Linguistic Characteristics of Production of Young Japanese Learners of English in Partial English Immersion Education

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1. Introduction

The main goal of this study is to investigate the effect of long-term English immersion education in Japan, focusing on children's production of English from a linguistic point of view. While different types of immersion education have long been carried out in various places around the world, immersion education in Japan does not have a long history, and accordingly there are few case studies. Also, there are currently a very small number of schools that offer English immersion education, and the amount of information about the effects of immersion education is thus extremely slim, with regard to any aspect of it. Since English education in Japan is administered in a foreign language environment, the learner in a regular public school is not exposed to a sufficient amount of natural

input to develop his/her communication ability, even though efforts of various kinds have thus far been made. For this reason, it is of particular interest to investigate the effects of immersion education, so as to contribute not only to the development of immersion education itself, but also to the English education system in Japan.

As part of a larger-scale research project[2], this preliminary study attempts to identify common characteristics of young Japanese learners' production, the learners in question currently receiving partial English immersion education at Gunma Kokusai Academy (hereafter, GKA) in Ota City, Gunma Prefecture. In Japan, there are approximately 10 schools that carry out English immersion education. Of these schools, only two currently offer long-term English immersion education, and GKA is one of them, offering 12-year English immersion education. Thus, GKA can provide us with valuable opportunities to examine the effect of English immersion education in Japan. For this reason, we have begun collaborative research with GKA, and this study reports some of our findings based on this research. At regular public schools in Japan, it is very difficult for children to naturally and efficiently acquire English as "a means of communication" because they learn English as a foreign language. This situation contrasts with learning English in an environment in which English is not a mere subject, but rather is used as a real means of communication.

Immersion education was established in Canada in the mid-1960s. It was first aimed only at the development of students' Second Language (hereafter, L2). However, the purpose of immersion education gradually came to include the development of students' foreign language skills as well, and French immersion education spread throughout many other places in Canada, even where French was not used. Since then, foreign language immersion has spread all over the world — English immersion in Hungary ; French immersion in Australia ; Japanese, Mandarin, and Indonesian immersion in Australia ; Mandarin immersion in Vancouver ; and Korean, Russian, and Japanese immersion in America (Johnson & Swain 1997).

English immersion education is language education in which children use English daily in various situations at school. According to Johnson & Johnson (1998 : 162), immersion education can be defined[3] as "[o]ne in which school pupils are taught the normal school curriculum through the medium of a language which is not their native one." Thus, pupils under English immersion undergo the normal school curriculum with English as the medium, even though is not their native language. There are various degrees of immersion education, some methods involving full (or total) immersion, and others partial immersion : The former type is an immersion program in which students/pupils learn only in L2, and the latter is an immersion program in which students/pupils learn in L2 as little as, or less than, 50% of the time (Johnson & Swain 1997). Moreover, in partial immersion programs, each class has a teacher who is proficient in the students' First Language (hereafter, L1) and a teacher who is proficient in L2 (Brondum & Stenson 1998). At

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2　The purpose of the research project is to examine educational effects of 12-year English immersion education and to develop its teaching methods. The project has begun in 2007 in the form of collaborative research between Gunma University and Gunma Kokusai Academy. Through this research, we expect to find many advantages to long-term English immersion education and to make suggestions with regard to English education in Japan. Our research project consists of a series of investigations. Part of this study is a brief summary of an investigation conducted in 2008, the second term of the series. Since the 12-year English immersion education program at GKA provides us with a rare and rich resource to explore, it was considered worth performing a longitudinal research project.

3　For more detailed definitions of immersion education, see e. g., Brondum & Stenton (1998), CARLA (2006), Fortune & Tedick (2008), Johnson & Swain (1997), among others.

GKA, Japanese classes and Social Studies classes are taught in the Japanese language, and children are taught in each class by two teachers, an English-speaking teacher and a Japanese-speaking teacher. In this sense, the English immersion program offered at GKA is a *partial immersion* program.

Another way to look at immersion[4] is to focus on the difference in terms of the time at which students/pupils begin early, mid, and late immersion programs. That is, *early immersion* begins in the first grade of formal education ; *mid immersion*, in the fourth or fifth grade ; and *late immersion*, in the sixth or seventh grade (Johnson & Swain 1997). Since GKA was established in 2005, there are two groups of children in terms of the length of experience of immersion education : an early immersion and a mid immersion group. When GKA was established, students in only two grades, the first and fourth, entered the school. These grades have been added each year since then, so as to fill the first to ninth grades by the 2013 school year.

Although there are many interesting areas to explore, this study focuses on children's production, in terms of syntax, pronunciation, and correspondence between sounds and letters.[5] The primary method of the study was to film a variety of classes at GKA, and to transcribe recorded samples for analysis. The major goal of this analysis is to investigate the effects of immersion education by finding out in what respects GKA children's production is superior to that of children receiving standard English education and to consider possible ways to develop teaching methods by analyzing children's errors.[6]

Table 1 below summarizes the numbers of classes and samples which were used for analyses during the study. In the table, "unclear samples" in (c) mean items that were either inaudible or unreadable (or both), due to a limitation of filming. For example, in analyzing errors within the *Syntax* category, 891 sentences were tabulated, but 221 sentences of those sentences were not clear enough to completely transcribe. Thus, the number of clear sample sentences in (d) for analysis of syntactic errors was 670 (N＝891-221).

The numbers in (e) and (f) in Table 1 indicate

Table 1.　Children's Production Samples Used for Error Analyses

		Syntax	Pronunciation	Correspondence between Sounds and Letters	Total
a	classes	26　classes	26　classes	16　classes	68　classes
b	samples	891　sentences	9,424　words	4,174　words	14,489　tokens
c	unclear samples	221　sentences	—	132　words	—
d	clear samples	670　sentences	9,424　words	4,042　words	14,136　tokens
e	correct tokens in clear samples	646　sentences	9,360　words	3,942　words	13,948　tokens
f	errors in clear samples	24　sentences[1]	69　words[2]	100　words[3]	193　tokens
g	percent error in clear samples	3.5%	1.0%	2.0%	1.4%

1　The number of sentences that contained syntactic errors was 24, but there were 21 sentences that contained only one error, 8 sentences that contained two errors, and one sentence that contained three errors. Thus, occurrences of syntactic errors numbered 40, in total.

4　Other ways to classify immersion education include, for example, making a distinction between one-way (foreign) versus two-way (dual). Other classifications are outside the direct scope of the study. For details, see e. g., Brondum & Stenton (1998), among others.

5　The scope of the entire research project covers a wider range of interests, including not only teaching methods but also childrens comprehension and production besides the three areas taken up in this study.

6　More details are reported in on-going studies in Obana (in progress), Shinohara (in progress), Tanaka (in progress), and Uehara (in progress).

numbers of correct tokens and errors occurring in the clear samples, respectively, and (g) indicates the ratio of errors relative to clear samples, as a percentile. Also, in analyzing *Pronunciation* errors, there were many words that were not audible for transcription, even for chunking into words. For this reason, there are two cells in (c) under *Pronunciation* that do not have numbers, and the numbers of samples and clear samples under *Pronunciation* is the same. The filmed classes which were used for analyses include the first to seventh grades in a variety of classes, excluding the Japanese and Social Studies, in which the Japanese language was used. The number of classes in (a), under *Correspondence between Sounds and Letters*, is rather small because there were not so many classes which involved any considerable amount of writing activities among those we were able to film this time. In addition, our analysis under the category *Syntax* used sentences, including those that contained subject and predicate and those that consisted of a phrase, but excluded short answers that consisted of only the words "Yes" or "No". On the other hand, analyses under the category *Pronunciation* and *Correspondence between Sounds and Letters* looked at samples at the word level.

As shown in Table 1 above, it is said that GKA children acquire English extremely well — very naturally and efficiently. It is striking that of the clear samples that were usable for analysis, there were very small numbers of errors observed relative to that of correct samples, in each of the categories *Syntax, Pronunciation*, and *Correspondence between Sounds and Letters*, i.e., 3.5%, 1%, and 2%, respectively.

However, the data we analyzed revealed that some parts of the production of GKA children are affected by their L1. We found some negative L1 transfer effects on syntax, pronunciation, and the relationship between sounds and letters. It was also interesting to note certain phenomena that cannot simply be explained by negative L1 transfer effects. In the following sections, we will report our findings by describing various characteristics of the children's production errors, in terms of syntax (Section 2), pronunciation (Section 3), and correspondence between sounds and letters (Section 4).

2. Syntactic Characteristics

The English development of GKA children compares remarkably well with that of public school children, and the number of errors observed was extremely small when one considers the amount of English the children produced (see Table 1 above). For this reason, the error samples available for our analysis were rather few. We did, however, identify certain characteristics of the syntactic errors which occurred in the classes we filmed. As such characteristics, 16 different types are reported in Tables 2–17 below. In these tables, each error is underlined, followed by the intended (or appropriate) word in parentheses. Also, the column on the right indicates the grade of the children who made the particular errors listed, and the line at the bottom shows the total number of occurrences involving one of the 16 types, the number of errors of agreement, and the percentile of errors relative to the total occurrences involving agreement of subject and verb/auxiliary verb. Note that among the 24 sentence samples were

Table 2. Errors in Agreement between Subject and Verb/Auxiliary Verb

1	*Kumi <u>don't have</u> (doesn't have) . . .		1st
2	*Soya <u>don't</u> (doesn't) help me.		2nd
3	*That paper <u>float</u> (floats).		2nd
4	*<u>Is</u> (are) there any more <u>presentation</u> (presentations) ?		5th
	Total # of Occurrences : 80 sentences	# of Errors : 4 samples	5.0%

eight sentences that contained two syntactic errors and one sentence that contained three errors. These sentences are reported two or three times in the relevant sections, but the errors observed in each sentence are all indicated in the manner described above.

The first type of error we found were errors in **the agreement between subject and verb/auxiliary verb**. Table 2 on the preceding page lists recorded errors of this type :

It is quite impressive that most GKA children seem to have acquired subject-verb agreement quite naturally. As shown in Table 2, only four examples of errors in subject-verb agreement were observed in our records. Many children in regular public schools who learn English as a foreign language frequently struggle with obligatory subject-verb agreement in English, subject-verb agreement being something the Japanese language does not have. This is said to be one of the most typical negative L1 transfer effects on English. However, out of 80 occurrences of subject-verb agreement in GKA children's production, only 5.0% were erroneous.

Another type of syntactic error we observed was a lack of do-support, which is also very difficult for Japanese children in regular public schools who learn English as a foreign language. Surprisingly, there were 51 occurrences that involved do-support, but the error shown in Table 3

below was the only one. This sample was intended to be an imperative sentence but **lacked *do*-support**, indicating the possibility that the IP (Inflectional Phrase) of this child has not yet been fully developed. Interestingly, after the child uttered the sample in Table 3, we recorded other children saying "Don't touch this."

Now, we will discuss **overlap of general verbs and the *be*-verb**, which is another problem children in regular public schools tend to have. Here, "overlap of general verbs and the be-verb" is when the be-verb is used together with the root form of a regular verb, and the error samples presented in Table 4 are of two types: One is a lack of the gerundive suffix -*ing* in the present progressive, and the other, use of an *extra* be-verb with a general verb. The samples in (2) and (3) were produced by the same child. The problem with these samples is the lack of the gerundive suffix -*ing* to represent the present progressive tense. Since this type of error can be seen very frequently in the production of children at regular public schools, we expected to find more such examples in this research, but much fewer were found than we expected. In our records, the number of correct occurrences of present/past progressive sentences was 31 tokens, and 6 cases (19.4%) were incorrect, as listed in Table 4 below. Compared to all other types of errors, *be*-verb-less progressive-type errors seemed to occur more frequently. One possible

Table 3.   Lack of Do-Support

1	*Not take (*e*), please. (Do not take…, please.)		4th
	Total # of Occurrences : 51 sentences	# of Errors : 1 sample	2.0%

NOTE: The symbol (*e*) represents an empty category.

Table 4.   Overlap of General Verbs and the Be-Verb

1	*What is mean "why"? (What does "why" mean?)		3rd
2	*(The) paper is move. (The paper is moving.)		4th
3	*This is move (moving).		4th
4	*I'm did (did) best performance too.		4th
5	*First, I'm did (did) Japanese…		4th
6	*This is start here and… (This starts from here and…)		6th
	Total # of Occurrences : 490 sentences	# of Errors : 6 samples	1.2%

explanation is that the Japanese learner tends to straightforwardly associate the gerundive form of English verbs with the -*teiru* form of Japanese verbs, which includes the meaning of a be-verb, without recognizing the necessity of be-verbs to correctly form the present/past progressive sentence. If this explanation is correct, then this type of error can be considered a negative L1 transfer effect on English.

The samples in (1) and (4)-(6) in Table 4 on the preceding page evidence incomplete acquisition of the ability to distinguish between be-verbs and the root forms of regular verbs. This is also a rather difficult grammatical task for the Japanese learner of English. However, comparing the percentile of errors against the total number of samples containing the relevant structure, it is clear that occurrences of this type of error are strikingly few in GKA children's production.

Next, let us take a look at two types of syntactic error which are ungrammatical due to a lack of an important constituent in the sentence: One is the **lack of a verb**, and the other is the **lack of an object**, and these are shown in Tables 5 and 6 below, respectively. In the Japanese language, not only pronouns (Japanese is a 'pro-drop' language, which means that pronouns can be omitted) but also

certain other constituents can be dropped as long as the meaning is supported by the context, whereas it is not acceptable in English to freely elide constituents. In Table 6, the obligatory object for the transitive verb *take*, which should not have been dropped, is indicated by (*e*) to mean an empty category. The verb-less (or predicate-less) structure in Table 6 and the object-less structure in Table 6 may thus be suggesting the possibility of negative L1 transfer. However, the former occurred in only 0.1% of the samples involving predicates, and the latter in only 0.9% of the samples requiring sentential objects.

Unlike Japanese, English makes a strict distinction between singular and plural forms of countable nouns. The errors listed in Table 7 below are cases in which nouns were not used in **plural forms**, but should have been:

This type of error is considered to be a negative L1 transfer effect. It is impressive, however, that most children at GKA hardly have any problems with the distinction between singular and plural nouns. Notice that each of the samples in (1)-(3) contains more than one error, indicating that the children who produced these had problems with more than one grammatical rule. Also, the samples in (4) and (5) were produced by the same

Table 5.　Verb-Less Structure

1	*This textbook ＿＿ only one. (This textbook is only one.)		3rd
	Total # of Occurrences : 670 sentences	# of Errors : 1 sample	0.1%

Table 6.　Object-Less Structure

1	*Not take (*e*), please. (Do not take, please.)		4th
2	*I can do (*e*) easy (easily).		6th
	Total # of Occurrences : 230 sentences	# of Errors : 2 samples	0.9%

NOTE: (*e*) represents an empty category.

Table 7.　Failure in Use of Plural Forms of Nouns

1	*I have twelve ten (tens).		1st
2	*At (On the) performance day, I always mistake some thing (things).		4th
3	*Is (are) there any more presentation (presentations)?		5th
4	*Eight hour (hours).		6th
5	*Fifty hour (hours).		6th
	Total # of Occurrences : 51 sentences	# of Errors : 5 samples	9.8%

child. The child uttered (5) approximately three minutes after he uttered (4). The distinction between singular and plural forms of countable nouns and the distinction between countable nouns and uncountable nouns are serious problems for Japanese children learning English in a foreign language environment, and children at regular schools frequently struggle with them. It would thus be interesting to continuously observe the developmental process of the child who produced (4) and (5) to investigate when and how he acquires the ability to make such distinctions. Other children (N = 46) that produced sentences or phrases involving plural forms of nouns had no problems with the form.

Besides the agreement between subject and verb/auxiliary verb, English requires **agreement between adjective and noun**. The error sample shown in Table 8 below is a case in which the adjective *many*, which should be used with a countable noun, was used to modify the uncountable noun *air*. This sample also shows that the child used the infinitive determiner *a* in front of many. The problem with use of determiners is taken up separately right after this error type, but the fact that this child simultaneously used *a* and *many with air*, which is an uncountable noun, indicates that he is not aware of the English-specific distinction between countable and uncountable noun. The number of occurrences in Table 8, N = 4, includes all instances of correct use of *many*, *much*, and *a few*, including the error example shown in the table.

Another type of syntactic error observed in our investigation is **incorrect use of determiners**, as shown in Table 9 below. The samples in (1)-(2) have errors in the use of the indefinite determiner *a*, whereas those in (3)-(6) have errors in the use of the definite determiner *the*. It is well known that the acquisition of determiners in English is one of the most difficult problems for L2 learners of English, and that even advanced learners of English may have problems with the use of determiners. Surprisingly, there were just six errors in the samples, in total, observed in the recorded production of GKA children. Since the samples analyzed in the study were not collected evenly across all the grades, nothing decisive can be said at this point. However, it might be instructive to further investigate critical period effects on the use of determiners, by comparing children that began to undergo immersion early on, those that began immersion midway, and adults who are native speakers of English (see Johnson & Newport 1989). The majority of the samples in Table 9 are highlighted in gray, which means that each of the children who produced these sentences made more

Table 8. Countable/Uncountable Disagreement between Adjective and Noun

1	*Because blue one has a <u>many</u> (much) air.	2nd
Total # of Occurrences : 4 sentences	# of Errors : 1 sample	25.0%

Table 9. Errors in Use of Determiners

1	*Because blue one has a <u>many</u> (much) air.	2nd
2	*Green one is (a) little <u>small</u> (smaller). and green one has. . .	2nd
3	*In morning. (In the morning.)	4th
4	*<u>At</u> (On the) performance day, I always mistake some <u>thing</u> (things).	4th
5	* (The) paper <u>is move</u>. (The paper is moving.)	4th
6	*Then, what we do is <u>we are</u> (to be) in class and (the) forest. . .	4th
Total # of Occurrences : 208 sentences	# of Errors : 6 samples	2.9%

Table 10. Errors in Use of Prepositions

1	*<u>At</u> (On the) performance day, I always mistake some <u>thing</u> (things).	4th
Total # of Occurrences : 93 sentences	# of Errors : 1 sample	1.1%

than one error per sentence. This in turn indicates that those children were still in the process of acquiring multiple numbers of syntactic rules, and that other GKA children did not have such a problem.

The next type of error is the **misuse of prepositions**, as presented in Table 10 on the preceding page. Selection of appropriate prepositions is another challenge for the learner (see e.g., Klaine 1993), and it is often observed that children who are receiving standard English education make errors in using prepositions. For the total number of occurrences involving prepositions (N＝91), the sample in Table 10 was the only case in which a preposition was used incorrectly. It is thus impressive that the majority of GKA children use prepositions perfectly well.

Another type of syntactic error found in our investigation is **the misuse of adjectives in place of adverbs**. The errors in (1) and (2) in Table 11 below were made by a fourth grader and a sixth grader, respectively. These samples may suggest that the children were not fully aware of parts of speech, while the majority of GKA children did seem to have awareness of parts of speech. Alternatively, these children might have frequently heard certain informal speech that contained an adjective in the sentence-final adverbial position, such as "do it good", and formed a hypothesis on the use of adjectives in that position. However, even

in informal speech, the adjectives *perfect* and easy are not used in such a manner, suggesting that the alternative account is probably not plausible. Interestingly, there were only 18 occurrences of adverbs in sentences in the recorded samples, 16 of which were perfectly grammatical.

The next error sample is also related to awareness of parts of speech. The sample in Table 12 below shows failure in **use of the past-participle** *finished* of the verb *to finish*. This sample was produced by a child who wanted to tell the teacher that he had finished an assignment. The teacher explained the meaning of "Finish.", as in "I want you to finish the class.", using both English and Japanese, to the class. After that, the teacher taught the correct phrase by asking the children how they would say it correctly, and they answered, "I'm finished." From this observation, it is clear that the child who produced this error was not aware of the difference between the verb and its past-participle. This means that the child was not aware of the function of the suffix *-ed*, which gives the verb an adjectival function.

Another sample that is related to **use of suffixes** is related to the comparative degree. As shown in Table 13 below, there was one sample in which the comparative suffix *-er* was lacking where it should have been used. After the teacher noticed this error, he began to use "smaller" explicitly in class. Once the teacher used

Table 11. Misuse of Adjectives in Place of Adverbs

1	*I can't remember <u>perfect</u> (perfectly).		4th
2	*I can do (*e*) <u>easy</u> (easily).		6th
	Total # of Occurrences : 18 sentences	# of Errors : 2 samples	11.1%

NOTE: The symbol (*e*) represents an empty category.

Table 12. Failure in Use of the Past-Participle

1	*Finish. (I'm finished.)		4th
	Total # of Occurrences : 25 sentences	# of Errors : 1 sample	4.0%

Table 13. Lack of Comparative Suffix

1	*Green one is (a) little <u>small</u> (smaller), and green one has…		2nd
	Total # of Occurrences : 7 sentences	# of Errors : 1 sample	14.3%

"smaller", the children started using "smaller" and "bigger" correctly.

Let us now look at error samples involving complex sentence structure. There are two types of errors observed in the samples we analyzed. First, in **the indirect *wh*-question** in Table 14 below, the embedded *be*-verb was not inverted to the post subject position. Second, in the complex sentence in Table 15 below, the subordinate clause following the main *be*-verb was incorrectly embedded in the matrix clause. The structure of embedded sentences can be divided into two types : One is a type of structure in which a tensed clause is embedded in the matrix clause, and the other is a type of structure in which a non-tensed clause is embedded in the matrix clause. In this example, the subordinate clause should have been constructed by using non-tensed ***to*-infinitive**. Although this sample contained an error in the embedded clause, the matrix subject was a relative clause, showing the advanced grammatical ability of the child. In regular public junior high schools, the indirect *wh*-question and *to*-infinitive are usually introduced to higher grades, and problems with uninverted subject-verb positions and with use of infinitival clauses are frequently observed in many children's production. Thus, in GKA children's production, it is quite understandable that there were only two occurrences that involved indirect *wh*-questions, one of which was perfectly grammatical. However, it is very surprising that there were 27 occurrences of complex sentences that involved *to*-infinitives, and that 26 of them were perfectly grammatical.

The next error, which is shown in Table 16 below, may or may not be purely syntactic. That is, it can be taken as a lack of a conjunction, but it involves particular expressions involving the term *half*, or decimal digits. Expressions of this sort are frequently used in mathematics and science classes. So, the majority of GKA children seem to acquire them very naturally.

The last type of error we found was **the inter-sentential use of the past tense**, which is considered pragmatic rather than syntactic. However, as this was one of the most frequent types of error we found in the samples, it was considered reasonable to include it in our report. Table 17 below lists recorded errors of this type :
Each sentence (1) to (6) is in fact perfectly

Table 14. Uninverted Subject-Verb Positions in Subordinate Wh-Questions

1	*I don't know where <u>is</u> Mr. Johns' string. (I don't know where Mr. Johns' string is.)	4th
Total # of Occurrences : 2 sentences	# of Errors : 1 sample	50.0%

Table 15. Error in Embedding To-Infinitive

1	*Then, what we do is <u>we are</u> (to be) in class and (the) forest…	4th
Total # of Occurrences : 27 sentences	# of Errors : 1 sample	3.7%

Table 16. Lack of Conjunctions and/or Expressions Involving Decimal Digits

1	The gym's length <u>is</u> (was) <u>24 meters 50 centimeters</u> (24.5 meters *or* 24 and half meters).	2nd
Total # of Occurrences : 68 sentences	# of Errors : 1 sample	1.5%

Table 17. Errors in Inter-Sentential Use of the Past Tense

1	I <u>go</u> (went) to Huis Ten Bosch, too.	2nd
2	The gym's length <u>is</u> (was) <u>24 meters 50 centimeters</u> (24.5 meters *or* 24 and half meters).	2nd
3	Hanging up posters <u>is</u> (was) faster.	4th
4	I <u>write</u> (wrote) it.	4th
5	I <u>speak</u> (spoke) my part.	4th
6	I <u>explain</u> (explained) it.	4th
Total # of Occurrences : 95 sentences	# of Errors : 6 samples	6.3%

grammatical, but in the particular context where it was produced, the verbs should have been in the past tense rather than the present tense. For this reason, we call this type of error *inter-sentential* and have not put the symbol "*" in front of the sentence to indicate ungrammaticality of the sentence per se. Strictly speaking, this type of error should be categorized at the level of discourse, since it may seriously degrade cohesion of an utterance or written text, by causing in the listener confusion between what happens and what happened. Since the meaning of the verb may not be appropriately integrated into the context because of a mismatch of tense, it is considered incorrect from the point of view of discourse. The errors presented in Table 17 on the preceding page were made by different children. The samples in (1)-(4) were found in oral production, while those in (5)-(6) were in written compositions. Interestingly, we did not find any errors in the production of constructions about the future, and examples using expressions about the future, such as "The cup will fall down," and "First, this group is going to (the) computer," were correct.

A question arises as to why the past tense, not future expressions, tended to trigger errors in the children's production, as shown in Table 17 on the preceding page. One possible account might be that the children's cognitive systems have not yet been fully developed with regard to tense, making it rather difficult to fully express the notion of past occurrences, particularly in L2, as Yoshida (2009) pointed out. Another possible account is that the children who made these errors might be in the developmental stage of the acquisition of irregular verbs. That is, it is well-known that children tend at first to make no errors in their use of irregular verbs, and then begin to make errors as they acquire the past-tense suffix *-ed*, and over-generalize its application. The children in this study might have been in the stage between the complete and incomplete acquisition of that rule. It is necessary to collect more data from the same children to construct a plausible explanation.

Our findings in this research are briefly summarized in the following three points. First, GKA children, overall, are acquiring English syntax very naturally and efficiently. Considering the amount of samples we analyzed, there were an extremely small number of errors. Second, syntactic errors that GKA children tend to make are with items which they have already understood. We would like to consider possible ways to reduce the occurrence of this type of error by defining on what occasions they tend to occur, and by comparing the frequency of errors across all grades. Third, we found some errors that indicate negative L1 transfer effects, such as a lack of subject-verb agreement and the failure to use plural forms and determiners. These negative transfer effects involved various kinds of the structural rules of English. While there are some children that make these types of errors, many children do not. We would like to investigate further in order to identify factors causing the difference between children who exhibit hardly any negative L1 transfer effects and those that suffer from them.

3.　Characteristics of Pronunciation

In Section 2, we described the excellence of GKA children in the acquisition of English syntax. In this section, we look at characteristics of their pronunciation. The total number of words examined in terms of pronunciation in the study was N＝9,360, and the error samples reported in this section were observed in N＝69 words. These error samples were divided into several types, as reported below.

Just as with syntax, GKA children are acquiring English pronunciation very naturally and efficiently. For the amount of samples we examined, there were a very small number of characteristics that need to be improved. One such

Table 18. *Katakana*-Like Pronunciation

	Intended Word	Pronunciation Observed	Grade		Intended Word	Pronunciation Observed	Grade
1	textbook	*tekisutobukku	1st	21	just	*jasuto	4th
2	Kung ho	*kanfuu	2nd	22		*jasuto	4th
3	measure	*mejaa	2nd	23	out	*auto	4th
4	meter	*meetoru	2nd	24	side	*saido	4th
5	paper	*peepaa	2nd	25	size	*saizu	4th
6	table	*teeburu	2nd	26	take	*teiku	4th
7	color	*karaa	3rd	27	three	*surii	4th
8	cup	*kappu/koppu	3rd	28	time	*taimu	4th
9	fire	*faiaa	3rd	29	shelter	*sherutaa	5th
10	kilogram	*kiroguramu	3rd	30	Australia	*oosutoraria	6th
11	measure	*mejaa	3rd	31	bear	*beaa	6th
12	page	*peeji	3rd	32	cancer	*kyansaa	6th
13	pencil	*pensiru	3rd	33	compass	*konpasu	6th
14	small	*sumooru	3rd	34	electric	*erekutorikku	6th
15	bottom	*botomu	4th	35	hour	*awaa	6th
16		*botomu	4th	36	Japan	*japan	6th
17	computer	*konpuutaa	4th	37	minor	*mainaa	6th
18		*konpuutaa	4th	38	original	*orijinaru	6th
19	change	*chenji	4th	39	pole	*pooru	6th
20		*chenji	4th				

characteristic was *katakana*-like pronunciation, particularly of words which are used as *katakana* words in daily Japanese. This phenomenon could be considered either a negative L1 transfer effect or so-called *borrowing*, in which children take the words in question from Japanese and use them in English. Table 18 above presents samples observed in the filmed classes, and whenever there was more than one individual that made errors on the same word, they are separately listed in the table. It should be noted first that, although 39 samples of *katakana*-like pronunciation may appear to be relatively many, their rate of occurrence was only 0.4% of the total analyzed samples (N＝9360). In Table 18 above, the column on the left shows the spelling of the words which children intended to pronounce, while the second column from the left indicates the children's *katakana*-like pronunciation as observed, as represented by Romanized characters with the symbol "*" for incorrect pronunciation, and without ［　］ for differences from normal English pronunciation.

In addition, while the children as a whole exhibited a very high ability in English pronunciation, as we saw above, there were specific sounds that were pronounced differently by different individuals. In particular, the quality of the sound ［ər］ was one clear example of such individual differences. For example, some children pronounced words that contain the ［ər］ sound just like native speakers of English, as in *caterpillar* (1st grade), *firefighter* (2nd grade), *bird* (5th grade), *percentage* (5th grade), and *passengers* (fifth grade, math). In contrast, other children's pronunciation of this sound was somewhat closer to Japanese ア-like sounds, and these have been indicated in Table 18 above by putting the numbers in a □. Interestingly, children in lower grades, relative to those in higher grades, showed a strong tendency toward the natural acquisition of［ər］, which is often said to be very difficult for Japanese learners of English as a foreign language.

A second characteristic of pronunciation that needs to be improved is pronunciation in which a vowel is added to the word-final consonant. This seems to be a negative language transfer effect of

Table 19. Addition of Vowels to Word-Final Consonants

1	but	*but＋[o]	2nd
2	should	*should＋[o]	2nd
3	because	*because＋[u]	4th
4	like	*like＋[u]	4th
5	next	*next＋[o]	4th
6	think	*think＋[u]	4th
7	like	*like＋[u]	6th
8	named	*named＋[u]	6th
9	What are you doing?	*What＋[o] are you *doing＋[u]?	3rd
10	Don't move paper.	*Don't＋[o] *move＋[u] *paper＋[a]	4th
11	I have this.	*I have＋[u] *this＋[u]	4th
12	That is only …	*That＋[o] *is＋[u] *only＋[i] …	4th

Table 20. Substitution of [s] for an [θ] Sound

1	thing	*[siŋ]	4th
2	think	*[sink]	4th
3	think	*[sink]	5th/6th
4	anything	*[enisiŋ]	6th
5	north	*[nɔːs]	6th
6	south	*[saus]	6th
7	thing	*[siŋ]	6th

Table 21. Incorrect Application of Phonics Rules

1	cow	*[kou]	2nd
2	difference	*[diferens]	2nd
3	air	*[ɛːə]	5th
4	capacity	*[kəpeisiti]	5th
5	prices	*[praiz]	5th
6	revision	*[rivaiʒən]	5th

the Japanese sound system, [consonant-vowel]. This kind of error was not as common as *katakana*-like pronunciation in GKA children's production, according to our records. Table 19 above lists recorded samples, including eight words in (1)-(8) and five sentences in (9)-(12). Each sample listed as a single word was observed in a sentence, and occurred when other words within the same sentence did not have an additional extraneous vowel added to the word-final consonant. When some children spoke slowly, we observed that often more than one word in a single sentence showed this characteristic, as illustrated in (9)-(12). The 12 occurrences of vowels being added to word-final consonants constituted 0.1% of the total number of samples (N＝9,360) examined in our investigation.

A third characteristic of pronunciation that needs improvement is the pronunciation of [θ], as shown in Table 20 above. Some children, particularly in the higher grades, tended to pronounce [θ] as [s], while only a few such samples were observed for the pronunciation of students in the lower grades. The seven occurrences of substitution of [s] for the [θ] sound constituted 0.07% of the total samples (N＝9,360) examined in our

Table 22.   Others

1	another	*[ʌðər] (confused with "other"?)	1st
2	caterpillar	*cat-er-*pil*-lar	1st
3	finished	*[finiʃd̠]	4th
4	scissors	*[sizərs̠]	4th
5	recommend	*[rekəmænd]	7th

investigation.

A fourth characteristic of pronunciation that needs improvement consists of several kinds of incorrect pronunciation that seem to be caused by incorrect application of phonics rules, as listed in Table 21 on the preceding page. The six occurrences of incorrect applications of phonics rules constituted 0.06% of the total number of samples (N＝9,360) examined in our investigation.

In addition to the pronunciation issues described above, we found five samples of other types of pronunciation that need improvement, and these are shown in Table 22 above. The samples (3) and (4) are classified as of the same type in our analysis, as we comment below.

First, there was one instance of a first grader who may have confused *another* with *other*, as given in (1). Second, sample (2) is the only recorded sample that exhibits an error in position of stress, besides the *katakana*-like pronunciation addressed earlier. The difference between samples of *katakana*-like pronunciation and this particular sample is that the former type is considered to occur as a result of negative L1 transfer effects or borrowing, while the latter type is not. It is impressive that GKA children are acquiring English phonological rules very efficiently, so much so that it is rather difficult for us to find errors in the position of stress, other than those caused by prior knowledge of Japanese *katakana* words. Third, there were two samples of incorrect pronunciation of the affixes -*ed* and -*s*, which are listed in (3)-(4). Finally, a seventh grader mispronounced *recommend*, as in (4), but he noticed his error while pronouncing the word. He immediately made a self-correction and pronounced it again correctly.

Since we very seldom observed self-correction samples, this sample is interesting. It is evident how rarely each of the above types was observed in the samples we analyzed: For example, the two examples in (3) and (4), taken together, constituted 0.02% of the total number of samples (N＝9,360) we examined.

The difficulty with the distinction between the [l] and [r] sounds is extremely problematic for Japanese learners of English. It is thus very impressive that most GKA children in each grade can make a clear distinction between the pronunciation of [l] and [r]. For example, some children could write which of [l] or [r] was used in an unknown word, just by listening to the teachers' pronunciation. In the fourth graders' English class, a child asked the teacher the spelling of the word "recitation", and the teacher pronounced the word. The child guessed the spelling from the teacher's pronunciation, and spelled it correctly. Also, in the first graders' music class, children sang *Twinkle Twinkle Little Star* with good pronunciation, distinguishing between [l] and [r] very naturally.

As a possible factor contributing to the excellence of lower-grade children in English pronunciation, the Multiple Critical Period (Seliger 1978) suggests that the critical period for effortless and natural language acquisition for different particular aspects of language is different, with a particularly large difference between that for phonological acquisition and that for syntactic acquisition. More specifically, the critical period for phonological acquisition comes earlier than that for syntactic acquisition. Besides this, we noticed through careful analysis of the filmed classes that

another possible factor may be the fact that lower graders have more time to orally and individually communicate with their teacher than do children in the higher grades. If children have many opportunities to communicate with the teacher in class, they may listen to his/her English pronunciation closely. The teacher in turn may have many opportunities to listen to each child individually, so that he/she can be aware of the different children's pronunciation errors and correct them instantly, either explicitly or implicitly.

Other general tendencies observed in the filmed classes include the following: Lower graders tended to mispronounce long words and words just learned. When teachers conducted class activities in small groups, they corrected this type of mispronunciation instantly and made the children say the words again. Children's utterances, particularly at the sentence level, were greater in volume in the third and fourth grade classes as compared to those of the first and second grades. As pointed out earlier, when children expressed their opinions slowly, while thinking of what to say, they tended to add vowels to word-final consonants. Also, when children were engaged in learning activities in groups, *katakana*-like pronunciation and addition of vowels to word-final consonants were observed more frequently than in other situations. Moreover, in the higher grades, there were no errors made by the children who often

spoke up in class, whereas those who hardly spoke up in class tended to show strong tendencies toward *katakana*-like pronunciation and/or vowel-addition to word-final consonants. This may suggest that children in the higher grades are aware of the quality of their pronunciation, and that such awareness affects the level of their confidence.

4. Observed Characteristics of Production with Regard to Correspondence between Sounds and Letters

This section summarizes our findings on the acquisition of the correspondence between sounds and letters. Overall, GKA children are acquiring correspondence between sounds and letters well, and only N＝108 error samples were observed out of N＝3,942 words examined in the study. Unfortunately, however, the number of writing activities filmed this time was rather small, resulting in great differences in the number of samples between grades. Particularly in the upper grades, there were few samples. For this reason, information obtained from the analyses is quite limited. We, however, identified certain interesting characteristics through recorded samples, and these are presented in Tables 23 to 30 below. The samples taken from the filmed classes included those in children's notebooks, notebooks used specifically for writing activities, and spelling

Table 23. Inference from Teachers' Pronunciation

1	could	*cauod	2nd
2	fountain	*faunten	2nd
3	measure	*mesuar	2nd
4	water	*warter	2nd
5	heavier	*heveier	3rd
6	nervous	*nurvese	4th
7	recitation	*ressetaision	4th
8	session	*sation	4th
9		*setion	4th
10	accidentally	*axidently	6th
11	alternative	*altanative	7th
12	conclusion	*conclution	7th

Table 24. Confusion with Similar Sounds

1	further	*farther	2nd
2	sections	*cections	2nd
3	surface	*sarfase	2nd
4	eraser	*ersar	3rd
5	character	*charactor	4th
6	nervous	*nervaus	4th
7	perfect	*parfect	4th
8	session	*sation	4th
9	session	*setion	4th
10	gather	*gether	5th
11	thirsty	*thursty	5th
12	ventilate	*ventalete	5th
13	accidentally	*axidently	6th
14	devil	*devel	6th
15	experiment	*experament	6th
16	tall	*toll	6th
17	organize	*orgonize	7th
18	Saturday	*Saterday	7th

Table 25. Confusion between [l] and [r] Sounds

1	around	*alound	2nd
2	clown	*crown	2nd
3	locker	*rocker	2nd
4	paper	*papel	2nd
5	dragonflies	*dragonfries	3rd
6	nearly	*nerery	3rd
7	bully	*bury	6th

tests and worksheets given during classes. In the tables presented below, whenever there is more than one probable cause for an observed error sample, the row containing the sample is highlighted in gray, and the sample is placed in more than one category. Also, whenever there was more than one individual that made errors on the same word, they are separately listed in the tables.

At GKA, teachers do not teach children the Roman alphabet. When teachers teach spellings of English words, they regard the correspondence between sounds and letters as the most important issue. Within English immersion education, children have many opportunities to listen to teachers' English pronunciation and spell out what they have heard. Although spelling tests are frequently given in class, the main task in the tests is dictation, during which children often have to infer the spellings of words from the teacher's pronunciation. Table 23 on the preceding page shows error samples that possibly occurred during such inferences.

The highlighted sample in Table 23 may have been caused not only by an inference from the teacher's pronunciation, but also by some other factor. Errors of this type (N=12) constituted just 0.3% of the total number of samples used in the analysis.

Also, as shown in Table 24 above, there were 18 errors that possibly occurred due to confusion of the correct sounds with sounds similar to them, which resulted in spelling associated with incorrect sounds. This kind of error tended to appear more often in connection with vowel sounds. Errors of this type constituted 0.45% of the samples analyzed in the study.

Table 26.　Reversal of the Order of Letters

1	could	*c**lou**d	2nd
2	lighting	*lightnig	4th

Table 27.　Substitution by a Different Letter

1	climax	*c**l**lmax	6th

Table 28.　Confusion with a Different Word

1	clown	***crown**	2nd
2	three	***tree**	2nd
3	ball	***bowl**	3rd

Table 29.　Addition of Letters

1	bumpy	*bummpy	2nd
2	measure	*measurer	2nd
3	water	*warter	2nd
4	nervous	*nervouse	4th

Table 25 on the preceding page shows that there were errors that might have resulted from confusion between the [l] and [r] sounds. This confusion may have occurred due to a negative L1 transfer effect, this effect being manifested as a spelling error when the children transcribed what they heard. The occurrences of this type of error constituted just 0.17% of all the samples examined in the study.

Next, there were two samples in which the order of certain letters within a word was reversed, as listed in Table 26 above, and one sample in which a letter was substituted for by a different letter, as shown in Table 27 above. The occurrences of these types as a percentage of the total number of samples examined were 0.05% and 0.02%, respectively.

Another type of error seems to have occurred due to confusion between different real, correct words. In Table 28 above, there are two samples of the confusion between the [l] and [r] sounds : one example of the omission of a letter, and one example of confusion between the [ɔː] and [ou] sounds. Occurrences of this type of error are again very few, i.e., 0.07% of all the samples analyzed. The next type of error observed in this research was

the addition of an extra letter, as presented in Table 29 above, and there were three kinds of this type of error : addition of an [r] onto a long (or long-sounding) vowel, addition of a vowel after a word-final consonant, and duplication of consonant letters. Errors of this type were found in 0.10% of the samples analyzed in terms of correspondence between sounds and letters.

Finally, the most frequent type of error observed was the omission of a letter, and there were 20 samples of this type, as listed in Table 30 on the following page. Occurrences of this error type were more common than those of all the other types we have seen so far, i.e., 0.64% of all the samples examined. However, this ratio was surprisingly small. Again, the excellence of children undergoing this English immersion program can be clearly seen. There are roughly three kinds of omission observed in Table 30: Omission of vowel letters, omission of consonant letters, and omission of vowel and consonant letters. In the table, these are indicated by putting the number in a □, putting no marks on the number, and putting a circle around the number, respectively.

Since the amount of information available for our examination of written samples was rather

Table 30. Omission of Letters

1	again	*agin	2nd	14	February	*Febrary	3rd
2	chopstick	*chopstic	2nd	15	heavier	*havier	3rd
3	could	*coud	2nd	16		*hevier	3rd
4	evaporate	*evaporte	2nd	17	February	*Febuary	4th
5	experiment	*experment	2nd	18		*Febrary	4th
6	faster	*fater	2nd	19	performance	*peformance	4th
7	frown	*fown	2nd	20	accidentally	*axidently	6th
8	paper	*pape	2nd	21	bully	*buly	6th
9	should	*shoud	2nd	22	grade	*grad	6th
10	thought	*thougt	2nd	23	there	*ther	6th
11	three	*thre	2nd	24	diagonal	*diagnal	7th
12		*tree	2nd	25	increasing	*increasin	7th
13	eraser	*ersar	3rd	26	vertical	*vertcal	7th

limited, it was very difficult to generalize the tendencies observed in the filmed classes. In particular, more samples are necessary in order to infer what possible factors might have caused errors made with regard to the correspondence between sounds and letters. Moreover, it is very important to observe how children are exposed to English input in their daily classes. It would be particularly interesting to find out the relationship between the phonics rules that children acquire and the spelling errors they make. For these reasons, we currently have some research in progress on these issues.

5. Concluding Remarks

The goal and major purpose of this study was to examine the effect of longitudinal English immersion education in Japan. Various types of immersion education have long been carried out in different places in the world, but the Japanese history of immersion education is rather short. For this reason, we lack any information about the effects of immersion education in Japan. Our research has thus begun under the belief that the findings of our research can contribute a great deal, not only to the development of immersion education itself, but also to the development of English education in Japan. The site of our research was Gunma Kokusai Academy, which is one of the two schools offering longitudinal English immersion education in Japan. As part of a large-scale research project, the study focused on an investigation of the linguistic characteristics of young Japanese learners of English who are receiving partial English immersion education, particularly in terms of syntax, pronunciation, and correspondence between sounds and letters. Having filmed a variety of classes from the first to seventh grades, samples were transcribed and analyzed to identify any advantages and items that needed to be improved. A total of 14,136 tokens of samples were used for analyses.

Throughout our investigation, we found that children at Gunma Kokusai Academy, as a whole, have been acquiring English very naturally, and that their performance is remarkable in various ways. While most children at this school seem to suffer from many fewer negative L1 transfer effects than children at regular public schools, we discovered certain specific tendencies that need to be addressed. First, from a syntactic point of view, the various types of errors typically seem to occur as a result of negative L1 transfer effects. Next, in terms of pronunciation, some particularly frequent errors are *katakana*-like pronunciation, and pronunciation of unnecessary vowels. As for the correspondence between sounds and letters, we

found that there are cases in which the [l] sound and [r] sound are confused, which seems to cause spelling errors.   We also found that children try to spell words according to what they hear rather than according to transference from their mother tongue. It was also interesting to note certain phenomena that cannot simply be explained by negative L1 transfer effects, for example misapplications of phonics rules.   These call for further investigation.

As the study showed, GKA children acquire English extremely well.   Their acquisition processes are very natural and efficient, and their progress is far beyond comparison with children at regular public schools who learn English as a foreign language.   It is obvious that daily use of English as a communication tool has many advantages.   Through vast amounts of spoken and written input, GKA children acquire English naturally in terms of the areas we examined, i.e., syntax, pronunciation, and the correspondence between sounds and letters.

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