

# Error Analysis of Japanese University Learners' Productive Affix Usage

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## Abstract

This research aimed to analyze errors observed among responses in a productive affix test by Japanese university learners of English with the hope of providing empirical data to make the teaching of affixes more fruitful. A total of 6640 responses from 83 participants were analyzed, and the results helped us identify seven types of errors. Among such errors, a large percentage of null responses indicated a serious lack of affix knowledge among Japanese university learners. Further, a different distribution of error types between prefix and suffix was observed. The possible cause of such a difference is discussed.

**Keywords** : productive affix knowledge, erroneous affix usage, affix testing

## 1. Introduction

Learning vocabulary is a time-consuming and daunting task for learners of English due to its sheer volume. However, learners are not entirely without help, and one source of help is derived from affixes. As affixes combine with stem words on a one-to-many basis, knowing even one affix could make many unknown affixed words known, provided that stem words are already known. Examples of such affixes are found in White, Sowell, and Yanagihara (1989) where 58% of the prefix usage was accounted for by four affixes (*un-*, *re-*, *in-*, and *dis-*).

By analyzing words in school English, Nagy and Anderson (1984) estimated that, on average, one to three words were derived from each stem word through affixation. Further, Bauer and Nation (1993) assume that affixed words should be understandable if stem words are known by

learners. That is, affixes are considered to bridge the gap in one's vocabulary. Such an idea is also supported by significant correlations between vocabulary size and affix knowledge (Aizawa, Iso, & Nadasdy, 2019; Mochizuki & Aizawa, 2000; Schmitt & Meara, 1997).

Unfortunately, in Japanese English education settings, the importance of affix knowledge seems to be disregarded, as the number of affixes found in textbooks suggests (Morita, Uchida, & Takahashi, 2019). Considering the frequency and the usefulness of affixes, this could be a deficit to English learners in Japan. There is a need to teach affixes systematically so that learners enjoy the benefit of them. Despite the studies that inform us of the difficulty level of various affixes (Aizawa et al., 2019; Mochizuki & Aizawa, 2000; Sasao & Webb, 2017), there is still a severe paucity of information that proves to be helpful in teaching affixes.

This study, therefore, aims to provide empirical

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data on errors observed in productive affix usage among Japanese university students. Such information can be useful in discovering affixes that need to be taught with extra care. For this purpose, the following research questions were asked:

1. What types of errors do Japanese university learners make while using affix knowledge productively?
2. Are there any differences in error types between prefixes and suffixes?
3. Are there particular types of errors prevalent across affixes?

## 2. Method

### Participants

The participants were 83 Japanese university students. All of them had studied English for at least six years in junior high and high school. A casual inquiry confirmed that they knew what affixes were and how they functioned.

The average TOEIC score of the participants was 405.06. Although the score ranged from 225.00 to 715.00, the majority of the participants were between 300.00 and 500.00, which roughly translates to A2 to B1 on the CEFR scale.

### Materials

The participants' affix data was collected using an online productive affix test (Iso, Aizawa, & Nadasdy, 2021). The test was HTML and form-based, and the participants were required to type in an appropriate stem word for a given affix. Each affix appeared twice during the test, which was shown to the participants consecutively (Figure 1). This was done to make sure that the participants did not provide the same stem words twice to an affix unintentionally.

One may argue that erroneous usage of affixes should be analyzed using actual writing samples as in Kalee, Rasyid, and Muliastuti (2018).

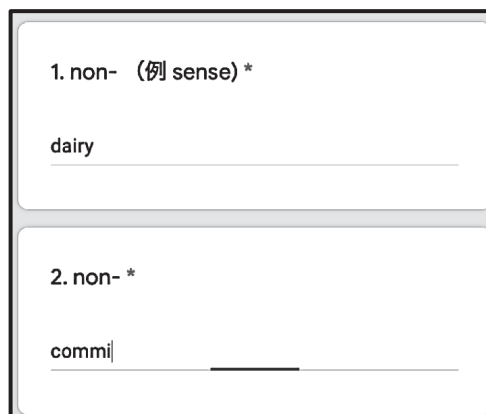


Figure 1. A screen shot of the productive affix test.

Considering the proficiency level of the participants, however, the number of affix use and errors was thought to be limited. Further, the participants with higher proficiency could simply employ strategies such as avoidance and circumlocution in situations where affixes could be used. Therefore, it was decided that the data should be collected through a forced production to ensure a large sample.

The affixes that appeared in the test were 20 prefixes (*anti-*, *bi-*, *counter-*, *dis-*, *en-*, *ex-<sup>BEFORE</sup>*, *ex-<sup>OUT</sup>*, *fore-*, *in-*, *inter-*, *mis-*, *multi-*, *non-*, *over-*, *post-*, *pre-*, *re-*, *semi-*, *sub-*, *un-*) and 20 suffixes (*-able*, *-al<sup>ADJ</sup>*, *-al<sup>N</sup>*, *-ant*, *-ation*, *-en<sup>V</sup>*, *-er*, *-ful*, *-ish*, *-ism*, *-ist*, *-ity*, *-ize*, *-less*, *-ly*, *-ment*, *-ness*, *-ous*, *-ship*, *-y*). Affixes with multiple meanings or functions were indicated with superscripts. In the test program, such affixes were made distinguishable by an example answer provided with each affix in the test.

### Analyses

Due to the lack of previous research on affix errors made by Japanese learners of English, a preliminary analysis was conducted on the first 5% of the data from each affix. This initial analysis revealed the following types of errors:

- **mismatch:** A combination of a correctly spelled affix and a stem word that is not

listed in either the New Oxford American Dictionary or the Wisdom English-Japanese Dictionary (e.g., \*nonstyle).

- **nonword**: A combination of a correctly spelled affix and a misspelled stem (e.g., \*nonstless).
- **nonaffix**: A word that shares the same letter strings as existing affixes but is not an affixed word (e.g., instead). This is caused by deceptive transparency (Laufer, 1997).
- **loanword**: A combination of existing affix and a stem that does not exist in English but does in Japanese (e.g., \*antibarrier).
- **meaning**: A semantic or functional misuse of an affix (e.g., \*wooden<sup>1</sup>).
- **spelling**: A misspelled affixed word that is a correct answer if spelled correctly (e.g., \*unbelievable).

After the categorization and the criteria were agreed upon among the current authors, each response made by the participants was labeled accordingly. Further, null responses were labeled as **blank**, and were also treated as mistakes.

### 3. Results

The first research question was concerned with the types of errors observed in the responses to the productive affix test. Upon completion of the labeling, it was found that the error types identified during the preliminary analysis were extensive enough, so adding further categories was not necessary. Table 1 shows the descriptive statistics.

Including the blanks, the total number of responses was 6640. Among the errors, the most noticeable type of error was blank, which accounted for more than 40% of all the responses. Aside from **blanks**, the most frequent errors turned out to be other types of **nonaffix** errors, namely, **mismatch**, **spelling**, **meaning**, **nonword**, and **loanword**. These were limited in number, accounting for about 16% of all responses.

**Table 1. Types and Numbers of Errors**

Types	Raw Count	Percentage
Nonaffix	730	10.99
Mismatch	374	5.63
Spelling	253	3.81
Meaning	187	2.82
Nonword	165	2.48
Loanword	121	1.82
Blank	2850	42.92
Correct	1960	29.52
Total	6640	100

The second research question focused on the differences between prefixes and suffixes in terms of error types. The results of the raw count and chi-squared test are shown in Table 2. According to the statistical analysis, significant differences were observed in all the error types and correct responses. Errors such as **nonaffix**, **mismatch**, **meaning**, **nonword**, and **loanword** were observed significantly more frequently among prefixes, while occurrences of spelling and blank among suffixes outnumbered the counterpart. Further, judging from the chi-squared test, it can be said that suffixes were easier for the current participants.

**Table 2. Comparison of Error Types**

	Prefix	Suffix	$\chi^2 (p < .01)$
Nonaffix	566	164	221.38
Mismatch	228	146	17.98
Spelling	88	165	23.44
Meaning	165	22	109.35
Nonword	101	64	8.30
Loanword	88	33	25.00
Blank	1226	1624	60.34
Correct	858	1102	30.38
Total	3320	3320	

The third research question asked if there were particular error types frequently seen across affixes. Table 3 and Table 4 show the error counts

Table 3. Frequent error groups among prefixes

	nonaffix	mismatch	spelling	meaning	nonword	loanword	blank	correct	$\chi^2$ (p. < .01)
non-	3	27	1	0	2	15	86	32	268.43
un-	15	15	15	0	1	1	22	97	343.40
in-	62	9	5	11	27	0	41	11	152.17
anti-	3	5	3	0	12	10	103	30	402.48
en-	25	3	6	33	7	0	54	38	131.25
fore-	13	18	0	0	2	0	107	26	442.29
inter-	29	14	6	0	6	0	33	78	233.13
mis-	49	13	3	0	4	0	54	43	188.70
post-	19	14	0	41	0	1	80	11	256.17
semi-	2	14	10	0	2	7	69	62	265.71
sub-	48	15	10	0	1	13	35	44	121.23
pre-	59	6	0	0	9	2	50	40	205.18
re-	41	4	9	1	1	0	6	104	442.77
dis-	38	16	5	2	6	1	52	46	151.40
ex-BEFORE	60	6	1	13	5	1	74	6	284.31
ex-OUT	60	8	5	0	2	0	70	21	269.37
bi-	24	0	4	0	8	0	110	20	468.02
multi-	12	9	1	0	3	24	64	53	205.86
over-	1	15	1	64	2	8	19	56	214.15
counter-	3	17	3	0	1	5	97	40	380.60

for each affix along with the results of chi-squared tests. For each affix, the results of the chi-squared test were found to be significant ( $p < .01$ ). Further, Ryan's multiple comparisons ( $p < .05$ ) showed that certain types of errors outnumbered others. Such results were indicated in Table 3 and Table 4 in two levels of shades where the most frequent error groups are in black cells and the second most frequent groups are in gray. Note that there were significant differences between the groups.

As expected from the answer to the first

research question, **blank** was the most or second most frequent type of error among most of the prefixes and suffixes. The exceptions were *re-* and *-er* where the number of null responses was considerably limited.

Aside from the null responses, **nonaffix** was the most frequent error type in eight of the 20 prefixes (*in-*, *en-*, *mis-*, *sub-*, *pre-*, *dis-*, *ex*<sup>-BEFORE</sup>, and *ex*<sup>-OUT</sup>) and the second most frequent in four suffixes (*-able*, *-a*<sup>ADJ</sup>, *-a*<sup>N</sup>, and *-ation*). Furthermore, semantic misuse of the prefix *en-* and *over-* was observed significantly more

Table 4. Frequent error groups among suffixes

	nonaffix	mismatch	spelling	meaning	nonword	loanword	blank	correct	$\chi^2$ (p. < .01)
-able	22	5	14	0	3	0	61	61	227.06
-al <sup>ADJ</sup>	30	4	2	1	1	0	79	49	294.92
-al <sup>N</sup>	14	5	0	21	2	0	113	11	487.30
-ant	10	5	8	0	10	0	103	30	402.58
-ation	3	4	11	0	4	0	84	60	355.35
-en	7	12	4	0	4	0	109	30	460.80
-er	5	9	15	0	2	0	17	118	535.11
-ful	0	9	15	0	3	3	49	87	330.10
-ish	8	8	4	0	0	27	89	30	301.18
-ism	3	8	10	0	11	0	91	43	336.36
-ist	4	12	14	0	2	0	72	62	286.43
-ity	6	3	11	0	3	0	89	54	364.70
-ize	6	7	8	0	5	0	105	35	432.75
-less	5	6	2	0	1	0	63	89	410.19
-ly	6	10	7	0	1	0	48	94	379.83
-ment	12	4	11	0	4	0	101	34	395.64
-ness	0	10	4	0	0	0	79	73	397.18
-ous	12	1	1	0	3	0	138	11	765.08
-ship	5	15	17	0	2	3	72	52	240.75
-y	6	9	7	0	3	0	62	79	328.46

frequently than other error types among prefixes. Interestingly, all the error types except for **blank** remained the second most frequent among suffixes.

#### 4. Discussion

As seen in the results, the erroneous responses during the productive affix test were categorized into seven types, including the null responses. For the majority of the affixes, the null response

was the most frequent type of error. Considering the question format of the test in which the participants were asked to provide stem words to a given affix, the prevalence of null responses clearly shows the considerable lack of affix knowledge among the participants. The fact that the affixes *re-* and *-er*, frequent in both English and English loanwords in Japanese, did not show such tendencies leads to the following two separate but interconnected reasons: frequency and analysis. It is well within reason

to suspect that the participants lack exposure to many affixed words, or they simply do not notice when words are affixed. The lack of opportunity further leads the participants not to analyze words morphologically, and so they do not realize a given word is comprised of affixes and a stem.

However, even with abundant opportunities, there remains a problem caused by deceptive transparency (Laufer, 1997), indicated by the nonaffix error type which accounted for more than 10% of the errors in the current study. This is particularly problematic as deceptively transparent words carry the same letter strings as affixes.

Further, erroneous use of affixes in loanwords, such as \*nonsugar and \*antibarrier, must also be dealt with. Though such an error type was limited in numbers in the current study, they are without doubt a source of confusion as it seems to be difficult for Japanese English learners to realize that they do not exist in English vocabulary.

Interestingly, the errors found in productive affix usage showed a different picture between prefix and suffix. Results showed that in most of the observed error types (**nonaffix**, **mismatch**, **meaning**, **nonword**, and **loanword**), the use of prefixes was affected significantly and in a negative way. Though it is merely speculation at this point, the position of the affix might hold the key to an answer. When answering a stem word in the prefix section, the onset of an affixed word is given. The provided prefix could function as a keyword or a “hook” for words with the same beginning regardless of their correctness, making the search within one’s mental lexicon susceptible to errors.

In the case of suffixes, however, the same search technique cannot be applied, because the onset of an affixed word could virtually be any letter of the alphabet. Therefore, the search for a suffixed word in one’s mental lexicon could lead

to confident answers or null responses, which in turn makes it less probable for learners to resort to erroneous combinations of a suffix and a stem. If this is true, the significantly larger number of correct and null responses among the suffix section of the test can be accounted for.

To determine if there is such a difference, further studies using a think-aloud protocol will be necessary.

## 5. Conclusion

This study analyzed erroneous responses found in Japanese university learners’ productive affix test answers to categorize misused affixes as well as to quantify errors. The results indicated that the participants in general lacked knowledge of affixes. Even so, one type of error, namely **nonaffix**, was found to be prominent among prefixes. Since this type of error is caused by deceptive transparency, care must be taken when encountering words such as *interest*, *enter*, *mischievous*, *subject*, *preach*, *discern*, and *examine*.

Further, according to the results, prefix outnumbered suffix in terms of the number of errors in most of the error types identified in the current study. Though the reason for this remains unclear, future research using the think-aloud protocol is expected to shed light on this question.

The treatment of affixes in teaching tends to be sporadic, i.e., the meaning or the function of an affix is taught with limited examples when an affixed word appears in textbooks. However, the frequency and the type of affixes in textbooks are found to be limited, at least at junior high school level (Morita et al., 2019). As a valuable tool in vocabulary acquisition, the usefulness and the source of errors need to be more widely recognized by English teachers so that learners can enjoy the benefit of affixes to lessen the burden of the learning of vocabulary.

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## Note

1. Although wooden is a correct affixed word, -en is used as a verb-making suffix.