixed yet and hence, its choice of categorizers is arbitrary. In contrast to a root domain, an outer domain consists of an existing word such as a noun, a verb, or an adjective, represented as X, and a categorizer represented as *y* in (18). As a result, a complex word Y is formed. Marantz (2001) argues that word formation from words is productive and the resulting word has a semantically compositional meaning because a word is formed by attaching an affix to a word whose interpretation is fixed.

To understand the workings of the two domains, let us use attested data:

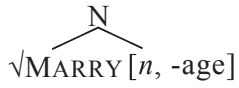
(19) a. refus-al, marri-age, destruct-ion, break-Ø
b. refus-ing, marry-ing, destroy-ing, break-ing

(Embick (2010:46))

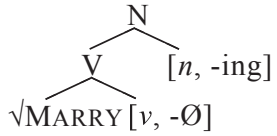
Derivatives in both (19a) and (19b) are composed of bases and nominalizers.

The bases of the derivatives in (19a) are identical to those of the derivatives in (19b). However, with respect to nominalizers, the derivatives in (19a) differ from those in (19b). Each noun in (19a) uses a different nominalizer, whereas every noun in (19b) uses the same nominalizer. In other words, the nouns in (19a) are derived from a non-productive nominalization process, whereas those in (19b) from a productive nominalization process. This difference is explained by considering that the nouns in (19a) are derived by directly attaching a Root to a nominalizer *n* and those in (19b) are derived by attaching *n* to a verb formed in a root domain. To put it differently, *n* in (19a) is inserted in a root domain, whereas *n* in (19b) is inserted in an outer domain, as illustrated in (20):

(20) a. marriage



b. marrying



The structure in (20a) corresponds to the nouns in (19a). In this structure, the choice of a nominalizer is arbitrary. For example, *marriage* consists of the Root √MARRY and the nominalizer that ultimately becomes *-age*, as shown in (20a). The structure in (20b) corresponds to the nouns in (19b). In this structure, the choice of a nominalizer is predictable. For example, *marrying* is composed of the existing verb *marry*, which is already derived in a root domain, and the nominalizer that ultimately becomes *-ing*.

With respect to semantic compositionality, let us show a contrast as in (21):

(21) a. curiosity ‘something that is unusual, interesting, and fairly rare’
b. curiousness ‘being curious’

According to Embick and Marantz (2008), *curiosity* has a non-compositional meaning and is derived in a root domain, whereas *curiousness* has a compositional meaning and is formed by merging a word *curious* with *n* in an

outer domain.[7]

3.2. A Word-Version of the EPP Feature

As introduced in section 3.1.1, there are two types of morphemes in Distributed Morphology, functional and lexical ones. With respect to the former, Okubo (2014) reveals the presence of a word-version of the EPP feature. Let us sketch Okubo's argument in the rest of this section.

Okubo argues that a linking element that links between constituents in a compound is a kind of expletives. Witness the following data:

(22) a. English: parks department, children's hour, frontiersman
(Lieber (2009:369))

b. German: Liebe-s lied
lit. love-LE song
'love song'
(Bauer (2009:346))

(23) a. French: port-e drapeu
lit. bear-LE standard.Pl
'standard bearer'
(Fradin (2009:422))

b. Maori: waiata-ā-ringa
lit. song-of-hand
'action song'
(Bauer (1997:309))

It has been noted that linking elements have two characteristics: one is semantic emptiness and the other is formal recycled status. Let us observe them in turn. In (22), according to Lieber (2009), *-s* and *-'s* in the first constituents of *parks department* and *children's hour* do not have grammatical meanings, although their forms are formally identical with plural or possessive inflection. Moreover, Lieber notes that plural or possessive interpretation is not possible in the case of *frontiers* of *frontiersman*. In German, the semantic emptiness of linking elements is shown more clearly. Bauer (2009:346) notes

[7] Shotaro Namiki (p.c.) points out that it is not necessarily the case that an expression has a non-compositional meaning when formed in a root domain. The reason behind this is that the nouns in (19a) have compositional meanings, although they are derived by non-productive suffixes. This problem is also pointed out by Borer (2014). She argues against the view that non-compositional meanings are limited to root domains. Although this issue is important, it is beyond the scope of the paper.

that *Liebes* of *Liebes-lied* in (22b) has no contribution to the meaning of the compound, although *-s* has a possessive or plural interpretation in other contexts; *meines Bruder-s* means 'my brother's' and *die Auto-s* 'the cars.' The reason behind this is that a possessive or plural form of *Liebe* is different from *Liebes*; its possessive and plural forms are *Liebe-Ø* and *Liebe-n*, respectively.

The presence of linking elements coming from a possessive or plural marker does not mean that such markers are the only sources of linking elements. Fradin (2009) shows that the form of verbal inflection *-e* can be used as a linking element in (23a). It is a realization of 3rd person, singular, and present features in other contexts. In addition, according to Bauer (1997), some Maori compounds include linking elements whose forms are identical with a preposition *-ā-*. These facts indicate the formal recycled status of linking elements.

The semantically empty nature and formal recycled status of linking elements are parallel with the characteristics of expletives. An expletive is a checker of the uninterpretable EPP feature (Chomsky (2000, 2001)) and then, does not convey any lexical meaning. In addition, its forms are identical with other elements. For example, the expletives *it* and *there* are formally identical with the pro-forms *it* and *there*. As the same as linking elements, there are various origins. For example, Shimada (2004) adds *do* and *much* to English expletives. Given this correlation between linking elements and expletives, Okubo regards linking elements as a kind of expletives.

With respect to the function of linking elements, Okubo agrees with Mukai (2008) that a linking element checks off an uninterpretable feature in a compound. Given this function and the view of linking elements as a kind of expletive, Okubo argues in the framework of Distributed Morphology that linking elements check off an EPP-like uninterpretable feature *f* in the word domain. Due to the checking, the wordhood of the entire construction is validated.

Examining data from more than thirty languages, Okubo (2014) points out the presence of two types of linking elements. One is a linking element attached to a word, as shown in (22)-(23). The other is that attached to a stem, as shown in (24). Okubo calls the former a linking element of word-based type and the latter that of stem-based type:

(24) a. Greek: aɣri-ó-ɣata
lit. wild-LE-cat
'wild cat'

(Ralli (2013:185))

b. Czech: nov-o-stavba
lit. new-LE-construction
'new construction'
(Štichauer (2009:295))

c. Russian: gaz-o-snabženie
lit. gas-LE-supply
'gas supply'
(Benigni and Massini (2009:174))

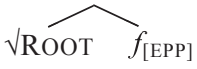
d. Kannada: de:var-a+mane
lit. god-LE+house
'room set aside for prayer and worship in the house, a 'home-shrine''
(Sridhar (1990:284))

e. Japanese: nak-i+sakeb-u
lit. weep-LE-cry-Prs
'weep and cry'
(Shimada (2013:90))

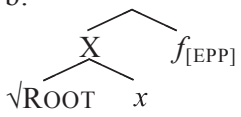
According to Okubo, the languages listed in (24) are stem-based languages. For instance, *nak-* in (24e) cannot stand on its own without the assistance of suffixes like *-i*, *-u*, and *-e*. To the verbal stem, the linking element *-i* is attached.[8]

Based on the fact that there are two types of linking elements, Okubo proposes that *f* occurs in both root and outer domains, as shown in (25):

(25) a.



b.



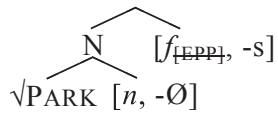
In (25a), *f* directly sticks to the Root, which forms a root domain. By contrast, *f* in (25b) is attached to the existing word X, which forms an outer domain. The fact that linking elements in (22)-(23) stick to words shows that they occur

[8] For the origins of linking elements in (24), see Asano and Okubo (2013).

within an outer domain; in contrast, the fact that linking elements in (24) stick to stems shows that they occur within a root domain:

(26) a. aγri-ó-γata (= (24a))

b. parks department (= (22a))



The structure in (26a) corresponds to the non-heads of the compounds in (24). For example, the non-head of *aγri-ó-γata* in (24a) is formed by combining the Root √AΓRI with *f* that is ultimately realized as *-o-*. In contrast, the structure in (26b) corresponds to the non-heads of the compounds in (22)-(23). For instance, *parks* of *parks department* in (26b) is formed by merging the existing noun *park* with *f* that ultimately becomes *-s*.

4. Proposal

In this section, first of all, based on the facts observed in section 2, I propose that LSs are stems used solely for compounds, namely compounding stems. Second, I prove that a compounding stem in question is a complex object composed of a Root and *f*.

4.1. LSs as Compounding Stems

In section 2, we observed that LSs have lexical meanings, as shown in (27)-(28), repeated from (2)-(3):

(27)	a.	-as ‘-face’	vs.	s’ó:thes ‘face’
	b.	-tses ‘-hand’	vs.	cháléx ‘hand’
	c.	-awts ‘-building’	vs.	lálém ‘house’
	d.	-ilep ‘-ground’	vs.	téméxw ‘earth, land’
	e.	-elcep ‘-firewood’	vs.	siyólh ‘firewood’
	f.	-als ‘-fruit/round’	vs.	sth’í:m ‘berry, fruit’
	g.	-(e)wi:l(s) ‘-dishes’	vs.	ló:thel ‘dish’
(28)	a.	-ínəs ‘-chest, beach’	vs.	s-ʔínəs ‘chest’
	b.	-éqsən ‘-nose, point’	vs.	m-éqsən ‘nose’

c. -ələcən ‘-testicles’ vs. m-écen ‘testicle’
d. -épsəm ‘-neck, nape’ vs. t-əpsəm ‘neck, nape’
e. -éləx^{w}θəɬ ‘-tongue’ vs. t-éx^{w}θəɬ ‘tongue’
f. -məx^{w} ‘-land, people’ vs. t-éməx^{w} ‘land, earth’
g. -énəs ‘tooth’ vs. y-énəs ‘tooth’
h. -aθən ‘margin’ vs. θ-áθən ‘margin’

The data in (27) and (28) indicate that LSs are not suffixes but bound stems. The reason behind this is that unlike stems, suffixes do not convey lexical meanings. The view of LSs as bound stems is confirmed by the data in (29)-(31), repeated from (4)-(6):

(29) a. [tale]-áwtxw
money-building
‘bank’
b. s-[qo]-áls
Nom-water-fruit
‘juicy fruit’

(30) a. [xaws]-ó:lkwlh
new-spirit.dancer
‘new spirit dancer’
b. [mímel]-eqel
small-container
‘small container’

(31) a. [Ihq’átses]-ówes
five-canoe paddles
‘five canoe paddles’
b. [Ihq’átses]-áwtxw
five-building
‘five houses’

The data in (29)-(31) show that LSs can stick to nominals, adjectives, and numerals. This behavior is difficult to explain if LSs are suffixes because suffixes are very choosy about their hosts. For example, the suffix *-able* in English can select verbs, but not other categories, as its hosts. The behavior shown in (29)-(31) is captured if LSs are not suffixes but bound stems, because a stem ignores categories of other elements in the case of composition.

If LSs turn out to be bound stems, the complex words in (29)-(31) cannot

be derivatives but are words composed of two stems, which means that the words can be regarded as compounds and LSs occur only in compounds. In other words, LSs are compounding stems.

Although stems are regarded as having categories by some researchers, compounding stems in question do not have categories. The data in (32)-(36), repeated from (7)-(11), illustrate that the bound stems are not nominals:

(32) te má:l-s
Det father-3.Poss
'his/her father'

(33) *th'exw-xál-s-t-es te Strang
wash-foot-Poss-Trans-3.S Det Strang
intended: 'Strang washed his/someone's foot.'

(34) a. mámele (cf. méle)
child.Pl
'children'

b. q'álemi (cf. q'ámi)
girl.Pl
'girls'

c. swóweles (cf. swíweles)
boy.Pl
'boys'

(35) a. *a'as/*ales (cf. -as)
face.Pl
intended: 'faces'

b. *tsetses/tseles (cf. -tses)
hand.Pl
intended: 'hands'

c. *xexel/xelel (cf. -xel)
foot.Pl
intended: 'feet'

(36) a. íqw'-t-es *(te) Konrad
wipe-Trans-3.S Det Konrad
'He wiped Konrad.'

b. *íqw'-te-es-t-es te Konrad
wipe-Det-face-Tras-3.S Det Konrad
intended: 'He wiped Konrad's face.'

In addition, the data in (37)-(41), repeated from (12)-(16), demonstrate the categoryless nature of the bound stems:

(37) a. [tale]-áwtxw
money-building
'bank'

b. [thíy]-áwtxw
fix-building
'build a house'

(38) a. [sqal]-uc
fruit-mouth
'fruit'

b. [namilc]-uc
?-mouth
'channel opens up'

(39) a. th'éxw-wíl-t-es te ló:thel
wash-dish-Trans-3.S Det dish
'He washed the dish.'

b. th'éxw-wíl-t-es te lepót
wash-dish-Trans-3.S Det pot
'He washed the cup.'

(40) a. th'éxw-xál-t-es te Strang te Konrad
wash-foot-Trans-3.S Det Strang Det Konrad
'Strang washed Konrad's foot/feet.'
lit. 'Strang foot-washed Konrad.'

b. xwmékwáthet-tses-t-es te Martina te Strang
kiss-hand-Trans-3.S Det Martina Det Strang
'Martina kisses Strang's hand.'
lit. 'Martina hand-kisses Strang.'/'Martina kisses Strang on the hand.'

(41) cp-u·ɬ-ic ti-yalk-u·ɬ-tx
wipe-round-1/3 Prox-ball-round-Det
'I'm wiping the ball.'

In the next subsection, I suggest that compounding stems are a realization of a complex object composed of a Root and *f*.[9]

[9] Given the data in (37) and (39)-(40), Wiltschko (2009) argues that LSs are Roots. I agree with Wiltschko that LSs have no categories. However, unlike Wiltschko, I argue in

4.2. The Derivation of Compounding Stems

So far, I have proposed that LSs can be regarded as compounding stems. This view is compatible with Ralli's (2008) view of linking elements as compound markers. This is because compounding stems and linking elements are found only in compounds. In other words, compounding stems function as compound markers. Given their similarity and the category-neutral status of compounding stems, it follows that compounding stems are derived in the same way as linking elements of stem-based type. Accordingly, I suggest the following structure, repeated from (25a):

(42)

For example, the structure of *-as* in (27a) is represented as follows:

(43)

However, this structure poses a problem. According to Okubo's (2014) proposal, *f* is an uninterpretable EPP feature and in order to check off this feature, a linking element is inserted. However, the compounds in (29)-(31) do not have linking elements. If compounding stems have the structure in (43), the absence of linking elements is a problem. To solve this problem, I propose that *f* can be checked off by incorporating a Root into *f*. Given this proposal, the derivation of *-as* is as follows. First, the Root √FACE is merged with *f*. Second, in order to check off the uninterpretable EPP feature of *f*, the Root is incorporated into *f*. Third, the resulting structure is transferred to PF and is assigned the sound *-as* there.[10] The second and third procedures are represented in (44):[11, 12]

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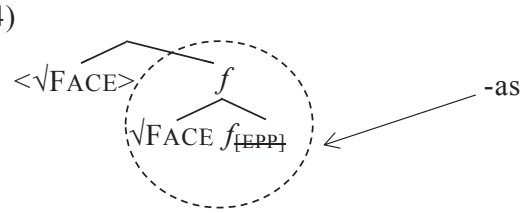
section 4.2 that an LS is a complex element.

[10] To be specific, the resulting structure is assigned the sound *-as* at Morphology, which is a post-syntactic component positioned on the way to PF. For a detailed mechanism, see Embick and Noyer (2007).

[11] To make it clear that the Root moves into *f*, I illustrate its copy in (44). However, this does not mean that I adopt the copy theory of movement.

[12] Mithun (1997) points out the correlation of the presence of LSs and the flow of information. According to her, LSs are used if they are informationally less important. To investigate the exact reason for the use of LSs is beyond the scope of this paper.

(44)



The broken circle and the solid arrow show the second and third procedures, respectively.[13] Since compounding stems are formed in this way, LSs are no longer a problem for Distributed Morphology.

5. Analysis

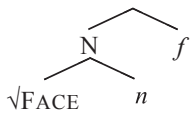
Based on my proposal, it is explained that compounding stems in question have unpredictable forms. As shown in (27), LSs have forms that cannot be derived from any morphological or phonological rules. The reason behind this is that compounding stems in question are formed in a root domain, where words are formed by morphologically non-productive processes. Recall the cases of nominalization in (19a) such as *refusal*, *marriage*, *destruction*, and *break*. Their suffixes differ from each other, which means that the correct choice of the suffixes is determined with respect to each stems.

My proposal also accounts for the fact that LSs tend to be assigned different meanings from those of free forms. Witness the following data:

(45)	a.	-awts '-building'	vs.	lálém 'house'	(= (27c))
	b.	-ilep '-ground'	vs.	téméxw 'earth, land'	(= (27d))
	c.	-als '-fruit/round'	vs.	sth'í:m 'berry, fruit'	(= (27f))
	d.	-ínəs '-chest, beach'	vs.	s-ʔínəs 'chest'	(= (28a))
	e.	-éqsən '-nose, point'	vs.	m-éqsən 'nose'	(= (28b))
	f.	-məx^{w} '-land, people'	vs.	t-éməx^{w} 'land, earth'	(= (28f))

[13] One might think that compounding stems are formed in an outer domain. However, it is not desirable because a compounding stem must be assigned a category when formed in an outer domain, which cannot capture the facts in (32)-(41), as the following structure illustrates:

(i)



If *-as* 'face' were formed in an outer domain, it would be nominalized and behave as a noun. However, as shown in (35a), it disallows pluralization which is allowed in nouns in (34).

In (45), LSs receive additional meanings or have different meanings from those of free forms. This semantic difference is captured because special interpretation is obtained in a root domain.[14]

6. Word Compounding and Lexical Affixation in Coeur d'Alene

The proposal that compounding stems are derived from checking of *f* by a Root is supported by the fact that linking elements and compounding stems are in complementary distribution. In other words, given my proposal, linking elements, which are realizations of *f*, cannot co-occur with compounding stems. This prediction is borne out by the following data:

(46) a. gʷiy'asqɛy'm
Ø-√gʷɛy'-ɛł-s-√qɛy'-m
3.Abs-finish-Conn-Nom-write-M
'He finished writing.'

b. čngʷiy'ɛsk'ʷúl'
čn-√gʷɛy'-ɛł-s-√k'ʷul
1.Nom-finish-Conn-Nom-make
'I finished working.'
(Doak (1997:289) cited from Bischoff (2011:5))

(47) a. gʷɛy'cn
Ø-√gʷɛy'-cn
3.Abs-finish-mouth
'He finished eating.'

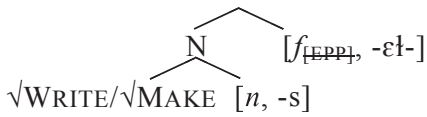
b. hngʷáy'qn
Ø-hn-√gʷɛy'-qn
3.Abs-Loc-finish-head
'He finished growing.'
(Doak (1997:289) cited from Bischoff (2011:5))

According to Bischoff (2011:5), the Coeur d'Alene compounds in (46) consist of two stems. For example, the compound in (46a) is composed of the verbal stem corresponding to 'He finished' and the nominal stem corresponding to 'writing.' In contrast, the words in (47) are composed of a stem and an LS (or a compounding stem in this paper). For example, the word in (47a) consists of the same verbal stem as (46a) and the LS *-cn*. There are two differences

[14] Not every LS shows this semantic change. For non-compositional meanings obtained in a root domain, see fn. 7.

between the compounds in (46) and the words in (47). The first difference is the presence of nominalizers *-s* only in (46). Their presence indicates the nominal status of the second stems. The second difference is the presence of connectors only in (46). The exact status of connectors is not clear, but given their semantically empty nature and their presence in compounds, it seems to me that they function as linking elements. Accordingly, the presence of nominalizers and connectors means that the stems corresponding to 'writing' and 'working' have a structure as follows:[15]

(48)

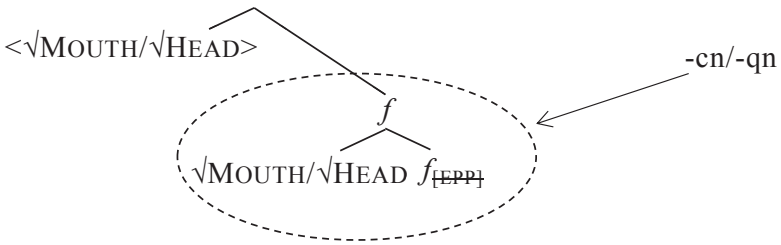


This structure is the same as that of a linking element of word-based type in (25b). In contrast, since an LS is a compounding stem in my proposal, LSs in (47) have the same structure as that of a linking element of stem-based type:

(49)

If *f* is present in both structures, the absence of linking elements in the words in (47) appears to be a problem. However, their absence is correctly explained by the present analysis; the Roots √MOUTH/√HEAD in (49) are incorporated into *f* and as a result, the uninterpretable EPP feature is checked off. Due to this checking, the source of linking elements is exhausted, as shown in (50):

(50)



In sum, linking elements and compounding stems are in complementary distribution since the derivation of compounding stems requires the checking and

[15] The linear order represented in (48) cannot be obtained from the structure. However, in the present context, order is irrelevant.

deletion of *f* and as a result, linking elements are unnecessary. Whether such complementary distribution is found in general needs further investigation.

7. Consequence: Root Suppletion and the Early Root Insertion Approach

So far, I have demonstrated that compounding stems are derived in the framework of Distributed Morphology. In this section, I demonstrate that the presence of compounding stems has an interesting consequence on Roots.

Haugen and Siddiqi (2013) point out that there are two approaches to Roots; one is called Early Root Insertion (Embick (2000), Embick and Halle (2005), Embick and Noyer (2007), etc.) and the other Late Root Insertion (Halle and Marantz (1993, 1994), Marantz (1995), Siddiqi (2006), etc.). The former differs from the latter in that a Root has its own phonological form from the beginning of the derivation. Their difference makes a different prediction; Early Root Insertion predicts the absence of Root suppletion, whereas Late Root Insertion predicts the presence of Root suppletion.[16, 17] The prediction made by the latter approach is confirmed by the presence of compounding stems composed of a Root and *f*. As we observed earlier, there are two types of compounding stems. One is a compounding stem whose form is very different from that of a free form, as shown in (27). The other is a compounding stem whose form is almost identical with that of a free form, as shown in (28). Given the definition of Root suppletion offered in fn. 16, only the former type is judged as Root suppletion. Accordingly, this paper strengthens the Late Root Insertion approach.

8. Conclusion

Salish languages, Wakashan languages, and other northwestern Native American languages have a peculiar morpheme called an LS. LSs act like lexical items and functional items because they have nominal meanings and function as bound morphemes. Their dual behavior poses an interesting challenge to the approach that makes a clear distinction between lexical and functional items. To solve this problem, first, I have argued that LSs are compounding stems. Second, based on the framework of Distributed Morphology, which is an elaborated version of the approach mentioned above, and Okubo's (2014) proposal that there is a word-version of the uninterpretable

[16] According to Haugen and Siddiqi (2013:fn. 2), Root suppletion is defined as "morphologically conditioned stem allomorphy where the conditioned form has little or no phonological identity with the default form."

[17] Accordingly, in Early Root Insertion, suppletion is found only in functional morphemes such as a [past] feature on T^0 (for example, *-t*, *-ø*, and default *-ed*).

EPP feature *f*, I have suggested that compounding stems result from checking of *f* by incorporating a Root into the head. My proposal makes a prediction about the distribution of linking elements that are realizations of *f*; linking elements cannot appear when compounding stems occur because of the absence of their sources. In addition, my proposal implies that compounding stems are Root suppletion, which supports the Late Root Insertion approach.

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