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A REVIEW ON THE SUFFIX -*FREE* RELATED TO NEGATION AND SPATIAL COGNITION

1 INTRODUCTION

In recent studies on English negative expressions, it has been suggested that there exist some derivational suffixes that denote implicit negation, in addition to negative prefixes like *un-*, *in-*, *non-*, and *dis-*.   For example, the suffix *-free*, which combines with nouns to form adjectives, means "something does not have the thing mentioned" (*Collins*) or "lacking the undesirable thing imparted by the nominal root" (Hamawand 2007).[1]   Examples of denominal adjectives in *-free* (i.e., *N-free*) are shown below.

(1)　　a.　**cloud-free** sky 'sky that is empty of clouds'
　　　　b.　**queue-free** check-in 'check-in that is free from queues'
　　　　c.　a **weed-free** garden 'a garden that lacks weed'

<div align="right">(based on Hamawand 2007: 77)</div>

According to Arimitsu (2011), who examines the mechanism of negation in English and Japanese, the nature of implicit negation denoted by the suffix *-free* is closely associated with spatial cognition of an entity being absent from a bounded space.   In this short paper, I describe some characteristics of *-free* in terms of negation and spatial cognition, and make a comment on Arimitsu's (2011) discussion.

This paper is organized as follows.   Section 2 first introduces the basic cognitive notions related to negation, such as Langacker (1991) and Yamanashi (2000a, b). Section 3 reviews a cognitive approach to the suffix *-free* proposed by Arimitsu (2011), and presents an overall evaluation of her analysis.   Section 4 concludes this paper with a summary of discussions.

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[1] For the morphological status of *-free*, the question of whether it should be considered a suffix or a full word, has been occasionally discussed in some studies on word formation.   Marchand (1969: 356) treats the elements such as *-like* or *-free* as semi-suffixes, because they "stand midway between full words and suffixes."   On the other hand, Namiki (1988: 12) regards the form *N-free* as compound adjectives.   A similar argument is also made for *error-free* vs. *free of error(s)* in Plag (2003: 73), who suggests that *-free* is a compounding use of a free morpheme.   Following Hamawand (2007: 74), I regard *-free* as a suffix because it changes the grammatical category of the base noun to which it is attached (e.g., *interest* (N) → *interest-free* (Adj.)) and modifies the semantic property of the base.

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2   BACKGROUND: THE BASIC COGNITIVE NOTIONS OF NEGATION

In this section, I briefly outline the cognitive notions involving negation presented by Langacker (1991) and Yamanashi (2000a, b), both of which will be the basis for the analysis of the suffix *-free* in Arimitsu (2011).

2.1 Cognitive Model of Negation

Though the notion of negation is generally described as a semantic primitive, Givón (1979), for instance, demonstrates that negation is the marked member of the positive/negative opposition in terms of perceptual saliency or figure-ground relations. In parallel with this view, Langacker (1991) points out that negation can be specified with reference to other notions, and treats the notion of negation as in (2).

(2)   In the terminology of cognitive grammar, NEG [= negation] is conceptually dependent, for it makes salient (though schematic) internal reference to the situation whose existence it denies.   Also relevant is the dictum that *existence* is always *existence in some location*, which suggests the corollary that *non-existence* is always *non-existence in some location*.

(Langacker 1991: 132)

Langacker implies that negation presupposes some evocation of the positive situation where something *is* (or *exists*) in a bounded mental space.   That is, the function of negation is to specify a situation where some entity is *non-existent* in such a space.   We are thought to conceive of such a negative situation based on the cognitive model of negation shown in Figure 1.
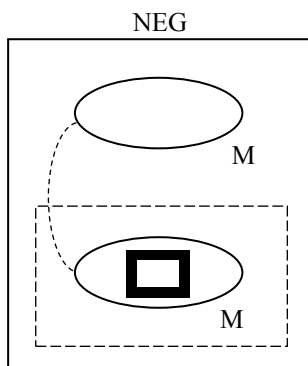
NEG

Figure 1: Cognitive model of negation (Langacker 1991: 134)

In Figure 1, M represents a mental space, and a positive conception in which some

entity exists in M is enclosed by the dashed-line box. According to Langacker,
against the background of this positive conception, negation expresses a situation in
which that entity does not occur in M. Thus, the positive-negative relation can be
represented as the perceptual opposition of existence versus non-existence, and the
cognitive model in Figure 1 suggests that negation cannot be captured without the
conception of this opposition.

2.2 Indirect Negative Expressions Based on Spatial Cognition

The notion of spatial cognition, such as IN-OUT, NEAR-FAR, and FRONT-BACK
orientations, is regarded as one of our experiential domains involving the external
world. The meaning of a linguistic expression is, therefore, characterized on the
basis of our bodily and spatial experience in the external world. For the relation
between negation and spatial cognition, Yamanashi (2000a, b) argues that the notion
of negation depends inherently on our subjective experience of spatial cognition, and
that the understanding of negation in natural language can be indirectly obtained
through the metaphorical interpretation of spatial and locational domains.

  Let us take the Japanese grammatical marker -*gai* as an example of the extended
usage of indirect negation. This marker, which originally means 'outside,' basically
co-occurs with expressions designating a bounded space or location, as in
*Kodomo-tati wa **oku-gai** de asonde ita* 'The children were playing outdoors' and *Basu
wa yagate **si-gai** ni deta* 'The bus soon came outside (of) the town.' In these
examples, -*gai* represents the physical domain which is outside of a given bounded
space like a house or town. In addition to this literal use of -*gai*, Yamanashi
demonstrates that -*gai* can also co-occur with non-spatial terms like *senmon* 'one's
line,' *kengen* 'authority,' and *kankatu* 'jurisdiction' and function as an indirect
negative marker, as shown in (3).

  (3) a. Kore wa   watasi no senmon-gai de aru.
          this TP   me   GN line-outside CP be-PRS
          'This is {out of my line/not in my line}.'
       b. Kare wa kengen-gai   no kooi o   sita.
          he   TP   authority-outside GN act   AC do-PST
          'He did an act in excess of his authority.'
       c. Sore wa   kare no kankatu-gai   da.
          that TP   he   GN control-outside CP
          'That is outside his control.'   (Yamanashi 2000a: 246-247)

In (3), abstract concepts such as *senmon*, *kengen*, and *kankatu* are metaphorically
construed as definite bounded spaces. When attached to these nouns, -*gai* functions
as representing the abstract domain which is outside such a bounded space.
Basically, the sentences in (3) can be paraphrased into the explicit negative sentences
in (4), respectively.

(4) a. Kore wa watasi no senmon   de wa nai.
         this TP me   GN speciality CP TP not
         'This is not my speciality.'
     b. Kare wa zibun ni kengen   ga nai kooi o   sita.
         he   TP self   DT authority NM not act AC do-PST
         'He did an act which he was not authorized to perform.'
     c. Sore wa kare no kankatu de wa nai.
         it   TP he GN control CP TP not
         'He has no control over the matter.'   (Yamanashi 2000a: 247)

Thus, the usage of -*gai* in (3) can be extended to imply the negation of the propositions such as *senmon (de aru)* '(be) one's speciality' and *kengen (ga aru)* '(having) authority,' and the indirect negative expressions in (3) involve the following spatial cognition based on the container schema (i.e., IN-OUT orientation).
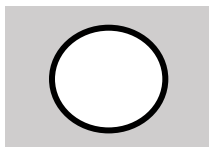

Figure 2 (Yamanashi 2000b: 160)

In the case of (3), we metaphorically understand the categories like *senmon*, *kengen*, *kankatu* as some kinds of containers, and the negation of such an abstract conception is interpreted as being outside the definite bounded container, which is illustrated by the shaded area in Figure 2.

Furthermore, we ourselves can also be interpreted as bounded spaces or containers in that we are individual entities.   Yamanashi (2000a: 250) notes that "the experience of ourselves as containers is further metaphorically conceptualized," and this can be confirmed by the following examples, which can be roughly paraphrased as in the sentences *Kanozyo ni wa ninsiki dekite inai* and *Kare wa zyoosiki-teki dewa nai*.

(5) a. Kanozyo wa ninsiki-busoku   da.
         she   TP awareness-lack   CP
         'She does not understand.'
     b. Kare wa zyoosiki   ni kakete iru.
         he   TP common sense in lacking be-PRS
         'He {is wanting in/lacks} common sense.'
     c. Sono gakusei wa seizitu-sa o   mattaku kaite ita.
         the   student TP sincerity AC quite   lack be-PST
         'There was an utter absence of sincerity in the student.'
                                             (Yamanashi 2000a: 251)

In (5), *kanozyo* 'she,' *kare* 'he,' and *sono gakusei* 'the student' as containers are

metaphorically conceptualized as some abstract domains which have some psychological or intellectual substance. The above examples with the predicates *husoku da* 'is lacking,' *kakete iru* 'is lacking,' and *kaite iru* 'is lacking in' basically express the following situation: the person in question lacks some abstract entities which he or she is expected to have, that is, *ninsiki* 'awareness,' *zyoosiki* 'common sense,' and *seizitu-sa* 'sincerity.' Therefore, the examples in (5) are regarded as a kind of indirect negative expressions, and the container schemas with the IN-OUT orientation in spatial cognition are illustrated in Figure 3.
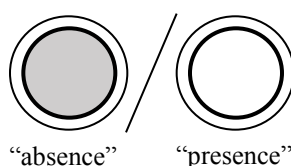

"absence"   "presence"

Figure 3 (Yamanashi 2000b: 162)

In Figure 3, the shaded part of a black circle in the left container represents the absence of abstract entities or states of affairs in a bounded space schematized as a container. The meanings of indirect negative expressions can be obtained through the metaphorical interpretation of spatial and locational domains.

3   A COGNITIVE APPROACH TO THE SUFFIX -*FREE*

In Section 2, I have presented the cognitive notions involving negation in Langacker (1991) and Yamanashi (2000a, b). Negation is basically dependent on the perceptual opposition of existence or non-existence, and spatial cognition involving the IN-OUT orientation of a container. These two conceptions are also reflected in the indirect negative expressions such as (3) and (5). In Section 3.1, I review a cognitive approach to the suffix -*free* in Arimitsu (2011), who claims that the word *N-free* expresses the non-existence of an entity (N) in a given space and that it is related to spatial cognition based on the container schemas. Then, in Section 3.2, I make a few comments on the analysis of -*free* as an overall evaluation.

3.1 An Outline of Arimitsu (2011)

Following the cognitive views by Langacker (1991) and Yamanashi (2000a, b), Arimitsu (2011) emphasizes that negation is correlated with the perceptual notions of opposition: the "presence" or "absence" of an entity in a given space, and spatial cognition of something being "inside" or "outside" such a space. The understanding

of this relation between negation and perceptual opposition is claimed to be reflected in the derivational affixes as well.   In English, some prefixes have direct negative meanings like *un-*, *in-*, *non-*, *dis-*, and *a-*, whereas some suffixes function as indirect negative markers.   In the case of *N-free* 'free from/of N,' Arimitsu argues that the suffix *-free* is used to describe the non-existence of the undesirable thing denoted by the base noun in a bounded space.

For example, the word *China-free* means that Chinese raw materials are not used in a certain product or food (i.e., the product or food safety is secured).   This word has become widely used in the United States of America since the recalls on products exported from China in 2007 (including consumer goods such as pet food and toys). The use of *China-free* aims to prove the safety of products or foods and to relieve consumers' concerns about them.   At the same time, this new word connotes the idea that "Chinese-made products or foods are dangerous," and therefore the negative meaning of *China-free* can be indirectly conveyed as lacking something that is made in China and that is bad for consumers.

Furthermore, let us have a look at the examples of *N-free* in (6).

(6)   tax-free, fee-free, sugar-free, care-free, smoke-free, barrier-free, alcohol-free

(Arimitsu 2011: 116)

A common feature among individual *-free* adjectives in (6) is that a base noun refers to something undesirable for a speaker, or something that is unwanted.   For example, the word *tax* refers to money that one must pay to the government according to their income, the cost of goods, or public services.   In the same vein, *fee* refers to an amount of money charged for a service or for the use of something.   If something is *tax-free*, we do not have to pay tax on it, and if a service is *fee-free*, we also do not have to pay for it.   The adjective *care-free*, which means 'having no worries or problems,' often collocates with nouns denoting people, way of living (such as *attitude* and *life*), and time (such as *day* and *summer*).   Besides, in the sentence *To be healthy, it is important to have a sugar-free diet* (cited from Hamawand 2007: 178), a sugar-free diet refers to a diet that does not contain sugar or contains a limited amount of sugar.   For someone who wants to be healthy, consuming too much sugar is an undesirable behavior and the entity *sugar* might be regarded as something unnecessary.   When attached to the base nouns denoting physical or abstract entities, *-free* implies that such entities are absent from a bounded individual like a person or a place.   The occurrence of *N-free*, including *China-free*, is motivated by the metaphorical interpretation of "lacking something undesirable for a speaker."

Based on these observations, *-free* is claimed to be a kind of indirect negative suffix, unlike the explicit negative markers (e.g., *not* and *no* in English, and *nai* in Japanese).   Applying Yamanashi's (2000a, b) notion of spatial cognition to the suffix *-free*, Arimitsu assumes that the negative meaning implied by *-free* is derived from our experience of spatial cognition involving the container schema illustrated in

Figure 3.   The view that -*free* is associated with the notion of "non-existence" is considered to lead to our understanding of negation.

3.2 Evaluation

A consideration of negative expressions in Arimitsu (2011) is informative for both cognitive linguists and morphologists.   Particularly interesting to researchers of morphological derivation is the examination of the suffix -*free* in terms of negation and spatial cognition.   Here, I would like to give a brief evaluation of Arimitsu's analysis by pointing out how it contributes to the study of morphological derivation and what the potential problems are.

   The most important contribution of her analysis is as follows: her view that the suffix -*free* represents an indirect negative meaning expands the possibility that other affixes denoting indirect negation can also be analyzed in the same way as -*free*.   As described earlier, it becomes obvious that negation in natural language basically depends on the opposition of existence/non-existence and the understanding of negation is closely related to spatial cognition of the IN-OUT orientation of a container. Drawing on this relation of negation and spatial cognition, Arimitsu argues that *N-free* means the non-existence of an entity denoted by the base noun in a bounded space and then the missing entity refers to something undesirable for a speaker.   As a result, she analyzes -*free* as a suffix implying a negative meaning, and the occurrence of the new word *China-free* is motivated by the nature of implicit negation in -*free*.   Such a cognitive approach to the suffix -*free* has not been offered in previous studies on derivational affixes, except for Arimitsu (2007a, b).

   Let us now turn to two potential problems of Arimitsu's cognitive approach to the suffix -*free*.   First, her research lacks a detailed description of the relation between -*free* and the schematic model shown in Figure 3.   That is, without applying this model to concrete examples, she only states that -*free* can be characterized by the image schema formed on the basis of spatial cognition of existence or non-existence. Consider the following examples, which are drawn from COCA.

   (7)   a.   Research indicates that **smoke-free** *workplaces* encourage cessation
             and reduce consumption, in addition to limiting both smokers' and
             nonsmokers' exposure to secondhand smoke.   [smoke-free
             workplaces = workplaces where smoking is not allowed]
                                                                (COCA: ACAD)
         b.   Sandler has spent a quarter-century running -- and expanding -- the
             Scholarship Foundation of St. Louis, which makes more than $3.6
             million in **interest-free** *loans* to low-income college students
             annually.   [interest-free loans = with no interest charged on loans]
                                                                (COCA: MAG)
         c.   The New York City subway is a mass-transit system that offers
             barrier-free *wheelchair access* at some stations: nine in Manhattan,

two in the Bronx, seven in Queens, and two in Brooklyn.
[barrier-free wheelchair access = an access aisle designed so that wheelchair users are not prevented from using]

(COCA: ACAD)

Based on the cognitive model shown in Figure 3, the process of semantic interpretation of *N-free X* can be explained in the following way. In (7), the entities such as workplaces, loans, and wheelchair access that are collocated with *N-free* are conceptualized as abstract bounded containers. The non-existence of smoke, interest, and barrier in each container means that workplaces, loans, and wheelchair access lack smoke, an interest, and a barrier, respectively. As a result, the cognitive model in Figure 4, which represents the case of (7a), helps us lead to an understanding of indirect negation denoted by *N-free*.

workplace   workplace

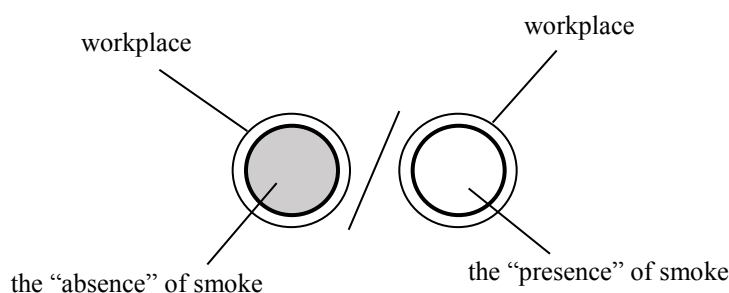the "absence" of smoke   the "presence" of smoke

Figure 4: The cognitive model of *smoke-free workplace(s)*

As illustrated in Figure 4, against the background of a positive conception (i.e., the presence of smoke in the workplaces), *smoke-free workplace(s)* expresses a negative conception that the workplace lacks smoke. This container schema based on spatial cognition works behind the usage of the suffix *-free*, and allows us to get the semantic interpretation of *smoke-free* serving as an indirect negative expression. The same holds for the cases of (7b) and (7c).

Another problem with Arimitsu's analysis is that a base noun N in *N-free* does not always refer to something undesirable for a speaker. In the cases of *N-free* in (7), *smoke* is something that is unwanted for nonsmokers, *interest* for college students who take out a loan, and *barrier* for wheelchair users. However, in the following examples, the base nouns in *N-free* do not seem to represent something negative.

(8)   a.   One button -- OnStar -- activates all the features. GPS address input
              is a fast, two-step process, and the system provides excellent
              guidance. Very good audio quality; microphone is clear and true
              when using **hands-free** *phone*.   (COCA: MAG)
       b.   Bikul Das, a postdoctoral scholar, found that when human embryonic
              stem cells were placed for 24 hours in a nearly **oxygen-free**
              environment, most changed or died and only 10 percent kept their

ability to develop into any type of cell.   (COCA: NEWS)

In (8a), *hands-free phone* refers to a phone which can be operated without using one's hands.   Both hands denoted by the base noun *hands* are parts of the human body, and it is rather unusual to regard one's hands as undesirable.   In the context of (8a), they are not necessary in operating the phone, but they are never "undesirable."   In (8b), *oxygen-free environment* means the environment lacks oxygen.   In this context, oxygen is far from "undesirable."   It is utterly required to develop stem cells into any type of cell.   These examples show that N in the form *N-free* is not necessarily restricted to entities with negative evaluation or undesirability.   Further research into the nature of N in this derivative should be carried out in the future.

4   CONCLUSION

In this paper, I described the behavior of the English suffix *-free* in terms of negation and spatial cognition.   Specifically, I first introduced Langacker's (1991) cognitive model of negation and Yamanashi's (2000a, b) notion of spatial cognition of existence or non-existence, and outlined Arimitsu's (2011) approach to the suffix *-free* based on such cognitive notions involving negation.   The main features of *-free* in the form *N-free* are summarized as follows: (i) *-free* functions as a suffix that represents an indirect negative meaning, (ii) the nature of indirect negation inherent in *-free* is closely related to the perceptual opposition of existence versus non-existence and spatial cognition of the IN-OUT orientation of a container, and thus (iii) when attached to a base noun, *-free* expresses the absence of an entity N in a bounded space and then N is something undesirable for a speaker.   From these observations, it follows that the indirect negative suffix *-free* differs in character from the markers denoting the direct negation, such as negative terms (e.g., *not* and *no*) and negative prefixes (e.g., *un-*, *in-*, *non-*, *dis-*, and *a-*).

    As mentioned in Sections 2 and 3, Arimitsu reveals the importance of the notion of spatial cognition working behind the mechanism of negation in a linguistic expression, and claims that the negative meaning of *-free* in *N-free* is derived from our experience of spatial cognition with the container schema shown in Figure 3. Although I have pointed out some potential problems with this type of analysis in Section 3.2, such a cognitive analysis leads us to a better understanding of *N-free X* (or *X is N-free*).   We need to examine the semantic nature of a base noun N in *N-free* in more detail, because N sometimes designates something "desirable" for a speaker. Therefore, I leave this issue for future research.

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Corpus of Contemporary American English (COCA) (https://corpus.byu.edu/coca/)

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DICTIONARY

Collins English Dictionary Online (*Collins*) (https://www.collinsdictionary.com/)

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