Dajare is more Flexible than Puns:
Evidence from Word Play in Japanese

Takashi Otake *

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1. Introduction

Imagine that you are listening to your favorite radio talk show on your iPod, walking around your neighborhood on a sunny morning. At first you are successfully accessing to intended words which constitute a message with high precision. You occasionally, however, encounter ambiguous words which make you perplex because the semantic information emerged from them is blurred. This “littler disturbance” typically occurs when phonologically similar words such as homophonie or near-homophonic words are contained in speech stream. This phenomenon is in fact unavoidable because spoken words are constructed by a limited number of phonemes and phonological patterns, so that a considerable number of phonologically similar words exist in spoken language. Thus, it should be considered as the inherent ambiguity of human language. This suggests that listeners may have a risk to undergo this unwanted access in spoken language.

The fact that listeners have a risk to encounter ambiguous words in spoken language may give you a negative impression. Language users, however, ingeniously exploit it in the form of word play which is called a pun1). According to OED, the most prestigious English dictionary, a pun is defined as “the use of a word in such a way as to suggest two or more meanings or different associations or the use of two or more words of the same or nearly the same sound with different meanings, so as to produce a humorous effect.” Corbett (1971: p.482) pointed out that puns can be classified into three types: (1) syllepsis (the use of a word understood differently in relation to two or more other words2), (2) paronomasia (the use of words alike in sound but different in meaning), (3) antanaclasis (the repetition of a word in two different senses). In other words, what this definition suggests is that language users can intentionally exploit ambiguity between the same or similar sound words to make people laugh.

Historically speaking, a pun has a long tradition in literary works from the ancient Greek era to the modern days. For example, it is said that Homer, a Greek epic poet, employed many puns in his works (Ogawa 1990: p.16). Paronomasia was regarded as an indispensable rhetorical skill for philosophers in delivering speech during the Roman era (Ogawa 1990: p.18). It is also well known that William Shakespeare, one of the greatest writers in English literature, is said to be a noted punster exploiting as many as 3,000 puns in his plays (Mahood 1957). In Japanese literary works, kakekotoba

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* E-Listening Laboratory (E-リスニング・ラボラトリー)
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whose function is similar to that of a pun in English was exploited as an important rhetorical skill in creating Japanese poetry (e.g., Man'yoshū) as early as eighth century. A pun also plays a vital role in narrative art in modern days to produce a humorous effect in many oral cultures. Japanese is no exception. In fact, Japanese has a very rich and long tradition to exploit it as a favorite trick for the purpose of entertaining people. For example, Rakugo, traditional comic story telling, and Manzai, a comic dialogue art, are among those, which exploit a humorous twist called ochi (Morioka and Sasaki 1986). All these facts suggest that punning is a matter of common practice in human languages.

Although puns in literary works and narrative arts described above are prepared in advance as a refined artistic skill, language users frequently experience improvised puns without any anticipation while chatting with a friend over tea or even having business talks. A question arises. Why does this happen in spoken language? How can we account for the mechanism of improvised puns? Although there are a number of studies on puns in Japanese in literary works (e.g., Odajima, 2000), there is little study which has attempted to explore answers to the questions except a few studies (e.g., Otake and Cutler 2001, Cutler and Otake 2001, Kawahara and Shinohara 2009). Thus, we attempted to explore such problems with respect to the concurrent multiple word activation model which is proposed in spoken-word recognition in Psycholinguistics (e.g., McClelland and Elman 1986, Norris 1994). We think that this approach is promising because the study of spoken-word recognition deals with the mechanism of the processing words in spontaneous speech.

The principal assumption of this model is that all sorts of words are expected to be activated in mental lexicon as long as they are matched with an auditory input (e.g., McQueen, Norris and Cutler 1994). As we will explain it more in detail in the following section, according to this model, both the words intended by the speaker and the unintended words embedded in spoken words are included among activated words. If the fundamental nature of improvised puns is characterized by the basic mechanism of spoken-word recognition, there is a possibility that similar types of words may be observed in puns. When Otake and Cutler (2001) examined a study of English puns which analyzed well-known database on puns (Lagerquist 1981), they found that no evidence was reported in it. However, when they analyzed a database of Japanese pun, called dajare, they found that a considerable number of embedded words were exploited as a strategy as well as homophones and near-homophones, although they did not go into the detailed analysis of these words because their main concern in the study was to investigate the mechanism of mutations (near-homophones). Thus, in the present study we attempted to investigate what constitutes embedded words and how these words are exploited in dajare by analyzing a new set of dajare database on the website. In the following sections we will first review the basic concept of the concurrent multiple word activation model, and then present both the definition and the examples, and the analysis of dajare database. In the final section we will discuss the relevant issues on puns and spoken-word recognition.

2. Concurrent multiple word activation model

What is the concurrent multiple word activation model? This is the well-accepted model in the study of spoken-word recognition in Psycholinguistics today. The basic assumption for the model is that human listeners recognize a target word through the process of competition among activated multiple candidate words rather than recognizing a target word directly from an auditory signal (see more detail in McClelland and Elman 1986, Norris 1994). There is ample experimental evidence to support for the concurrent activation of multiple lexical candidates (e.g., Connie, Blasko and Wang 1994, McQueen et al. 1994, Tabossi, Burani and Scott 1995, Zwitserlood 1989), for activation of word candidates on the basis of partial and imperfect evidence (e.g., Connie et al. 1994, Goldlinger, Luce, Pisoni and Marcario 1992, Radeau, Morais and Segui 1995, Sloiazcek, Nusbaum and Pisoni 1987) and for continuous modulation of activation by early evidence of upcoming phonetic information (Marslen-Wilson and Warren 1994, McQueen, Norris and Cutler 1999).

The most striking characteristic of the model is that it is assumed that all sorts of embedded words which are fully or partially matched with an auditory signal could be activated in mental lexicon (McQueen et al. 1994). In order to provide a better understanding of the mechanism of this model, we overview two kinds of simulations in English in the literature which are directly relevant to our study.

2.1 Frauenfelder and Peeters (1990)

Frauenfelder and Peeters (1990) presented various types of simulations on the concurrent multiple word activation in English based upon the TRACE model proposed by McClelland and Elman (1986). The main goal of presenting the simulations in the study was to
show how lexical items were interactively activated over time in mental lexicon. In this study they focused on the interaction between two types of words: targets and competitors. Targets refer to the word that corresponds to the entire auditory input, while competitors refer to words that are partially matched with the auditory input. Here we illustrate one of the simulations introduced in the study (p.67). Fig. 1 shows how a target word (carpet) and a competitor word (car) are interactively activated by the auditory input of carpet over time. The horizontal axis indicates the phonemic input along the time domain, while the vertical axis indicates the activation level. When the auditory input for carpet is provided, the activation level for the target (carpet) starts increasing from the second segment. Notice that the activation level for the competitor (car) also starts increasing from the same position. This is because the initial portion of the phonemic representation of these two words is matched with the initial portion of the auditory input. When the auditory input is provided further, the activation level for carpet continues to increase, while that of car decreases after the sixth segment because the auditory input is no longer matched with the phonemic representation of this word. What this simulation suggests is that both the target (carpet) and the embedded competitor (car) are simultaneously activated together because both words are matched with the auditory input.

Now let us summarize the implications of the two simulations. If a shorter word is embedded within a longer word (a carrier word), the embedded word and the carrier word are simultaneously activated. But the embedded word disappears as soon as further auditory input is available. On the other hand, the longer word does not disappear, but survive in the reverse case. This suggests that a list of activated words is depended upon the relationship between the embedded word and the carrier word.

2.2 Otake and Cutler (2001)

Otake and Cutler (2001) demonstrated a simulation of the concurrent multiple word activation in a more concrete way. They attempted to present how embedded words were activated using the phrase first acre [fɜːrst ˈeɪkər] as an auditory input. They claimed that fur, stay, stake and take (the embedded words) as well as first and acre (the intended words) would be activated because all of them are embedded within the phrase. For example, fur (/fɜːr/) is embedded within first (/fɜːrst/) (the underlined portion indicates the embedded word). Stay (/steɪ/) is embedded in the middle of the phrase (/fɜːrst/ˈeɪkər/) (the underlined portion indicates stay). The same can be said for stake (/ˈfɜːrst/ˈeɪkər/) and take (/ˈfɜːrst/ˈeɪkər/) (the underlined portion indicates stake and take, respectively). Notice that these examples
clearly show that the embedded words within a word or even between words across a word boundary could be activated. Furthermore, they demonstrated that further (/fərər/) and fervent (/fɜrvənt/), neither of them are embedded within the phrase, could be momentarily activated because the initial portion of these two words are matched with the auditory signal of first [fɜrst] (underlined portion is matched). Notice that the former cases are fully embedded within the phrase, while the latter cases are not embedded within the first word nor the entire phrase. This suggests that any words are likely to be activated in mental lexicon as long as they are shared with an auditory input.

2.3 Summary of the simulations
Now let us summarize what we have observed in the two kinds of the simulations. They suggest that under a normal speech communication, given the auditory input, two types of words may be activated in mental lexicon. The first type is the intended words which are associated with the message transmitted by a speaker. The second type is the unintended words which are not associated with the message. These two types of words are activated together in mental lexicon.

3. What is dajare?
Let us now turn our attention to dajare. We will look at the definition of dajare, classification of dajare and the relationship between the model and dajare in order.

3.1 Definition
Dajare is defined as a poor or bad pun according to the most major Japanese dictionaries5). The word consists of two morphemes, da ‘poor or bad’ and share ‘a pun.’ So, the definition obviously implies that there are two types of puns in Japanese: share (a pun) and dajare (a degraded pun). Then, what is share? According to Kojien, it is associated with several meanings and one of them refers to witty remarks which are expressed by the same or similar sounding words6). Thus, this definition seems to suggest that it is almost equivalent to a pun in English, as we have seen in Introduction.

According to Suzuki (1985: p.1029), the word share was originally derived from shuuka ‘an excellent poem’ which used to be exploited as a kind of a pun after Kamakura period. And the word dajare was said to be first appeared in the literature and became popular among laymen during the Edo period (Suzuki 1985, p.1034). This brief historical observation clearly suggests that share had developed into dajare in course of time during the Edo period. In order to understand share in a more precise way, however, it may be helpful to consider a synonymic word jiguchi, because it is interchangeably used for share. Jiguchi is defined such that new phrases or expressions are created by changing some sounds of common phrases or proverbs. Given this fact, share may be defined in a more conclusive way. That is, it refers to witty remarks which are expressed by using the same or similar sounding words by manipulating some sounds of common phrases or proverbs, so as to produce a humorous effect.

Then, what is the difference between share and dajare? Unfortunately, there seems to be no clear-cut distinction between them as they are often interchangeably used today. We claim, however, that there are some noticeable differences between them. First, dajare could be exploited without referring to any common phrases or proverbs. It simply makes a reference to ordinary words and phrases. Look at (1).

(1) kono sensu wa sensu ga ii.
This folding fan TOP class SUBJ good
Gloss: This folding fan has class.

As can be seen in (1), sense appears twice in this dajare. The former functions as a reference word, while the latter works as a target word. It is obvious that the relationship between the two words was simply compared without referring any common phrases and proverbs. However, this condition alone does not constitute the requirement for dajare because a similar example can be easily found in an English pun, as shown in (2).

(2) Your argument is sound, nothing but sound.
This is a pun which was made by Benjamin Franklin. As can be seen, sound appears twice in it. Obviously, it has nothing to do with the common phrases or proverbs. Therefore, ordinary words and phrases can be used both in dajare as well as share.

Second, dajare seems to be exploited such that it could noticeably be distorted from a reference word significantly. Since homophones are by definition phonologically identical words, no distortion is permissible. Thus, they are equally exploited in share and dajare. Near-homophones, however, could be distorted in various ways. Look at (3). The target word in (3) is actually distorted at two segmental positions as underlined portions indicate.
(3) Shinrensai wa chingensai.
A new serial TOP bok choy
Gloss: A new serial (article) is about bok choy.

Thus, we assume that **dajare** could be far less constrained than **share** such that the relationship between a reference word and a target word could be maximally distorted.

Finally, **dajare** could be exploited without referring to any witty remarks. Recall the definition of **share** again. The original definition of **share** has to include witty remarks. Witty remarks are the definite requirement for **share**. If this interpretation is correct, **dajare** could be regarded as a form of language game rather than a form of wordplay because **dajare** players seem to enjoy simply finding a new association between a reference word and a target word.

### 3.2 Classification of **dajare**

Since we have established the definition, let us look at examples. In Introduction we looked at the definition and the classification of English puns. By definition, there were only two types in puns, homophonic pun (antanaiclass) and near-homophonic pun (paronomasia). However, Otake and Cutler’s (2001) assumed that there were three types of **dajare**, homophonic **dajare**, near-homophonic **dajare** and embedded **dajare**. In this section we look examples of these three types of **dajare** below.

First look at homophonic **dajare**. Look at (4a) and (4b). Subscript R and T refer to a reference word and a target word, respectively. As can be seen, the underlined two words are identical so that they are homophonic **dajare**. Homophonic **dajare** is equivalent to homophonic pun in English, because no manipulation of phonological representations is made.

**Homophonic **dajare****

(a) [**Koosoku**]$_R$ ni [**koosoku**]$_T$ sareru.
   school rules by bind PASS
   Gloss: (We) are bound by school rules

(b) Kono [**sensu**]$_R$ wa [**sensu**]$_T$ ga
   this folding fan TOP class SUB
   ii ne
   good PART
   Gloss: This folding fan has class

Now let us look at near-homophonic **dajare**. Near-homophonic **dajare** is almost equivalent to near-homophonic puns in English. Near-homophonic **dajare** is more complicated than an English counterpart because there are two ways to manipulate phonological representations. One is segments and the other is duration. There are three ways to manipulate segments of word forms in Japanese. Otake and Cutler’s (2001) analysis includes three types of classification for segmental manipulation: (1) **C-change** (C-change refers here to consonantal manipulation), (2) **V-change** (V-change refers to vocalic manipulation) and (3) **M-change** (M-change refers to moraic manipulation). Look at (5a), (5b) and (5c). (5a) indicates a single consonant manipulation word initially. (5b) indicates a single vowel manipulation word finally. (5c) indicates a single mora manipulation word initially. Thus, conceptually, the segmental manipulation of near-homophonic **dajare** is almost the same as the one in English.

**Near-homophonic **dajare** (segmental manipulation)**

(a) **C-change**

[**Baiku**]$_R$ no [**daiku**]$_T$.
   A bike GEN carpenter
   Gloss: Bike’s carpenter

(b) **V-change**

[**Daisuke**]$_R$ [**daisuki**]$_T$.
   Daisuke 1 like
   Gloss: I like Daisuke.

(c) **M-change**

[**Hashimoto**]$_R$ [**ashimoto**]$_T$ ga abunai
   Hashimoto your step SUB dangerous
   Gloss: Hashimoto, watch your step.

Furthermore, there are two ways to manipulate durational properties. Look at (6a) and (6b). (6a) indicates a manipulation of a consonantal duration. (6b) indicates a manipulation of a vowel duration. Notice that durational properties can alter meanings of words in Japanese by both lengthening and shortening. Thus, there are in fact four alternative choices. (6a) indicates an example of lengthening a consonant duration, while (6b) indicates an example of shortening a vowel duration.

**Near-homophonic **dajare** (durational manipulation)**

(a) **Cd-change**

[**haiteku**]$_R$ no sekai ni [**haiteku**]$_T$.
   high tech GEN world to enter
   Gloss: Get into the world of high tech

(b) **Vd-change**

[**Herushi**]$_R$ ni taijuu ga [**herushi**]$_T$.
   healthy with weight SUBJ reduce
   Gloss: Weight decreases healthily
Thus far, we have seen homophonic and near-homophonic dajare. These two types of dajare may be easily understood except the durational property because the basic system is the same as the one in English puns. The analysis in Otake and Cutler (2001) revealed that homophonic and near-homophonic dajare accounted for only 30% and that 70% of dajare belonged to embeddings. Look at (7a), (7b) and (7c). In (7a) sake as a free morpheme appears only once. However, there is another sake which is hidden within sakenda, as an underlined portion indicates. Look at (7b). Unlike (7a), komu is hidden within the first word, while the second one is a free morpheme (it is a monomorpheme word). Look at (7c). Unlike the previous two cases, baiku is hidden within two words across a word boundary.

(7) Embedded dajare

(a) [Sake]ᵣ ga [[sake]nda]ᵣ
   salmon SUBJ shouted
   Gloss: The salmon shouted

(b) [Akomu]ᵣ wa [komu]ᵣ
   Company’s name TOP crowded
   Gloss: Acorn is crowded

(c) [Baiku]ᵣ wa gasorin wo
   motor bike TOP gas OBJ
   $[ba]$ [ku]ᵣ, twice consume
   Gloss: (This) motor bike consumes twice as much as gas.

As we have seen above, three types of dajare are included in dajare. It is very obvious that the last type is considerably different from the first two types if the definition of dajare is based upon puns in English. The important fact is the last type exceeds the combination of the first two types. It seems that the concurrent multiple word activation model may give us a plausible explanation.

3.3 Concurrent multiple word activation model and dajare

Now we have seen the examples of the three types of dajare in Japanese. Let us turn our attention to how dajare can be explained by the concurrent multiple word activation model. If dajare is considered to be a pun as defined by Corbet (1971), then the examples in (7) contradict itself because they are neither homophonie pun nor near-homophonic puns. If so, how can we account for them? We argue that the simulations dealt in the section 2.3 may provide us with a possible solution for it. Let us look at how the simulations can explain these cases. Look at (7a) again. We assume that a reference word generates an auditory input. Given the auditory input, both sake and sakenda should be activated. Notice that the reference word is shorter than the target word. As we have seen in section 2.1, if the target word is shorter than the competitor word, the competitor word continues increasing toward the end of the word. Now look at (7b) again. Notice that the reference word is longer than the target word. As shown in section 2.1, if the target word is longer than the competitor word, the competitor disappears as soon as the auditory input is not available. These two simulations suggest both types of embedded words can be explained by the simulations which we have seen in section 2.3.

Interestingly, the simulations may explain both homophonic and near-homophonic dajare in the same way. Let us look at (1a) again. Notice that the reference word and the target word is identical. Thus, if the auditory input is given, both the reference word and the target word continue to rise in exactly the same way. Let us look at (2b). Notice that the target word differs from the reference word word-finally. Thus, the activation level for the target should be decreased. However, the rest should be the same as (7c).

Now we have seen how the simulations which are based upon the concurrent multiple word activation model can account for all examples in dajare. Let us now turn our attention to the analysis of dajare database. Our main motivation for the analysis is to find out evidence for embedded dajare in reference to homophonic and near-homophonic dajare. If the distribution of the embedded dajare shows a small percentage, then, it should be regarded as an exception. On the other hand, if it exceeds them, it has to be treated as one of the strategies in dajare.

4. Analysis of dajare

In Otake and Cutler (2001), a dajare database which contained 1,308 cases was analyzed. When we attempted to access the database again to analyze, it was found that the website was no longer accessible. Thus, we decided to analyze a new dajare database, which contained as many as 5,490 cases. In Otake and Cutler (2001), the whole data were simply classified into three categories after excluding irrelevant cases and some adjustments. Thus, it is hard to say that the data were well controlled. In the present study, however, we have selected only lexical items in order to make the analysis more accurate. The whole data were
analyzed on the basis of the following arbitrarily defined criteria.

(a) Homophonic dajare
Homophonic dajare is such that a reference word is duplicated as a target word. Thus, both words have the identical phonological form.

(b) Near-homophonic dajare
Near-homophonic dajare is such that a reference word is modified by changing single segmental or durational property. Thus, a reference word and a target word are phonologically very similar.

(c) Embedded dajare
Embedded dajare is such that either a reference word is embedded in a target word (this is called Type I) or a target word is embedded in a reference word (this is called Type II). This category also includes reanalysis of segmentation (this is called Type III).

4.1 Results
Of 5,490 cases, 1,459 cases were satisfied with the criteria. The frequency of dajare in three types was 428 cases for homophonic dajare, 318 cases for near-homophonic dajare and 713 cases for embedded dajare, respectively. The distribution of three types of dajare is shown in Fig. 3.

The whole pattern was very similar to the one in Otake and Cutler (2001). When we applied a statistical analysis, it showed that this difference was highly significant ($\chi^2(2)=170.905$, $p<0.0001$). This suggests that embedded dajare was most frequently exploited. Embedded dajare was further analyzed according to the three strategies (Type I, Type II and Type III). Fig. 4 shows the frequency of the three types of strategies in embedded dajare.

The statistical analysis showed that this difference was also highly significant ($\chi^2(2)=167.641$, $p<0.0001$). As can be seen, Type I was the most frequently used.

5. General Discussion
We have analyzed the dajare database with respect to the concurrent multiple word activation model which is proposed in spoken-word recognition in Psycholinguistics. There were two important findings in this study. First, it was found that three types of dajare are used: (1) homophonic dajare, (2) near-homophonic dajare and (3) embedded dajare. Among these three types, the third category was most frequently used. Second, it was also found that there were three types of strategies in embedded dajare: (1) type I, (2) type II and (3) type III. Among these three strategies, Type I was most frequently used. In this general discussion, we discuss the implication of these findings as well as the basic issues on punning.

First we discuss the definition of puns. As we have seen in Introduction, the definition of puns in English was made in reference to the word form of the reference word and the target word. The process employed here is that both word forms are compared with respect to the phonological representations. This process is represented in (8) and (9). In (8) both X and Y are identical, while in (9) X and Y are nearly identical. The same kind of process is widely used in various languages, so that it should be a universal definition of punning. Since the word form of the relevant two words is compared, let us call it a word form-based definition.

(8) Homophonic dajare

\[ \text{Homophonic} \]

(Where X=Y: X is a reference word and Y is a target word)
(9) Near-homophonic *dajare*  

\[ X \rightarrow Y \]  
(Where \( X \approx Y \): \( X \) is a reference word and \( Y \) is a target word)

However, as we have found in this study, another type of definition seems to be involved in *dajare*. Look at (10) and (11) below. In (10) \( Y \) is included in \( X \), so that this relationship is connotative. In (11) \( X \) is included in \( Y \), so that this relationship is denotative. As can be seen in (10) and (11), it is obvious that the relationship between two words is not based upon the phonological representations. They are based upon connotative-denotative relationship between the two words.

(10) **Embedded *dajare* (Type I)**  

\[ X \rightarrow Y \]  
(Where \( X > Y \): \( X \) is a reference word and \( Y \) is a target word)

(11) **Embedded *dajare* (Type II)**  

\[ X \rightarrow Y \]  
(Where \( X < Y \): \( X \) is a reference word and \( Y \) is a target word)

The interesting point here is that this relationship may be extended to even homophonic *dajare* in (8) because the length between a reference word and a target word is identical. If this interpretation is correct, near-homophonic *dajare* is the only one which is evaluated by phonological representations.

Second, we discuss embedded *dajare* and segmentation. In the analysis of *dajare*, the frequency of embedded *dajare* exceeded homophonic *dajare*, suggesting that it is considered to be more popular strategy in it. Does this suggest it is unique to Japanese punning? When Otake and Cutler (2001) analyzed Lagerquist’ data, no embedded puns were found. Does this mean that English puns never exploit embedded puns? One possible problem for the data was that the database was based upon literary works. Punning in literary works cannot be considered as evidence because it is an artistic skill based upon careful consideration. Thus, it may be too early to conclude at the moment that embedded puns do not exist in English until new data is available from continuous speech.

Then how can we account for embedded *dajare* in Japanese? In order to answer for this question, we need to consider the problem of segmentation. During the past two decades or so, the study of speech segmentation has progressed remarkably. One important outcome for Japanese speech segmentation is that Japanese speech is segmented by a mora-based speech segmentation strategy (Otate, Hatano, Cuter and Mehler 1993, Cutler and Otate 1994, Cutler and Otate 2001, McQueen, Otate and Cutler 2001). This finding is highly correlated with the structure of Japanese words. According to Otake (1990), most of morae of Japanese have the structure of CV, and CV is also by far the most common mora structure in natural Japanese speech. In Japanese each mora could be a free morpheme. For example, *sakana* ‘fish’ is a three mora word. If this word is segmented after each mora boundary, three independent one mora words emerge, sa ‘difference’, ka ‘mosquito’, and na ‘name’. If a new segmentation point is placed after the second mora, then *saka* ‘slope’ and *na* ‘name’ emerge. If another new segmentation point is placed after the first mora, *kana* ‘kana orthography’ and *sa* ‘difference’ emerge. What these facts indicate is that since the word boundary is so predictable that Japanese language users may be able to compare a reference word and a target word very easily. Thus, the connotative-denotative relationship can be easily established in Japanese *dajare*.

Third, we discuss a possibility of embedded *dajare* in other languages. As we discussed in the previous paragraph, we argued that the occurrence of embedded *dajare* was depended upon the word structure and the speech segmentation strategy. Then, is simple word structure a key to predict the occurrence of embedded punning? If the syllable structure alone determines the occurrence of embedded punning, then languages like Maori, Hawaiian and Telugu must have it. Telugu is said to be a language which employs both syllables and morae as a segmentation strategy (Martin, Otate and Cutler 2006). Does this imply that embedded pun is exploited in Telugu?

Our prediction is that the occurrence of embedded pun may be highly involved with the tradition of poetry. *Kakekotoba*, which is basically based on homophones, plays a very important role in Japanese poetry making since the earliest period of time. However, according to Kobayashi (2001), *kakekotoba* was not limited to homophones. Look at (12). This is a part of well-known poem from *Kokinshuu* which was compiled during tenth century.

(12) *furuni nagame* .... ?
There are two words which are assigned double meanings in (12). *Furu* designates (a) old and (b) rain, and *naga me* designates (a) to sing to oneself and (b) long rain. This type of *kakekotoba* was considered to be the central use. However, there was another type which violated homophonic usage. Look at (13). This is also a part of poem from *Kokinshu*.

(13) … ([toko]natsu) …

In this case, instead of assigning double meanings to the whole word *tokonatsu* ‘everlasting summer’, two separate meanings are assigned to two parts of this word. One meaning is *toko* ‘a bed’ and the other meaning is *tokonatsu* ‘everlasting summer’. In other words, the first word *toko* is an embedded word in *tokonatsu*. The important implication here is that the concept of embedding must have been already recognized by Japanese poetry makers as early as tenth century! Thus, this kind of poetry tradition must have enhanced the sensitivity of the mora-based segmentation strategy in Japanese. If languages like Maro, Hawaiian and Telugu have this kind of tradition, these language may have embedded punning. This has to be investigated further.

Finally, we discuss the definition of *dajare* again at the end of discussion. Thus far we have discussed *dajare* on the basis of *dajare* database. It was assumed that all the data were collected from on-line speech event. In order to confirm the findings in the present study, strictly speaking it is strongly recommended to collect the data from real conversational settings. We are now in the middle of collecting such data. The data collection is extremely difficult because it is almost impossible to predict when *dajare* occurs. One thing which we have noticed is that embedded *dajare* is certainly exploited in real conversation settings. If it is so, online *dajare* data may provide us with more valuable data on the mechanism of spoken-word recognition.

6. Conclusion

In the present study, we attempted to investigate a Japanese pun called *dajare* with respect to the concurrent multiple word activation model in spoken-word recognition in Psycholinguistics. The central question which we investigated was whether embedded words which play an important role in the concurrent multiple word activation model could be observed in *dajare*. The results of the analysis of *dajare* database revealed that both connotative and denotative types of embedded *dajare* were found. This suggests that Japanese punning process includes three types of *dajare*: (1) homophonic (syllepsis) *dajare*, (2) near-homophonic (paronomasia) *dajare* and (3) embedded *dajare*. This implies that Japanese punning process is richer than that of other puns like English.

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Notes

1) Since words can be represented by both speech sounds and orthographic letters, it is exploited both in literary and oral cultures.
2) (1) is not involved with the manipulation of sound forms, so that it is excluded in the present study.
3) The same type of simulation is presented in Shortlist model (See Norris 1994).
4) The original simulation was first introduced in Cutler (1999).
7) This example was adapted from *Kokinshu*. 蓮をたに 揮えるじぞと思ふ咲きより味とわが寝るとこなつの花（古今集）
8) This example was adapted from *Kokinshu*. 花の色はうつりにけりいたづらに我が身よふるながぬせ しまに（古今集）

References

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