L1 Transfer of the Mass-Count Distinction in Japanese-English Interlanguage*

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Abstract

This paper reports on a pilot study investigating the mass-count distinction adopted by Japanese-speaking intermediate learners of English. In English, mass nouns and count nouns are morpho-syntactically distinguished, and count nouns are further distinguished as singular and plural. Two experiments were conducted to examine Japanese speakers' use of number marking on English nouns. The results showed that Japanese speakers tend to use number marking on count nouns as well as on some mass nouns. The mass nouns that are typically number-marked by Japanese speakers were categorized as mass nouns in English, but were conceptually individuated nouns, such as *jewelry* and *corn*. These results were taken as evidence that Japanese speakers treat conceptually individuated nouns as count nouns. It will be argued that this is a transferred property from the learners' first language, which uses individuation to distinguish between count nouns and mass nouns.

1 Introduction

Japanese lacks obligatory number marking, whereas English has obligatory number marking on count nouns. Languages that lack number marking, such as Chinese languages and Japanese, have long been contrasted with languages that have it (Quine, 1969; Greenberg, 1973; Chierchia, 1998, among many others). The former type of languages is referred to as classifier languages. In classifier languages, bare nouns are used as singular and plural count nouns or mass nouns, as in (1).

(1) a. Taro-ga kuruma-o katta.
Taro-Nom car-Acc bought
"Taro bought a car/cars."
b. Taro-ga mizu-o nonda.
Taro-Nom water-Acc drank
"Taro drank water."

The examples in (1) show no difference between a count noun *kuruma* "car" and a mass noun *mizu* "water" in terms of their morphological properties, thus lacking any type of number

* This research was supported by a Grant-in-Aid for Scientific research (C), grant #24520684 from the Ministry of Education, Culture, Sports, Science & Technology in Japan.

marking.

Furthermore, in classifier languages, a numeral cannot directly modify nouns. Instead, numeral classifiers are optionally used for enumeration. Therefore, as in (2a), enumeration using a numeral classifier *-dai* is necessary, but as in the case of (2b), direct modification by a numeral is prohibited. Classifiers are also used for mass nouns, as shown in (3). Classifiers have their own semantic specifications in terms of the types of nouns they can be associated with. The specifications of each classifier may include features such as animacy (animate vs. inanimate), shapes (round vs. long), or functions (sea vessels vs. land vessels). Although the types of classifiers that can be used for *cars* and *water* might be different, again, there is no distinction between mass and count nouns in terms of the use of classifiers and the lack of number marking.

(2) a. Taro-ga san-dai-no kuruma-o katta.
Taro-Nom three-CL-Gen car-Acc bought
"Taro bought three cars."
b. *Taro-ga san kuruma-o katta.
Taro-Nom three car-Acc bought

(3) Taro-ga san-bai-no mizu-o nonda.
Taro-Nom three-CL-Gen water-Acc drank
"Taro drank three glasses of water."

Non-classifier languages such as English have a mass-count distinction, and there are morpho-syntactic manifestations. One of the manifestations is the use of number marking and numerals, including the indefinite article in the sense of *one* on count nouns and attachment of the plural marker on plural count nouns. For a singular count noun, the indefinite article may be used as in (4a), and for plural count nouns, the plural marker *-s* is used as in (4b). (4c) shows that English does not allow a bare count noun to appear in a sentence, and as in (4d), there is no English equivalent of (2a) in Japanese.

(4) a. Taro bought a car.
b. Taro bought three cars.
c. *Taro bought car.
d. *Taro bought three sets of car.

Mass nouns present the opposite distribution of number marking from count nouns shown in (4). The examples in (5) show that the use of the indefinite article or plural marking is prohibited. Furthermore, unlike count nouns, mass nouns can be used as bare nouns and a measure phrase can be associated with mass nouns to count the quantity of the substance that is referred to, similar to the Japanese sentence in (3b).

(5) a. *Taro drank a water.
b. *Taro drank three waters.

c. Taro drank water.
d. Taro drank three glasses of water.

As they lack number marking, nouns in classifier languages have been claimed to be all mass (e.g. Chierchia, 1998). However, it has also been proposed that Japanese and other classifier languages have mass-count distinction (e.g., Cheng & Sybesma, 1998 ; Iwasaki, 2002 ; Mizuguchi, 2004 ; Yi, 2009). According to this proposal, in classifier languages, the mass-count distinction is manifested in classifier choices. Some classifiers such as *-ko* or *-tsu* are used only for count nouns, and they are incompatible with mass nouns (Yi, 2009).[1] The mass-count distinction present in Japanese, however, seems to categorize nouns into count and mass in manner different from that in English. It has been claimed that in Japanese, conceptual individuation plays a role in categorizing nouns into count and mass (Yoshida, 2007). Cognitively individuated nouns with minimal parts, such as *inu* "dog," *isu* "chair," and *kagu* "furniture" are considered count in Japanese, and unindividuated nouns such as *suna* "sand" and *mizu* "water" are considered mass. In this paper, I assume that there is a mass-count distinction in Japanese, but it categorizes nouns differently from the mass-count distinction in English.

This study investigates how Japanese-speaking learners classify nouns into count and mass by examining their uses of number marking. The examples given above clearly show that a mass-count distinction is marked differently at the morpho-syntax level in Japanese and English. Japanese-speaking learners must learn how nouns are morpho-syntactically marked in English. The mass-count distinction is a crucial part of number marking in English. Therefore, they must also learn which nouns are categorized as count nouns and which are categorized as mass nouns in English. Under the assumption that the Japanese and the English mass-count distinctions differ in their categorization of mass nouns, Japanese-speaking learners of English, especially those at a low level of proficiency, are predicted to have problems with individuated mass nouns such as *furniture* and categorize them as countable owing to transfer of first language (L1) properties (e.g., Schwartz & Sprouse, 1996).[2]

Two experiments, a picture description task and a grammaticality judgment task, were designed to test the mass-count distinction in Japanese-English interlanguage. In both tests, 12 count nouns and 24 mass nouns were used. Half of the mass nouns were so-called object-mass nouns, including *furniture* and *mail*, which are uncountable in English but are countable in Japanese, and the other half of the mass nouns were so-called substance-mass nouns such as *sand* and *butter*. If Japanese speakers transfer the mass-count distinction in Japanese onto the initial state of their Japanese-English interlanguage, they would tend to use number marking on count nouns and individuated mass nouns more than on unindividuated mass nouns. Ten

1 The classifiers *-ko* and *-tsu* are only used for inanimate individuated objects. There is a range of classifiers used for nouns referring to humans and animals. See, for example, Matsumoto (1993) and Downing (1996).

2 Choi (2015) also argues that mass-count distinction is present in Korean based on a proposal made by Kim (2005), and it transfers to the initial state of the Korean-English interlanguage. Her study is summarized in Section 3.

intermediate learners of Japanese and six native speakers of English participated in this pilot study. The results support the L1 transfer of the mass-count distinction. In the grammaticality judgment task, on average, the learners preferred number marking on object-mass nouns such as **silverwares* rather than *silverware*, at 75%, whereas the native speakers' average was 0%, disallowing number marking on these nouns whatsoever. These results suggest that Japanese-speaking learners at the intermediate proficiency level use conceptual individuation to categorize English nouns into count and mass.

The remainder of this paper is organized as follows: Section 2 summarizes mass-count distinctions in English and Japanese and differences between the two languages. In Section 3, previous studies on L2 acquisition of the mass-count distinction in English by speakers of a classifier language are summarized. Section 4 summarizes the study, including the research questions, methods of the two experiments, and results. Discussion and conclusion are presented in Section 5.

2 Mass-count distinctions in English and Japanese

The nature of mass-count distinctions has been debated over many decades (Quine, 1960; Bloom, 1990; Link, 1983, among many others). The pertinent question is the source of the distinction between count nouns and mass nouns, whether it is the syntax that makes a speaker categorize objects in the world into countable (individuated) or uncountable (unindividuated) (Quine, 1960) or semantic distinctions such as "object" and "substance" in the physical world help children categorize nouns into "count" and "mass" (Macnamara, 1982). Bloom (1999) relates the mass-count distinction with individuation, where count nouns refer to individuated objects, whereas mass nouns refer to unindividuated objects. In English, however, the concept of individuation does not correlate exactly with the mass-count distinction (Pelletier & Schubert 1989). There are mass nouns that denote individuals, such as *furniture*, a type referred to as object-mass nouns, and therefore, Bloom's account on mass-count distinction using the concept of individuation does not capture the mass-count distinction in English.[3]

Although object-mass nouns are grammatically mass in English, Barner & Snedeker (2005) demonstrated that English speakers interpret them as referring to individuals. In their experiment, English-speaking adults and children were asked, "Who has more X?" where X is replaced with a count noun, an object-mass noun, or a substance-mass noun. The quantifier, *more*, with a count noun, as in *more candles*, was interpreted by English-speaking adults based on the number of candles rather than the volume or size of candles when making a judgment as to who has more candles. The rate of a number-based judgment by English-speaking adults was 100%. However, in a question with a substance-mass noun such as "who has more mustard," the rate of a volume-based judgment was 100%. With object-mass nouns such as

3 There are a few variations among non-classifier languages as to which nouns are categorized as count or mass. For example, in English, *furniture* is a mass noun, but in French, it is a count noun (Pelletier & Schubert 1989).

more furniture, in contrast, the rate of a number-based judgment was 98%, a judgment identical to count nouns, not to substance-mass nouns. The results of Barner & Snedeker's study demonstrated that English native speakers construe object-mass nouns as individuals as opposed to unindividuated objects. Barner & Snedeker also tested the interpretations of flexible nouns such as *string/strings* and *stone/stones*, which can be either count or mass. With flexible nouns such as these, when asked the question, "Who has more string?" or "Who has more strings?", English native speakers opted for a number-based judgment with *strings* and with *string* they opted for a volume-based judgment. These results furthermore demonstrate that morphological information is used when a noun is interpreted as an individuated object or unindividuated substance in English.

As discussed in the introduction, it has been claimed that classifier languages have a mass-count distinction, although it is not morpho-syntactically distinguished as in non-classifier languages. The distinction has been claimed to originate from the distinction in classifiers (Chao, 1968 ; Cheng & Sybesma, 1998 ; Iwasaki, 2002 ; Mizuguchi, 2004 ; Yi, 2009, among others). Numeral classifiers occur with nouns for enumeration, and a wide range of classifiers are used in Japanese.[4] Mizuguchi (2004), for example, categorized three types of classifiers : atomic, collective, and mass. Atomic and mass classifiers are summarized in this paper, but collective classifiers are not because they are out of the scope of this paper. He argues that atomic classifiers are used for atomic, individuated nouns and are associated with semantic properties, animacy, shapes, and functions. There are three generalized atomic classifiers for core semantic categories, *-ri/nin* for humans, *-hiki* for animals, and *-tsu* for inanimate objects (Matsumoto, 1991, 1993). They can be used for most nouns within the category. Mass classifiers are used for non-atomic, unindividuated nouns such as *mizu* "water" and *bataa* "butter." There are two types of mass classifiers, namely, container classifiers, such as *-hai* "cups of" and *-bin* "bottles of" and non-container classifiers such as *-kire* "slices of" and *-kake* "fragments of" (Mizuguchi, 2004 : 53-55).

Individuated nouns such as *inu* "dog" and *isu* "chair" can be combined with atomic classifiers *-hiki* and *-tsu*, respectively. Object-mass nouns such as *kagu* "furniture" and *hooseki* "jewelry" can also be combined with *-tsu*. Therefore, according to the categorization proposed by Mizuguchi, object-mass nouns belong to the same category as other count nouns in Japanese. Inagaki & Barner (2009) used the same method as Barner & Snedeker (2005) to test how Japanese-speaking adults interpret count, object-mass, and substance-mass nouns. Japanese speakers used a number-based judgment with count and object-mass nouns to answer the question "*Dotira-no hito-ga yori-ookuno kutu-o/kagu-o motte-iru desyoo-ka?*," "Who has more shoes/furniture," at 92% and 90%, respectively. With mass nouns, they used a volume-based judgment at 98%. The results of their study showed that although nouns in Japanese are not marked for number, Japanese speakers use individuation to categorize nouns.

In this section, I summarize the mass-count distinctions in English and Japanese. In English, the mass-count distinction is realized morpho-syntactically, but the distinction is not

4 Downing (1996) lists 154 classifiers used in modern Japanese.

direct in terms of conceptual individuation. This discrepancy is true for object-mass nouns, which are conceptually individuated but are morpho-syntactically categorized as mass. In Japanese, in contrast, the mass-count distinction is realized using numeral classifiers, and the distinction in Japanese corresponds directly to individuation; thus, there is no discrepancy, unlike the English mass-count distinction.

3 Previous studies on L2 acquisition of mass-count distinction and number marking

Many studies have looked at L2 acquisition of plural marking in non-classifier languages by learners whose L1 is a classifier language (Young, 1991; Gia, 2003; Lardiere, 2007; Yoshimura & Nakayama, 2009, among others). Lardiere (2007), for example, reports that her participant, a native speaker of Mandarin and Hokkien Chinese, supplied plural marking only about 50% of the time in oral production after 20 years of residence in an English-speaking country, suggesting that targets such as plural marking in English are difficult for L2 learners whose L1 is a classifier language. Yoshimura & Nakayama (2009) compared compositions written by 15 intermediate and 15 advanced English learners whose L1 was Japanese. They found that the plural marker *-s* was omitted in 30.7% of the responses by the intermediate learners and in 21.9% of the responses by the advanced learners. The omission rates of the intermediate group and the advanced group were not significantly different, suggesting that the obligatory plural marker poses persistent difficulty for Japanese speakers.

Snape (2008) investigated L2 acquisition of the mass-count distinction and article use in English by Japanese- and Spanish-speaking learners at the intermediate and advanced levels. For acquisition of the mass-count distinction, Snape used a grammaticality judgment task with four conditions: count singular, count plural, mass, and mass plural. In the test, the participants were asked to choose (an) appropriate phrase(s) containing a noun combined with a quantifier after reading a context. Some of the quantifiers included in the phrases were used exclusively for either count nouns or mass nouns. For example, in (6), after reading a context and the beginning of the sentence *Terry needed*, the participants were asked to choose an appropriate continuation for the sentence. For (6), with mass nouns such as *milk*, *butter*, and *sugar*, the quantifier *many* is inappropriate and it should therefore be rejected.

(6) Terry needed... *some milk/*many butter/much sugar*. (Snape, 2008: 69)

The results showed that intermediate learners from the both language groups were significantly different from the controls, but at the advanced level, such differences were not found for both language groups.[5] In addition, he reported that Japanese speakers seemed to have difficulties with mass noun conditions, accepting the ungrammatical ones and rejecting the grammatical ones. However, overall, the Japanese speakers at the advanced level were able to distinguish

5 Given that article choice is out of the scope of this paper, the results of the task investigating the learners' use of English articles are not reported in this paper.

between count nouns and mass nouns in the test, and thus, Snape concluded that Japanese speakers are able to acquire the mass-count distinction in English. In Snape's study, however, the mass nouns used in the experiment included both object-mass and substance-mass nouns ; thus, it is not clear whether Japanese speakers distinguish between the two types of mass nouns.

Inagaki (2013) tested intermediate Japanese-speaking learners' mass-count distinction in English. The experimental method used in his study was adopted from the methods used by Barner & Snedeker (2005) and Inagaki & Barner (2009). Similar to these studies, Inagaki tested the interpretations of nouns separated into four conditions : count nouns, object-mass nouns, substance-mass nouns, and flexible nouns. The studies of Inagaki & Barner (2009) and Barner et al. (2009) showed that Japanese native speakers use a number-based interpretation for count nouns and object-mass nouns, and a volume-based interpretation for substance-mass nouns in Japanese. The goal of his research was to show how Japanese-speaking learners of English interpret English nouns. The most crucial case in his study involved flexible nouns, which should be interpreted as number-based or value-based depending on number marking. With plural marking, *strings*, for example, a number-based interpretation should be employed and without number marking, a volume-based interpretation should be employed. The results showed that Japanese-speaking learners were targetlike for English count nouns, object-mass nouns, and substance-mass nouns. However, the results of the flexible noun case were statistically significant compared to those of the native controls, and the learners failed to use the plural marker *-s* as a cue for a number-based interpretation. Inagaki concluded that Japanese speakers have difficulty acquiring the mass-count distinction.

Ogawa (2011) used the same method as Inagaki & Barner (2009) and tested Japanese-speaking learners of English. In her test, the test items included larger sets of nouns with varying frequency. Moreover, she tested advanced learners as well as intermediate learners. Similar to Inagaki (2013), her subjects were also statistically different from native controls in terms of their interpretations of flexible nouns, even at the advanced level. She concluded that Japanese speakers are incapable of acquiring the morpho-syntactic mass-count distinction in English.

Choi (2015) tested Korean-speaking learners of English of low, intermediate, and advanced proficiency levels. Her study was based on the proposals of Kim (2005), who categorized Korean object-mass nouns as individuated because the plural marker *-tul* can be attached to object-mass nouns, such as *kakwu-tul* "furniture-PL." Choi proposed that because the Korean plural marker can attached to object-mass nouns, Korean-speaking learners may transfer the plural marking allowed in Korean to English and overuse the plural marker *-s* on object-mass nouns. She conducted an experiment involving a writing task, shown in (7) below. Participants were asked to provide the appropriate form of the noun in the parentheses. There were six categories, concrete/abstract count nouns, concrete/abstract object-mass nouns, and concrete/abstract substance-mass nouns.

(7) Yesterday, Maria received a lot of (message) from Jamie Parker, her former boss.

The results showed that the learners at all levels used the plural marker *-s* significantly more

frequently on object-mass nouns than on substance-mass nouns, showing the overuse of the plural marker *-s*; Choi considered this as a result of the L1 transfer of the mass-count distinction in Korean.

According to Inagaki (2013) and Ogawa (2011), Japanese speakers have difficulty acquiring the morpho-syntactic properties of the mass-count distinction in English, evident by their failure to notice the plural marker *-s* on flexible nouns to employ number-based interpretations. Although it may be indeed the case that it is difficult for Japanese speakers to acquire the morpho-syntactic properties of the English mass-count distinction, and therefore, L2 learners are often reported to omit or overuse number marking in English, their (mis)use of number marking, to my knowledge, has not been looked at systematically, except in Choi's study. Therefore, the present study examines how Japanese speakers use number marking for count nouns, object-mass nouns, and substance-mass nouns, and whether their use of number marking is influenced by their L1.

The present pilot study is similar to Choi's (2015) study because it investigates L2 learners' acquisition of the mass-count distinction by looking at the use of number marking in English. However, in this study, the assumptions about the mass-count distinction made by learners' initial states are different. In Choi's study, it was assumed that object-mass nouns are likely to be marked with a plural marker in English because plural marking is possible on object-mass nouns in Korean, and this property could be transferred onto the initial state of Korean-English interlanguage. This line of assumption does not work in Japanese because the plural marker *-tachi*, which has similar characteristics to the Korean *-tul*, cannot be attached to inanimate objects, including object-mass nouns. If we were to adopt Choi's assumption, in the Japanese-English interlanguage, object-mass nouns would not be count nouns because plural marking is prohibited in Japanese. However, as discussed in the previous section, I assume that there is indeed a mass-count distinction in Japanese, and this distinction is based on individuation. Nouns that denote individuals are count, and those that denote non-individuals are mass in Japanese. If we adopt this assumption, in the initial state, Japanese speakers treat count nouns and object-mass nouns as count nouns, and substance-mass nouns as mass nouns in English. The pilot study, which is described in the next section, tested whether the mass-count distinction in Japanese transfers onto the initial state of the Japanese-English interlanguage.

4 Pilot study

4.1 Research questions

In almost all English grammar books, the mass-count distinction and number marking are explicitly explained. However, Japanese speakers are often reported to make errors related to the mass-count distinction and number marking, such as the ones presented below (Inagaki, 2013: 2, (4)):

(8) a. *I have a news for you.
b. *He gave me many advices.
c. *She finally found a happiness.

These data clearly indicate that explicit instruction is not enough for L2 learners to learn which nouns are morpho-syntactically count and which are mass, and to mark them accordingly. As discussed in the previous sections, I assume that Japanese has the mass-count distinction based on individuation. If this is the case, this Japanese mass-count distinction is part of the initial state of the Japanese-English interlanguage. In addition, Japanese speakers learn both from positive evidence and from instruction that count nouns, which are individuated nouns in English, are marked morpho-syntactically as singular or plural. Given the initial state and positive evidence on plural marking on individuated nouns, the following is predicted:

(9) Due to L1 transfer, Japanese-speaking learners of English at a low proficiency level use number marking on individuated nouns (count nouns and object-mass nouns).

To examine this, I conducted two experiments.

4.2 Participants, procedures, and materials

The participants were ten Japanese-speaking learners of English and six native speakers of English (three speakers of American English, and three speakers of British English).[6] All participants in the Japanese-speaker group are students at Gunma Prefectural Women's University, majoring in International Communication. These L2 English participants were considered intermediate-level learners. Their TOEIC scores ranged between 495 and 680 (average 601.5). Experiment 1 involved a picture-description task, in which only the Japanese-speaker group participated. Experiment 2 involved a grammaticality judgment task, and both the Japanese-speaker group and control group participated in it.

The Japanese-speaker group performed the picture-description task first and then the grammaticality judgment task. The nouns used in the experiments were divided into three categories: count, object-mass, and substance-mass, as shown in Table 1.

Table 1. Nouns used in Experiments 1 & 2

Count (n=12)	Object-mass (n=12)	Substance-mass (n=12)
pea/key/toy/candle bottle/bowl/bed island/card/window bow/screw	jewelry/furniture silverware/stationary mail/swimwear/wood bread/candy food/soap/corn	mustard/peanut butter wool/sand/cereal flour/blood/butter oil/snow/wine/money

The object-mass nouns and the substance-mass nouns were divided based on a diagnostic test using the atomic classifier *-tsu* with the Japanese equivalent noun. If the Japanese equivalent noun could be combined with *-tsu* to refer to an individuated minimal part, then it was

6 There was one additional Japanese-speaking participant who participated in the experiments. Her results are not discussed in this paper because her proficiency level was substantially different from those of the other participants. Her results will be discussed in future research.

considered an object-mass noun ; else, it was considered a substance-mass noun.[7] A few of the substance-mass nouns in the list, such as *peanut butter* and *wine*, can be combined with *-tsu*. However, when a substance-mass noun is combined with *-tsu*, the containers that holds the substance is or pieces of the substance are counted. In addition, in order to ensure that the plural marker *-s* was consistently [z] as opposed to [s] or [ɪz], the count nouns that ended with sibilants [s], [z], [ʃ], [ʒ], [ʤ], [ʧ], and voiceless stops were avoided.[8]

In both Experiments 1 and 2, the nouns in Table 1 were presented with pictures showing the objects either in singular or plural visual contexts. Two lists of noun/picture pairs were created using a Latin-square design, and each noun was presented either in a singular or a plural context only once per experiment. Thus, for example, if *pea* was used in a singular context in the picture-description task in Experiment 1, it was used in a plural visual context in the grammaticality judgment task in Experiment 2. Plural visual contexts for substance-mass nouns involved substances contained in multiple containers or separated into multiple pieces or piles.

4.3 Experiment 1

4.3.1 Method

Experiment 1 was a picture-description task. In this task, each list consisted of 36 nouns including 12 count nouns, 12 object-mass nouns, and 12 substance-mass nouns, in the singular and plural contexts, as listed in Table 1. In each noun category, half of the nouns (6 items) were in singular visual contexts and half were in plural visual contexts. As fillers, 36 verbs were included in a list, taking the total number of items to 72 in each list. The Japanese speaker group took one of the versions of the test created from either list.

Pictures were presented using PowerPoint. First, the participants saw a target word with a picture showing the target item for 4 seconds. Then they saw a picture, which they were to describe using the target word. They were given 14 seconds to describe each picture using the target word. An example is given below (10).[9]

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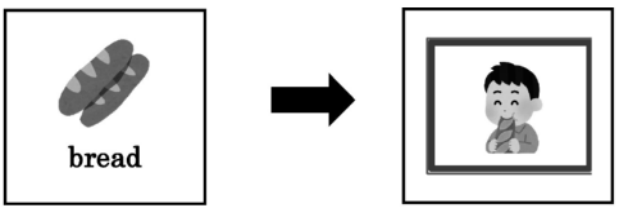
7 Some distinctions between object-mass and substance-mass in Table 1 may be different from the distinctions made typically. For example, *soap* is considered substance-mass and *money* is considered object-mass. The distinction in Table 1 is based on the mass-count distinction in Japanese.

8 To examine whether the sound at the end of a word has any influence on the attachment of the plural marker *-s*, the word endings of the count nouns in Table 1 were further controlled. Three words ending with a vowel, three words ending with a liquid consonant, /l/, three words ending with a voiced alveolar stop /d/, and three words ending with a glide /w/ were selected. See footnote 10 for the results pertaining to the word ending sounds. Controlling the word ending sounds was difficult for object-mass and substance-mass nouns, considering syntactic/semantic restrictions. However, voiceless consonants were also avoided, except in the case of *soap*.

9 For copyright issues, the actual pictures used in the experiments are not shown in the paper. The illustrations in (10) are sample illustrations from http://www.irasutoya.com. The illustrations posted on this site can be used free of charge, without permission.

(10)



a. 4 seconds b. 14 seconds

The target words were presented in a bare form without plural marking, but the accompanying pictures showed multiple items/units of the object(s) corresponding to the target word (e.g., two loaves of *bread* in (10a)). This is done to avoid association between the word form and the number of objects shown in the picture. The participants' utterances were recorded using an IC recorder (Olympus, LS-7).

4.3.2 Results

The author coded the recording for the presence/absence of plural marking on the target words. There were 360 tokens in all, but among those, for 21 tokens (5.8%), the participants failed to use the target word in the description. These instances were excluded, thus reducing the total number of tokens included in the analysis to 339. As can be seen in Figure 1, the learners did not use plural marking in singular visual contexts, but they did so in plural contexts, which suggests that the learners were aware of the singular/plural distinction in English. However, in plural visual contexts, plural marking was not always present, even in the cases in which it was obligatory.[10] The participants produced the plural marker in plural contexts for count nouns only about half of the time. Moreover, they used plural marking for object-mass nouns and substance-mass nouns in some cases. The Wilcoxon single-rank test employed for analyzing the paired samples showed that the difference in use of the plural marker in the count plural condition and the object-mass plural condition was not statistically significant ($p = .123$). However, the substance-mass condition was statistically significant compared to both the count plural context ($p = .011$) and to the object-mass context ($p = .025$).

10 As mentioned in footnote 8, the count nouns in Table 1 were controlled for the word ending sounds. Among these sounds, the sound /l/ seemed to pose some problems for the Japanese-speaking participants. As shown in Figure 1, the overall average of plural marker suppliance on count nouns was 50%. The words ending with /l/ had slightly lower average suppliance rates of *-s*. The average of /l/ was 38%, but other words had an average equal to or better than the average suppliance rates (57% for vowels, 50% for /d/, and 54% for glides). Because the number of tokens is small, it is difficult to arrive at any conclusion based on the results of the present study. However, because previous studies have found that Japanese speakers have difficulties producing /l/in word final position (e.g. Bradlow, et al., 1999 ; Aoyama, et al., 2004), it is possible that their relatively lower suppliance rate of the plural marker after /l/ might have been influenced by the additional difficulties in producing the sound /l/.

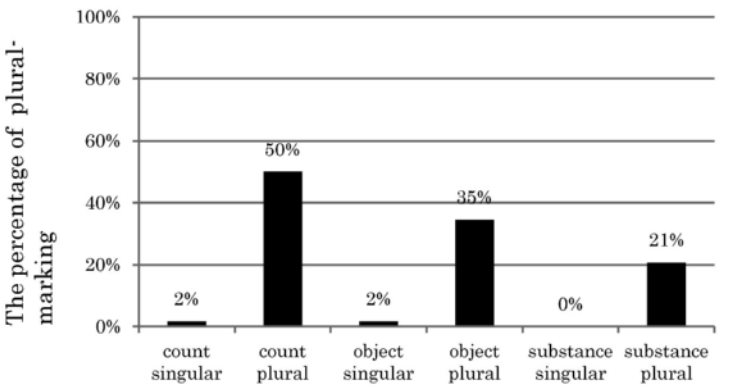


Figure 1. Production of plural marker *-s*

Some mass nouns seem to be more overtly plural-marked than the others. Object-mass nouns that were plural-marked in more than 50% of the responses were *corn* (50%), *wood* (50%), *candy* (60%), and *mail* (75%). There was one noun among substance-mass nouns that was marked with the plural marker in more than 50% of the responses. *Wool* was marked with the plural marker in 60% of the responses.[11]

4.4 Experiment 2

4.4.1 Method

Experiment 2 was a grammaticality judgment task. In this task, each noun was presented in two contrasting sentences with a picture showing either a singular or a plural context for the target noun. In the singular condition, the contrast was between a bare noun and a noun with the indefinite article, as in (11), and in the plural condition, the contrast was between a bare noun and a noun with the plural marker, as in (12). The participants were asked to choose the one that they felt was more natural as an English sentence. In these examples, (11a) and (12 a) are the correct responses.

(11) (a) A boy is eating bread.
(b) A boy is eating a bread.
(12) (a) A baker is removing bread out of an oven.
(b) A baker is removing breads out of an oven.

Similar to Experiment 1, each list consisted of 36 nouns from Table 1 in singular and plural visual conditions and 36 fillers, resulting in a total of 72 items per list. Two versions of the test

11 In the plural context for *wool*, a picture showing a woman selling balls of wool yarn at a marketplace was presented.

were created from the two lists of noun-picture pairs. The Japanese speaker group took the version of the test created from the list different from that used in Experiment 1. The English native speaker group took both versions of the test.

4.4.2 Results

The results are shown in Figure 2. English native speakers' accuracy rates were at the ceiling level. The learner group was accurate on count nouns, both in singular and plural conditions, but inaccurate in object-mass nouns in both conditions. For object-mass nouns, they overwhelmingly chose the one with number marking. They were much more accurate with substance-mass nouns, although in the plural condition, the accuracy rate was relatively low.

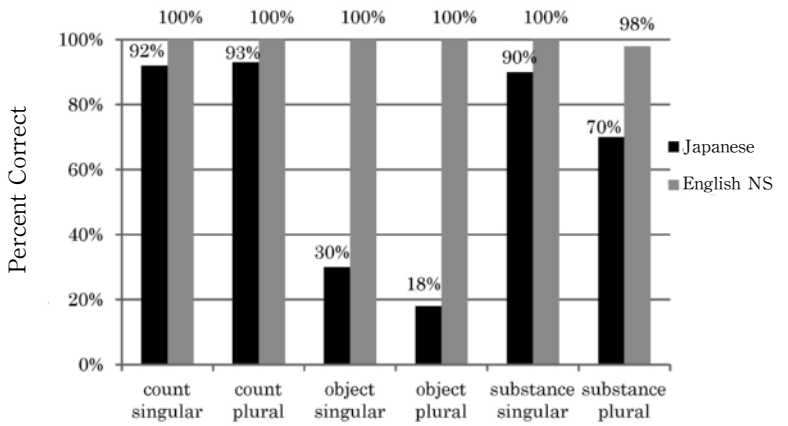


Figure 2. GJT Accuracy Rates

The Mann-Whitney U test showed statistically significant differences between the learner group and the native speaker group for the object-mass singular, object-mass plural, and substance-mass plural conditions. The statistical results are summarized in Table 2.

Table 2. Group comparisons between English NS and Japanese L2 learners

L1 English vs. L1 Japanese	count		object-mass		substance-mass	
	singular	plural	singular	plural	singular	Plural
	$p = .050$	$p = .254$	$\boldsymbol{p < .001}$	$\boldsymbol{p < .001}$	$p = .123$	$\boldsymbol{p = .007}$

In addition, the analysis using the Wilcoxon single-rank test for paired samples showed that the comparisons between singular conditions and plural conditions were not statistically significant for all noun categories for both groups, except for the learner group's results for substance-mass nouns, in which case the difference between the substance-mass singular conditions and the substance-mass plural conditions was statistically significant ($p = .025$).

The accuracy rates of the learner group rates were lower than 50% for the most object-

mass nouns in Table 1, except for *furniture*, for which the accuracy rate was 80%. For the noun, *food*, the accuracy rate was 50%, but all inaccuracies were caused in the plural condition, which means the participants in this group accepted *foods* but rejected *a food*. As for substance-mass nouns, nouns that had less than 70% accuracy were *flour* (70%), *butter* (70%), *sand* (60%), and *peanut butter* (50%).

4.5 Summary

In the picture-description task, the Japanese speakers omitted plural marking in some obligatory conditions. There was some evidence of overuse of plural marking for mass nouns in production as well. However, as expected, many object-mass nouns were associated with plural marking more frequently than substance-mass nouns. In the grammaticality judgment task, object-mass nouns were treated as count nouns, with the participants preferring number marking on them. In some responses, the learners allowed number marking on substance-mass nouns. The results of the two experiments suggest Japanese-speaking learners use number marking in English in a way consistent with the Japanese mass-count distinction.

5 Discussion and conclusion

This pilot study was conducted to investigate the following research question:

(13) Due to L1 transfer, Japanese-speaking learners of English at a low proficiency level use number marking on individuated nouns (count nouns and object-mass nouns).

As expected, nouns that are countable in Japanese seemed to be treated as count nouns by the intermediate Japanese-speaking English learners. The mass-count distinction used in Japanese appeared to transfer onto the initial state of the Japanese-English interlanguage. Therefore, once Japanese speakers learn how English distinguishes singular and plural on count nouns morpho-syntactically, using the indefinite article and the plural marker, they overextend the number marking in English to object-mass nouns, which are actually mass nouns in English.

Choi (2015) proposed that the plural marking in Korean transfers onto the Korean-English interlanguage, and Korean learners use plural marking on object-mass nouns. The present study demonstrates that Japanese speakers, too, use the plural marker for object-mass nouns. As discussed in Section 3, the Japanese plural marker is not used with inanimate object-mass nouns, and therefore, the cause of plural marking on object-mass nouns is unlikely to be due to the availability of plural marking in the learners' L1. Rather, it is likely to be caused by the mass-count distinction in the learners' L1. In addition, as found by Snape (2008), Japanese-speaking learners of English at the intermediate level do not acquire the mass-count distinction in English. The study suggests that their inability to distinguish count nouns from mass nouns is likely to be caused by L1 transfer.

In Experiment 1, the learners tended to omit the plural marker in obligatory contexts. The omission of the plural marker has been reported in L2 acquisition, as discussed in Section

3. Since the learners were at the intermediate level, the high omission rate was attributed to their low proficiency level. In future research, advanced-level learners will be tested to investigate whether the omission rates decrease as proficiency levels increase.

In Experiment 2, with the substance-mass nouns, there was a statistically significant difference between the singular and the plural conditions. In other words, the learners were more inclined to accept the plural form on substance-mass nouns than the singular form. In addition, in Experiment 1, a few substance-mass nouns were plural-marked. One possible explanation for this is to refer to so-called dual nouns, which can be pluralized in a few contexts. Nouns such as *wine*, *soap*, and *oil* can be pluralized when referring to different types of *wines/soaps/oils*.[12] Thus, input shows L2 learners that these nouns can be pluralized. However, the nouns that had higher suppliance or ratings of plural marking were not dual nouns, but non-dual nouns, such as *flour*, *butter*, *sand*, *peanut butter*, and *wool*. Thus, it is unlikely that they were influenced by input, but rather by visual cues. The picture used for the plural condition of *butter*, for example, showed three pads of butter on top of grilled fish, and the following test sentences were presented with the picture :

(17) a. The fish is topped with butter.
b. The fish is topped with butters.

The use of plural marking here is clearly based on visually separated pads of butter, rather than different types of butter. Thus, at least in this study, the results pertaining to the substance-mass nouns could not be attributed to dual-mass nouns.

This pilot study was conducted to examine L1 transfer of the mass-count distinction in the Japanese-English interlanguage. The results demonstrated that once Japanese speakers learn the morpho-syntactic number marking in English, they start to use it on nouns that they consider as countable, that is, conceptually individuated nouns, due to L1 transfer. The main pending issue is whether highly proficient Japanese-speaking learners of English are able to overcome L1 transfer and acquire the targetlike mass-count distinction. Therefore, in future research, I will investigate whether Japanese speakers at the advanced level can shift the mass-count distinction based on conceptual individuation, which is used in the L1, to the mass-count in English, in which there is discrepancy between conceptual countability and grammatical countability.

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12 Caution was employed to ensure that this kind of plural interpretation was not allowed for substance-mass nouns. For example, in the picture showing glasses of wine, it was clear that the wine in the glasses came from the same bottle.

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