

Some Aspects of Productivity in Affixation

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This paper is intended to be a morphological survey of word formation, specifying on the analysis of the intrinsic mechanism of affixation in English, Japanese, and Shuswap, one of the endangered languages in Canada. A linguistic process of word formation has its own synchronic and diachronic disciplines. A word is composed in some systematic combination of morphemes and is also coined from a phrase by the idiosyncratic process of lexicalization. The former is concerned with the morphological process of compositionality and the latter with the morphological idiosyncratic feature of idiomaticity. The objective of the present paper is to explore some aspects of productivity in affixation considering the analysis of a number of different languages. Words are ubiquitous in all human languages and the morphological process of word formation is varied according to the typological aspects of language. Our focus is placed on the analysis of the internal structure of words, which will lead us to the discussion of some aspects of productivity in a number of typological differences of language. Our interest goes to a contrastive analysis of the inner mechanism of word formation in terms of the analysis of the basic morphological data. A detailed discussion of Japanese affixes takes place and we will also refer to the morphological process of Shuswap in terms of the analysis of the combination of affixes and their stems.

Key words : infix, prefix, suffix, root, productivity, Japanese, Shuswap

1.0 Introduction

This research is focused on the analysis of the internal structure of words. There is no sentence without a word, and a word functions in a sentence. A word is stored and listed in the lexicon, and it is instantiated in the actual use of conversation. A word has its productive process caused by the combination of lexical units of morphemes. It is also coined from the lexicalization process from a phrase to a word. A word is composed in terms of either the compositional process of morphemes and of the idiosyncratic process of idiomatization.

English is considered to be a kind of inflectional language. Inflectional word endings play an important role in sentence formation. They undertake the grammatical function of tense, number and comparison in terms of the application of their systematic rules.

Contrastively, the derivational process of word formation by affixation cause to produce the variety of English words. English affixes are mainly originated either from Teutonic words or from Greco-Roman loanwords. *Un-* in *unhappy* and *unfold* is Teutonic and stands for the concept of negation. *In-* in *insane* and *injustice* is Latinate and stands for the similar concept of negation. The suffix *-less* in *careless* is Teutonic and *-dom* in *freedom* or *kingdom* is Latinate.

Japanese affixes are also characterized by two kinds of reading, Chinese derived reading and Japanese native reading. One is borrowed from China and the other is inherited from the diachronic source of Japanese. Japanese prefixes such as *go-* in *go-fujin* (a lady), *mi-* in *mi-seinen* (a person under age), *fu-* in *fu-kanou* (impossible) are characterized by Chinese derived reading. Those such as *aka-* in *aka-haji* (quite ashamed), *aki-* in *aki-bako* (empty box) or *aki-beya* (unoccupied room) are Japanese native reading. Japanese suffixes such as *-kyou* in *gorufu-kyou* (a mania for golfing) and *-jou* in *kyouiku-jou* or *bengi-jou* are Chinese derived reading. Contrastively, *-kaneru* in *wakari-kaneru* (difficult to understand) and *shi-kaneru* (difficult to do) and *-gachi* in *kangae-g(k)achi* (tend to think) and *hashiri-g(k)achi* (tend to run ahead) are Japanese derived reading. Thus the morphological process of affixation in English and Japanese is structurally and diachronically mingled in their intricate mechanism of word formation.

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2.0 English

2.1 Some Aspects of English Affixation

In English, *internationalization* consists of one root/stem *nation* and one prefix and three suffixes such as *-al*, *-ize* and *-ation*. *Telescope* consists of the two Latinate bound roots of *tele-* (far or distant) and *-scope* (an instrument for watching something with). Contrastively, the word, *state-of-the-art*, which means 'the most advanced' and functions as adjective, is a word which is newly coined from a noun phrase. Words such as *standoff*, *runaway* and *takeout* are those which are coined from their original form of phrasal verb. They are idiosyncratic in so far as they change into a tenseless entity in verb, into a numberless entity and a genderless entity in noun.

Words are produced and understood by participants of talk exchange in the communicative context where they are actually used. They are also varied in form regardless of whether or not they are isolated, agglutinative and analytic types of language. Words produced in actual communicative context are realized according to their own morphological module and consistency.

The morphological process of word formation is closely linked to some aspects of productivity in affixation. For example, *-a(i)ble* in English is productive to a great extent as in *readable*, *reliable* and *edible* as it can be attached to quite a number of motion and epistemic verbs. (cf. Bauer 2001: 23). Thus *-a(i)ble* is considered to be quite productive.

However, the suffix *-al* is unproductive, according to Haspelmath (2002: 40). It cannot be used at all to form novel lexemes in English. He points out that the list of derived nouns formed with *-al* is fixed in OED, numbering 35, and there is no new derived noun adding to this number. Thus it is reasonable to claim that some affixes are productive but others are not.

Productivity is one of the key terms to handle the puzzle of the complex mechanism of word formation. Bauer (2001: 7) refers to the diachronic variation in productivity of French as in *-aux* of *chevaux* 'horses' and *-s* of *bals* 'balls' (at which we dance). The former has the diachronic development from [ʃəval+s] to [ʃəvau+s], [ʃəvo+s], and [ʃəvo]. The latter has the diachronic change from [bal+s] to [bal]. In the former vocalization of [-l] takes place, but it does not so in the latter. Contrastively, the synchronic variation in productivity is to be seen in English as in *boys* [bɔi+z], *houses* [hauz+iz] and *books* [buk+s].

The variety of affixation poses the interesting insight into the cause of word formation. We oftentimes come across words such as *telescope*, *telephone*, *telepathy*, *telegram* and *telecommunication*. *Tele-* is a Latinate word element, having a contentive meaning, although it is functionally dependent. Along with this, the Greek originated affix *hyper-* is also contentive and functionally dependent as in *hypercritical*, *hyperbola*, and *hyperthesis*.

The prefix *para-* is a lexical element which combines with nouns and adjectives to form nouns and adjectives as in *paramedic*, *paramilitary* and *paratyphoid*. Likewise, *pan-* is a prefix which is combined with adjectives which describe a nation or a particular group of people in order to form new adjectives as in *pan-American*, *pan-European* and *pan-continental*.

Over, which is originally a particle in Teutonic English, turns out to be a prefix as in *overtime*, *overseas* and *overcoat*. Likewise *under* changes its function into prefix as in *underestimate*, *underthrow*, and *underlie*.

A word is composed of a set of lexical elements which are considered to be a unit of word formation. Unless idiosyncratic or idiomatic, it consists of the constituent elements of morpheme. Even very long words such as *antidisestablishmentarianism* (cf. Spencer 1991) are composed of the complex combination of many morphemes.

2.2 Productivity in English

The concept of productivity is synchronically important for a consistent analysis of morphological productivity. According to Haspelmath (2002:42), word formation patterns in English can be arranged on a scale from most to least productive and that the productivity of word formation patterns is not an all-or-nothing question. Notice the following:

(1)	-ness	-ize	mis-	-ee	-eer	-al	-th	-ter
	goodness	globalize	misrepresent	invitee	profiteer	refusal	warmth	laughter
	←-----				-----→			
	most productive				least productive			
	(Haspelmath 2002)							

This scale shows the gradation of productivity in its linear scale in English. The suffix *-ter* in *laughter* is used only in this word, although *-ness* is used in the variety of English adjectives as in *kindness*, *handsomeness* and *greatness*.

Morphological productivity is also a matter of diachrony. In Bauer's analysis, the matter of degree in productivity in word formation raises the further question of diachronic variation in productivity. According to his statistic analysis of the productivity of *-ment* based on *the Oxford English Dictionary (2nd edition)*, it peaks twice: first in the early seventeenth century and again in the early nineteenth century. It tails off rapidly in the twentieth century. Significantly, Bauer indicates that productivity appears to change in history, and as does the degree to which the potential for productivity can vary diachronically.

In addition, there are different types of productivity in word formation, exemplified by ablaut-motivated compounds in English whose segmental framework is reduplicated as in *chitchat*, *dilly dally*, *dingle dangle* and so on. We now come to know that there are some word formation processes which are not derivationally rule-governed. Although productive, this process of word formation is not a feature of derivational rules. This discussion enables us to formulate a definition of morphological productivity.

Bauer (2001) takes into account the basic terminology of productivity by discussing at first Pike's 'semi-active' step of productivity which acknowledges the productivity scale of progressive gradation from highly active to completely inactive. Second, he examines the terminology of Matthews (1974:52), 'semi-productivity,' the intermediate step in the scale of productivity. Bauer considers it to be a pseudo-notion that should not be given any theoretical status. Third, he discusses Botha's labels of productivity in transformational grammar such as 'immensely productive,' 'very productive' and 'marginally productive.' Fourth, Bauer introduces Fleisher (1975) who distinguishes between 'productive' and 'active' processes in terms of the statistical criterion of frequency.

After discussing the concept of productivity provided by numerous scholars, Bauer found these observations unhelpful in defining productivity. Bauer then claims that frequency seems to be a key term for productivity, though it is often a poor guide to it. Here the question arises as to whether or not a productive morphological process can be said to be productive in all kinds of words. A number of linguists, especially from the Netherlands, wish to exclude words which are intentionally coined such as clippings, blends, acronyms and some poetic coinages.

After the prerequisite discussions above, Bauer introduces the six types of productivity provided by Rainer (1987) and he concludes that studies of productivity are still rather in a poor state, and at the very least some terminological distinctions are necessary.

3.0 Japanese Prefix

3.1 Function of Japanese Prefix

Japanese prefixes are used to modify or emphasize root/stems and also to arrange a tone or a style of words. They are formed from four lexical categories, namely nouns, verbs, adjectives, and adverbs. First, let us look at nouns that function as prefix. Consider the following:

(2)	a. mame-X (bean-X):	mame-chishiki	[-knowledge]	"a handy knowledge"
		mame-denkyuu	[-electric bulb]	"a tiny electric bulb"
	b. hara-X (belly-X):	hara-gei	[-performance]	"the implicit signaling of one's intention"
		hara-guroi	[-black]	"malicious"
	c. atama-X (head-X):	atama-kazu	[-number]	"the number of people"
		atama-goshi	[-cross]	"over the head"

d. te-X (hand-X):	te-hajime	[-begin]	“the beginning”
	te-narai	[-learn]	“learning”

Prefixes in (2) can be used as an independent noun. For example, *mame-* in (2a) is originally an independent word that means “bean (s)”. However, it functions as prefix in case it comes to be grammaticalized significantly and its content meaning (bean (s)) is reduced. Thus *mame-denkyuu* (a little electric bulb) is coined from the stem *denkyuu* (an electric bulb).

Prefixes in (2) are also attached to nouns. For example, the prefix *hara-* (belly) in (2b) is attached to a noun stem *-gei* (“performance”) and coins a word *hara-gei* (implicit signaling of one’s intention). It is also attached to an adjective *-g(k)uroi* (black) and coins a word *hara-guroi* (malicious).

Second, verbs also function as prefix. Prefixes formed from verbs tend to be attached to nouns and modify them. Notice the following:

(3) a. hoshi-X (dry-X):	hoshi-zao	[-bar]	“a bar to dry cloths”
	hoshi-kusa	[-grass]	“dry grass”
b. tsuke-X (attach-X):	tsuke-matsuge	[-eyelash]	“false eyelashes”
	tsuke-gami	[-hair]	“a hairpiece”
c. aki-X (vacant-X):	aki-bako	[-box]	“empty box”
	aki-shitsu	[-room]	“vacant room”
d. buchi-X (hit-X):	buc-chigiru	[-tear up]	“tear up (emphasized)”
	buk-korosu	[-kill]	“kill (emphasized)”

Hoshi- in (3a) is formed from a verb *hosu* (to dry(up) something) which is converted to the continuative form which is called *renyou-kei* in Japanese. Attached to a noun stem *sao* (a bar), it coins a word *hoshi-s(z)ao* (a bar to dry clothes). Here we notice that a verb that functions as prefix must be in the continuative form. The prefix *tsuke-* in (3b) is the continuative form of a verb *tsukeru* (to attach), the prefix *aki-* in (3c) is that of a verb *aku* (to open) and the prefix *buchi-* in (3d) is that of a verb *butsu* (to hit).

Third, adjectives function as prefix, which tend to be attached to nouns and modify them. They are exemplified below:

(4) a. aku-X (bad/evil-X):	aku-shumi	[-hobby]	“bad taste”
	aku-daikan	[-governor]	“evil governor”
b. ko-X (small-X):	ko-hantoki	[-an hour]	“about an hour”
	ko-ichijikan	[-an hour]	“about an hour”
c. ko-X (died-X):	ko-jin	[-person]	“the late person”
	ko-tanakashi	[-Mr. Tanaka]	“the late Mr. Tanaka”
d. shin-X (new-X):	shin-kaihatsu	[-development]	“new development”
	shin-daitouryou	[-president]	“the new President”
e. kyuu-X (old-X):	kyuu-gunjin	[-soldier]	“an ex-soldier”
	kyuu-ka	[-house]	“an old (ancient) family”
f. dai-X (big -X):	dai-jiten	[-dictionary]	“a big dictionary”
	dai-ryuukou	[-fashion]	“the rage”

The prefix *aku-* in (4a) means “bad, evil”. Attached to a noun *shumi* (hobby, interest), it coins a word *aku-shumi* (bad taste).

When a prefix formed from an adjective is attached to a verb, it functions as adverb. Consider the following:

(5) a. asa-X (shallow-X):	asa-nemuri	[-sleep]	“a light sleep”
	asa-kokyuu	[-breath]	“shallow breathing”

b. ara-X (rough-X):	ara-g(k)oshi	[-filter]	“rough filtering”
	ara-ori	[-weave]	“rough weaving”
c. ara-X (harsh-X):	ara-kasegi	[-make money]	“robbery”
	ara-d(t)ateru	[-stand]	“stir things up”

The prefix *asa-* in (5a) is formed from an adjective *asai* (shallow, light). Attached to a verbal stem *nemuri* (sleep), it coins a word *asa-nemuri* (a shallow sleep), in which the prefix modifies the stem verb. Here we notice that the verbal stems in (5) tend to take the continuative form. This is a reminiscent of the verbal form of prefixes in (5); a verb that functions as prefix must be in the continuative form.

Fourth, adverbs function as prefix. Attached to verbs, the prefixes function to modify the verbs that follow them. They are exemplified below:

(6) a. ai-X (each other-X):	ai-terasu	[-reflect]	“reflect with each other”
	ai-yorokobu	[-be glad]	“be glad each other”
b. do-X (very/really-X):	do-erai	[-serious]	“immense(adj.)”
	do-mannaka	[-middle]	“right in the middle”

The prefix *ai-* in (6a) means “mutually/with each other”. Attached to the verb *terasu* (to reflect), it creates a word *ai-terasu* (to reflect with each other). Similarly, the prefix *do-* (very/really) in *do-mannaka* (right in the middle) in (6b) functions to emphasize the adjective stem *mannaka* (middle).

Lastly, we notice that prefixes never change the grammatical category of the stem in Japanese prefixation. In English, some prefixes change the grammatical category of their stems. For example, a prefix *en-* is combined with adjectives or nouns such as *large*, *rich*, and *danger*, and creates verbs like *enlarge*, *enrich*, and *endanger*, respectively. The grammatical category of stems is not inherited to newly created words.

In Japanese, on the other hand, prefixes do not change the grammatical category of the stem. Notice the following:

(7) a.	N_{prefix}	+	N_{stem}	→	N_{word}	hara-gei
	N_{prefix}	+	V_{stem}	→	V_{word}	hara-gamae
	N_{prefix}	+	Adj_{stem}	→	Adj_{word}	hara-guroi
b.	V_{prefix}	+	N_{stem}	→	N_{word}	hoshi-kusa
	V_{prefix}	+	V_{stem}	→	V_{word}	tsuke-dasu
c.	Adj_{prefix}	+	N_{stem}	→	N_{word}	dai-tasuu
	Adj_{prefix}	+	V_{stem}	→	V_{word}	oo-sawagi
	Adj_{prefix}	+	Adj_{stem}	→	Adj_{word}	sora-osoroshii

No matter what grammatical category a prefix may be, the grammatical category of stems is inherited to a newly coined word.

3.2 Equi-Etymological Principle in Prefixation

English affixes are mainly originated either from Teutonic words or Greco-Roman loanwords. Teutonic words are attached to Teutonic root/stems (*kind* and *large*). Likewise, Latinate words are attached to Latinate root/stems. We would like to propose this diachronic consistency of affixation as Equi-Etymological Principle.

Japanese affixes are also characterized by two types of reading; Japanese native reading (*Kun-Yomi*) and Chinese derived reading (*On-Yomi*). Equi-Etymological Principle also works in Japanese. When a prefix is characterized by Japanese native reading, it is attached to the same diachronic stem of Japanese native reading. Consider the following:

(8) a.	aka-X:	[red-X]	aka-haji	aka-hadaka
	ao-X:	[blue-X]	ao-nisai	ao-j(sh)ashin

b.	aki-X:	[vacant-X]	aki-bako	aki-jikan
	hoshi-X:	[dry-X]	hoshi-kusa	hoshi-zao
c.	asa-X:	[shallow-X]	asa-zuke	asa-guroi
	fuka-X:	[deep-X]	fuka-kizu	fuka-iri
d.	maru-X:	[round-X]	maru-bouzu	maru-mooke
	kaku-X:	[square-X]	kaku-zatou	kaku-gari
e.	ko-X:	[small-X]	ko-hantoki	ko-ichijikan
	oo-X:	[big-X]	oo-sawagi	oo-hashagi

Similarly, prefixes characterized by Chinese derived reading are attached to the same diachronic stem of Chinese derived reading. They are illustrated below:

(9)	a.	aku-X :	aku-shumi	aku-daikan
	b.	ko-X :	ko-hantoki	ko-ichijikan
	c.	ko-X :	ko-jin	ko-Tanakashi
	d.	shin-X :	shin-kaihatsu	shin-daitouryou
	e.	kyuu-X :	kyuu-gunjin	kyuu-ka
	f.	dai-X :	dai-jiten	dai-ryuukou

A number of prefixes that are written in the same Chinese character differ in reading. For example, two prefixes *aka-* and *seki-* are written in the same Chinese character. The former is of Japanese native reading and the latter is of Chinese derived reading. Equi-Etymological Principle works here. Notice the following:

(10)	a.	“red-X”	aka-X:	[Japanese _{prefix} -Japanese _{stem}]	aka-haji	aka-hadaka
			seki-X:	[Chinese _{prefix} -Chinese _{stem}]	seki-jitsu	seki-shoku
	b.	“blue”	ao-X:	[Japanese _{prefix} -Japanese _{stem}]	ao-nisai	ao-j(sh)ashin
			sei-X:	[Chinese _{prefix} -Chinese _{stem}]	sei-ki	sei-un
	c.	“big-X”	oo-X:	[Japanese _{prefix} -Japanese _{stem}]	oo-sawagi	oo-hashagi
			dai-X:	[Chinese _{prefix} -Chinese _{stem}]	dai-jiten	dai-jiten

In(10a), *aka-* is attached to stems *haji* (shame) and *hadaka* (nakedness) that are characterized by Japanese native reading, whereas *seki-* is attached to stems *jitsu* (day) and *shoku* (color) that are characterized by Chinese-derived reading.

4.0 Japanese Suffixes

4.1 Function of Suffix

Japanese suffixes are formed from the four lexical categories of noun, verb, adjective, and adverb. First, let us examine nouns that function as suffix:

(11)	a.	X-ke:	[X-family]:	Tokugawa-ke	[Tokugawa-]	“Tokugawa family”
				Sato-ke	[Sato-]	“Sato family”
		X-ka:	[X-house]:	seiji-ka	[politics-]	“a politician”
				shisan-ka	[wealth-]	“a wealthy person”
		X-san:	[X-mountain]:	Fuji-san	[Fuji-]	“Mt. Fuji”
				ka-z(s)an	[fire-]	“volcano”
		X-ten:	[X-shop]	shou-ten	[business-]	“a store”
				ro-ten	[dew-]	“a street stall”
	b.	X-kata:	[X-way]:	tsukai-kata	[use-]	“how to use”

		hanashi-kata	[talk-]	“a way of talking”
X-sama:	[X-way]:	ari-sama	[be-]	“the way things are”
		shini-zama	[die-]	“how someone dies”
X-kusa:	[X-an item of]:	katari-g(k)usa	[tell-]	“a topic”
		warai-g(k)usa	[laugh]	“a laughingstock”
c. X-mi:	[X-taste]:	aka-mi	[red-]	“reddish”
		kanashi-mi	[sad-]	“sadness”
X-ke:	[X-feeing]:	kawai-g(k)e	[pretty-]	“pretty-looking”
		kanashi-g(k)e	[sad-]	“sad-looking”
X-sa:	[X-ness]:	fuka-sa	[deep-]	“depth”
		kuro-sa	[black-]	“blackness”

Suffixes in (11a) are attached only to nouns. For example, the suffix *-ke* (family) is attached to nouns that are surnames as in *Tokugawa-ke* (Tokugawa-family). Suffixes in (11b) are only attached only to verbs. Thus, a suffix *-kata* (way) is attached to a verb *tsukai* and forms a word *tsukai-kata* (a way of using). Suffixes in (11c) are attached only to adjectives. Thus, the suffix *-mi* (“taste”) is attached to an adjective *aka* (red) and forms a word *aka-mi* (reddish).

Second, some verbs function as suffix. They are attached to the preceding nouns, verbs and adjectives. They are illustrated below:

(12) a.	X-atari:	[X-per]:	hitori-atari	[one person-]	“per person”
			ichijikan-atari	[one hour-]	“per hour”
	X-hari:	[X-style]:	souseki-b(h)ari	[Soseki-]	“a style of Souseki”
			yakusha-b(h)ari	[actor-]	“a style of an actor”
b.	X-kake:	[X-be about to]:	kaeri-g(k)ake	[go home-]	“on the way home”
			iki-g(k)ake	[go-]	“be about to go”
c.	X-kachi:	[X-be apt to]:	rusu-g(k)achi	[absent-]	“be often absent”
			namake-g(k)achi	[lazy-]	“be often lazy”

In (12a), *-atari* (per, each) is formed from a verb *ataru* and attached to a noun *hitori* (one person), forming a word *hitori-atari* (per person). In (12b), *-gake* (be about to do, on the way to) is formed from a verb *kakeru* and attached to a verb *kaeri* (return), forming a word *kaeri-g(k)ake* (on the way home). In (12c), *-gachi* (be apt to do) is formed from the verb *katsu* and attached to the adjective *rusu* (be absent/away from home), forming a word *rusu-g(k)achi* (be often absent/away from home).

We notice that the verbal suffixes in (12) holds the continuative form of verbs. This is the reminiscence of the verbal prefixes that must be in the continuative form as was discussed in (3).

Lastly, adjectives also function as suffix and tend to be attached to nouns. Notice the following:

(13) a.	X-kyou:	[X-strong]:	ichikiro-kyou	[a kilogram-]	“a little more than one kilogram”
b.	X-jaku:	[X-weak]:	ichikiro-jaku	[a kilogram-]	“a little less than one kilogram”
c.	X-dai:	[X-big]:	toushin-dai	[life size-big]	“life-size(d)”

A suffix *-kyou* in (13a) means “strong”. Attached to a noun *ichikiro* (one kilogram), it creates a word *ichikiro-kyou* that means a little more than one kilogram.

Recall that the grammatical category of stems is inherited to a newly coined word in prefixation as was discussed in (7). Contrastively, suffixes may change the grammatical category of stems. Consider the following examples:

(14) a.	Verb _{stem} (<i>tsukai</i>)	+	Noun _{suffix} (<i>-kata</i>)	→	Noun _{word} (<i>tsukai-kata</i>)
b.	Adjective _{stem} (<i>atataka</i>)	+	Noun _{suffix} (<i>-mi</i>)	→	Noun _{word} (<i>atataka-mi</i>)

In (14a), a suffix *-kata* (way, manner) is formed from a noun. When attached to a stem *tsukai-* formed from a verb *tsukau* (to use), it coins a noun *tsukai-kata* (how to use). Notice that the lexical category of the stem is a verb but not so is that of the coined word.

4.2 Equi-Etymological Principle in Suffixation

Japanese suffixes are characterized by Japanese native reading and Chinese derived readings as well as prefixes (see in 3.2). Equi-Etymological Principle also works in suffixation. Notice the following:

- (15) [Chinese_{stem}-Chinese_{suffix}]
- | | | | |
|-----------|---|------------------|-----------|
| a. X-ke | : | Tokugawa-ke | Sato-ke |
| X-ka | : | seiji-ka | shisan-ka |
| X-san | : | Fuji-san | ka-z(s)an |
| X-ten | : | shou-ten | ro-ten |
| b. X-kyou | : | ichimeetoru-kyou | |
| X-jaku | : | ichimeetoru-jaku | |
| X-dai | : | toushin-dai | |

In (15), each suffix characterized by Chinese derived reading is attached to a stem that is also characterized by Chinese derived reading.

By the same token, if a suffix is characterized by Japanese native reading, it is also attached to a stem characterized by Japanese native reading. Let us consider the following case where two different suffixes that are written in the same Chinese character differ in reading:

- (16) a. "X-mania": X-kurui: [Japanese_{stem}-Japanese_{suffix}] onna-g(k)urui
 X-kyou: [Chinese_{stem}-Chinese_{suffix}] maajan-kyou gorufu-kyou
 b. "X-person": X-h(b)ito: [Japanese_{stem}-Japanese_{suffix}] tabi-h(b)ito koi-h(b)ito
 X-jin: [Chinese_{stem}-Chinese_{suffix}] kansai-jin seiyou-jin
 c. "X-temple": X-t(d)era: [Japanese_{stem}-Japanese_{suffix}] tsubosaka-t(d)era kakekomi-t(d)era
 X-ji: [Chinese_{stem}-Chinese_{suffix}] houryuu-ji toudai-ji

In (16a), two suffixes *-kurui* and *-kyou* are written in the same Chinese character. *-kurui* is of Japanese native reading and attached to a stem of Japanese native reading *onna*, whereas *-kyou* is of Chinese derived reading and attached to a stem of Chinese derived reading *maajan*. Interestingly, if a stem is a loanword like *golf*, it is attached to a suffix of Chinese derived reading *-kyou* as in *gorufu-kyou* (golf mania).

Equi-Etymological Principle is not maintained in suffixes that are formed from verbs. This is illustrated below:

- (17) [Chinese_{stem}-Japanese_{suffix}]
- | | | | |
|---------------|--------------|---------------|-----------------|
| a. X-kagiri: | [X-limit]: | konkai-kagiri | hantoshi-kagiri |
| b. X-f(b)uri: | [X-pretend]: | seikyuu-buri | rakutan-buri |
| c. X-atari: | [X-per]: | jikan-atari | ninzuu-atari |
| d. X-gachi | [X-tend to]: | rusu-gachi | enryo-gachi |

Suffixes in (17) are characterized by Japanese native reading, but they are attached to stems of Chinese derived reading. For example, *-kagiri* (limited, restricted) in (17a) is of Japanese native reading and attached to a stem of Chinese derived reading as in *konkai* (this time) or *hantoshi* (a half year).

4.3 Productivity in Japanese

In Japanese, prefixes and suffixes are formed from the variety of lexical categories such as nouns, verbs, adjectives

and adverbs and are combined with the variety of stems to produce new words. The table in (18) illustrates which combination of affixes and root/stems is attested (indicated by “✓”) and which is not attested (indicated by “—”):

(18) a. Prefix + Stem

	Noun _{stem}	Verb _{stem}	Adjective _{stem}	Adverb _{stem}
Noun _{prefix}	✓	—	—	—
Verb _{prefix}	✓	✓	—	—
Adj _{prefix}	✓	✓	—	—
Adv _{prefix}	—	✓	✓	—

b. Stem + Suffix

	Noun _{stem}	Verb _{stem}	Adjective _{stem}	Adverb _{stem}
Noun _{suffix}	✓	✓	✓	—
Verb _{suffix}	✓	✓	✓	—
Adj _{suffix}	✓	—	—	—
Adv _{suffix}	—	—	—	—

Words are not randomly produced. They are composed in systematic combination of affixes and root/stems. Such combinations enable participants of talk exchange to produce and understand a large number of words in actual communicative context. However, some affixes are quite freely combined with any stems, whereas others are combined with a certain restricted class of stems. The former affixes are considered to be productive, while the latter are unproductive.

Haspelmath (2002) proposes that productivity is characterized by the gradient in scale from ‘most productive’ to ‘least productive’ (see (1) in 2.2). According to his scale, a noun-derived suffix *-kata* (way) is productive, since it can be combined with any verbal stems. While a noun-derived prefix *te-* (hand-) is unproductive since it can only be combined with some nouns.

Words are also formed by the cognitive process of analogy. For example, a prefix *mame-*, which literally means “beans”, denotes a metaphorical meaning “small/tiny like a bean”. When *mame-* is combined with a stem *denkyuu* (knowledge), an idiomatized word *mame-denkyuu* (a tiny electric bulb) is produced by the cognitive process of analogy.

In the following section, we will focus on the discussion of the morphological process of Shuswap.

5. Shuswap

Shuswap is an endangered language spoken in the interior of British Columbia, Canada. One of the intriguing properties of Shuswap is that long strings of affixes are united into single words, which may translate as an entire sentence in English. Such a language is often called a polysynthetic language. Polysynthetic languages are often found in many native languages of North America (ex.. Inuktitut, Cree). In this section, we will explore some interesting process of affixation in Shuswap and provide a discussion of productivity in affixation of this language.

5.1 Pronominal Affixation

In Japanese and English, pronouns like *he* and *she* are realized as independent words. In Shuswap, however, pronouns must be realized as affixes and attached to the verb stem. They are illustrated as follows:

(19) a. *Intransitive Subject suffixes*

qwetséts-*k*
leave-2sS

‘You left.’

b. *Transitive Subject and Object Suffixes*

wiwk-t-sm-c

see-tr-1sO-2sS

‘You saw me.’

c. *Possessives*

re 7-qé7tse

det 2sP-father

‘your father’

In (19a), a stem is an intransitive verb *qwerséts* (leave). A subject is a second person pronoun you and realized as a suffix *-k* which is attached to the stem. In (19b), a stem is a transitive verb *wiwk* (to see). A subject is also a second person pronoun but realized as a suffix *-c* and attached to the stem. In (19c), a stem is a noun *qé7tse* (father). A second person possessive pronoun is realized as a prefix *7-* and attached to the noun stem.

5.2 Reduplication

This language exhibits a very productive affixation process, namely, reduplication. Reduplication is a repetition of all or part of a root or stem to indicate certain meanings. A repeated portion forms an affix (henceforth reduplicative affix) and attaches to a root or stem. One of the most productive patterns of reduplication is to mark “plurality”, which is called distributive reduplication. Consider the following:

(20)	a.	s-péq	“berry”	s-pəq-péq	“berries”
	b.	s-k’*élt	“mountain”	s-k*əl-k’*élt	“mountains”
	c.	pésəlk’	“lake”	pəs-pésəlk’	“lakes”
	d.	kelx	“hand”	kei-keix	“hands”
	e.	sxənx	“stone”	s-xən-enx	“stones”

Here the reduplicative affix consists of a sequence of a consonant-vowel-consonant that is formed by copying the root. A vowel of the reduplicative affix is reduced to schwa [ə]. For example, in (20a) a root is a noun *péq* that means “one berry”. In order to make its plural form (berries), a sequence of a consonant-vowel-consonant *peq* is copied from the root and is attached to the root as a prefix, creating a reduplicated word *s-peq-péq*.

Distributive reduplication also operates on verbal roots to mark plurality of participants of the event. This is exemplified below:

(21)	a.	kicx-ek’e	“he/she arrives”
		kəc-kicx-ek’e	“they arrive”
	b.	cyem	“to be home/camped”
		c-yəm-yem	“several groups are home/camped”

The pattern of reduplication in (21) is the same as the one in the nominal stems in (20). In (21a), for example, a root is a verb *kicx* that means “arrive”. When the distributive reduplication applies to the verbal root, it creates *kəc-kicx* that marks plurality of participants of the event (several people arrive).

5.3 Infixation

An affix can be distinguished in terms of its position relative to its root or stem. As we have already seen in Japanese and English, a prefix is attached to the front of its root or stem, whereas a suffix is attached to the end of its root or stem. There is another far less common type of affix, namely, infix, which occurs within its root or stem. Shuswap employs infixation for marking “smallness of items”. The process of infixation is operated as reduplication, which is called

diminutive reduplication. The pattern of diminutive reduplication is exemplified as follows:

- | | | | | | |
|------|----|-----------------|----------|------------|----------------|
| (22) | a. | s-qéxə | “dog” | s-qé-q-xə | “small dog” |
| | b. | tuwít | “person” | tuwí-w-t | “child” |
| | c. | pésətk* | “lake” | pé-p-sətk* | “little lake” |
| | d. | ci ^t | “house” | ci-c-t* | “little house” |
| | e. | s-xenx | “stone” | s-xé-x-ənx | “pebble” |

Here the reduplicative affix consists of a consonant and appears within a root as an infix. It is always placed immediately after a stressed vowel of a root. For example, in (22a) a root is a noun *qéxə* that means “a dog”. In order to make its diminutive form (a small dog), a consonant *q* is copied from the root and attached to the root as an infix, creating a reduplicated word *s-qé-q-xə*.

Diminutive reduplication is also applied when a sentence contains the first person pronoun(s). Consider the following:

- | | | |
|------|----|---------------------|
| (23) | a. | wiwk-t- <i>ø</i> -n |
| | | see-tr-3sO-1sS |
| | | ‘I saw him/her.’ |
| | b. | wiwk-t-sm-c |
| | | see-tr-1sO-2sS |
| | | ‘You saw me.’ |

In a sentence (23a), a subject is the first person that is expressed by a suffix *-n*. Diminutive reduplication applies to the stem *wik* (to see), and the reduplicative affix *-w-* is infixed within stem as in *wi-w-k*. Since the diminutive reduplication denotes the concept of smallness, the use of diminutive reduplication has an effect of express “modesty”. Interestingly, we find a similar phenomenon in Japanese. Consider a word *shou-sei* (small-living) which refers to “I (myself)”. Although this word is not formed by affixation, Japanese also expresses “humbleness” by using the concept of smallness.

5.4 Double Reduplication

The two distributive and diminutive reduplications can simultaneously apply to the same stem. This pattern is often called double reduplication. Notice the following:

- | | | | | |
|------|----|-----------------------|----------------|---------------|
| (24) | a. | Stem: | pésətk* | “lake” |
| | | Distributive: | pəs-pésətk* | “lakes” |
| | | Diminutive: | pé-p-sətk* | “small lake” |
| | | Double Reduplication: | pəs-pé-p-sətk* | “small lakes” |
| | b. | Stem: | s-xenx | “stone” |
| | | Distributive: | s-xən-ənx | “stones” |
| | | Diminutive: | s-xé-x-ənx | “pebble” |
| | | Double Reduplication: | s-xən-xé-x-ənx | “pebbles” |

In (24a), the word *pəs-pé-p-sətk** (small lakes) contains both a distributive affix *pəs-* and a diminutive affix *-p-* and denote the notion of plurality and smallness.

5.5 Productivity in Shuswap

In Shuswap, affixation plays an important role in the grammar. Pronominal affixes undertake the grammatical function of subject, object and possessor. Combined with the variety of stems, they produce an infinite number of

sentences. Reduplicative affixes denote the notion of plurality or smallness. The process of reduplication applies to noun and verb stems and produces numerous words and sentences, respectively. In double reduplication, two different kinds of reduplication can apply to the same stem simultaneously and form new words that denote the notion of plurality and smallness. Since these processes of affixation can produce a large number of words, they are considered to be productive in this language.

However, in English and Japanese, we have examined productivity of affixes but not the process of affixation. According to Haspelmath's scale of productivity, the suffix *-ness* in *kindness* is most productive while *-ter* in *laughter* is least productive in English. Let us now examine productivity of affixes in Shuswap. According to Haspelmath's scale, a distributive reduplicative prefix such as *-pé* in *s-paq-péq* (berries) that denotes plurality of the stem *péq* (berry) is not considered to be productive, since this prefix cannot be attached to any other stems. Therefore, Haspelmath's scale analyzes all the reduplicative affixes in Shuswap as least productive. Since it does not seem reasonable to suppose that a language contains numerous 'least productive' affixes, the validity of Haspelmath's scale needs to be investigated by considering typological differences of languages.

6.0 Conclusion

The purpose of this research was to explore some aspects of morphological productivity in word formation. We specified on the analysis of affixation in three different languages of English, Japanese and Shuswap, one of the endangered language in Canada. The morphological process of affixation is varied according to the typological aspects of language. We provided a comparative analysis of the typological differences of words in terms of the elaborate discussion of the data taken from these three languages.

We first examined the morphological process of affixation and its productivity in English. Second, we made a further analysis of Japanese affixation, taking into consideration the extensive morphological Japanese data. Then we proposed Equi-Etymological Principle in reading which works both in English and Japanese. In English this principle works both in Teutonic and Latin respectively. Likewise, in Japanese, it works in the two types of reading; Japanese native reading (*Kun-Yomi*) and Chinese derived reading (*On-Yomi*).

Finally, we examined the morphological process of productivity in Shuswap affixation, taking account of the Haspelmath's scale of productivity. To our understanding, the scale of productivity needs to be investigated by considering typological differences of languages. This morphological research of intrinsic mechanism of productivity in affixation will provide us with some new morphological perspective in word formation.

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