

# Development of second language intuition: An experimental study on Japanese learners of English

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## **Abstract**

The present paper examines whether or not second language learners can achieve intuition towards the naturalness of their target language. An intuition test is devised to assess their understanding of six syntactic features inspired by Universal Grammar: 1) the direction of verb gapping, 2) the antecedent of reflexive pronouns, 3) the movement of question words, 4) the deletion of pronominal subjects, 5) the occurrence of multiple question words, and 6) the extraction of elements out of relative clauses. The test is given to 51 Japanese learners of English along with 37 native speakers of English. While the performance of the learners is above chance, it is not comparable to that of the native speakers. However, when the learners are divided into four groups according to the amount of reading in English, the group of the most amount of reading shows native-like performance on 1) the direction of verb gapping, 4) the deletion of pronominal subjects, and 5) the occurrence of multiple question words. Based on these results, the study concludes that second language learners can develop second language intuition, and that reading promotes the development.

## Introduction

Noam Chomsky (1980) advocates Universal Grammar (UG) to explain the Plato's problem that humans know more than they are taught in the context of language acquisition. It is UG that makes it possible for humans with various backgrounds and experiences to invariably acquire their first language (L1) and to create sentences that they have never heard before. The major components of UG are the computational system, performance system, and lexicon. Primary linguistic data (PLD) that enters the lexicon determines our L1. Figure 1 demonstrates a simplified UG model for L1 acquisition.

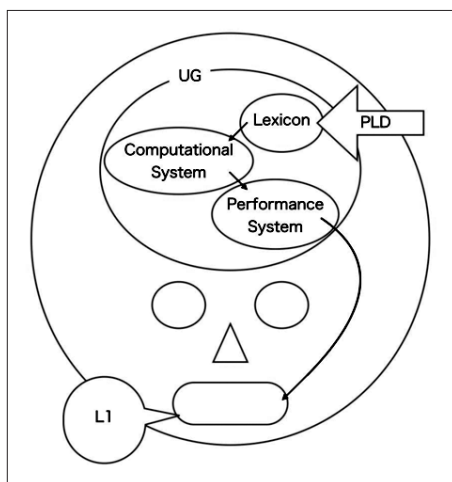


Figure 1. UG model for L1 acquisition

A number of researchers have investigated if UG is intact in second language acquisition (SLA) (White, 1988; Bley-Vroman et al., 1988; Flynn, 1989; Schachter, 1989; Naoi, 1989; Kanno, 1997; Yuan, 1998; White & Juffs, 1998; O'Grady, 1999; Bley-Vroman & Yoshinaga, 2000; Dai, 2017, etc.). In other words, they have attempted to present evidence that second language (L2) learners know more than they are taught about L2. They have studied syntactic differences that are not explicitly taught in language classrooms and examined if learners can demonstrate correct understanding about those differences. Their findings and discussions can roughly be categorized into three positions: i) Full Access, ii) Partial Access, and iii) Non-Access (White, 2003). The former two demonstrate evidence for UG role in SLA while the third position does not, and there has been no clear consensus to date.

The current research also addresses the issue of UG availability in SLA. However, unlike most similar studies in the past, it examines L2 learners' understanding towards multiple syntactic phenomena that are not obviously related to one another other than the fact that they are UG-driven. It attempts to capture the totality of syntactic intuition in SLA. In addition, the study aims to reveal what facilitates UG operation in SLA. Studies linking the findings of UG-based SLA research and classroom pedagogy have emerged in the last decade (Whong et al., 2013). In recent studies on second language learning, extensive reading

(ER)–the practice of learners’ reading for pleasure–has been found to be effective, especially for vocabulary learning (Pigada & Schmitt, 2006; Macalister, 2008, etc.). The input that adult learners can get through ER somewhat resembles the input that children receive in L1 acquisition in terms of volume and naturalness. Such input can play the role of PLD in case of SLA.

## Objectives

The first and major objective of the study is to investigate whether or not native speakers of English and Japanese learners of English are able to reject ungrammatical English sentences. The syntactic properties to be examined are 1) the direction of verb gapping, 2) the antecedent of reflexive pronouns, 3) the movement of question words, 4) the deletion of pronominal subjects, 5) the occurrence of multiple question words, and 6) the extraction of elements out of relative clauses. These linguistic properties are not explicitly taught in classrooms and operate differently between English and Japanese because either relevant linguistic data lacks in one of the languages or parameter settings are different between the languages. Table 1 demonstrates UG rules from which the six properties are evoked and samples of violations in English.

Table 1. UG rules and violations

Properties	UG rules	Violations
(1) Direction of verb gapping	Gapping	*John, meat, and Mary ate fish.
(2) Antecedent of reflexive pronouns	Binding	*John <sub>i</sub> asked Tom to punch himself <sub>i</sub> .
(3) Movement of question words	Subjacency	*What did you go to the store that had?
(4) Deletion of pronominal subjects	PRO-drop	*Who thinks is a genius?
(5) Occurrence of multiple question words	Empty Category Principle	*Who went how?
(6) Extraction of elements out of relative clauses	Structure Dependency	*Is the girl who in the corner is crying?

The equivalent Japanese sentences for the English violations in (1), (2), (4), and (5) are grammatical, and there is no equivalent Japanese data available for (3) and (6). Table 2 below provides fast facts about the two languages with respect to each UG rule.

Table 2. English and Japanese: Fast facts on UG rules

UG rules	English	Japanese
Gapping	<b>Forward</b> e.g. John ate meat, and <b>Mary, fish</b> .	<b>Backward</b> e.g. <b>John-wa niku-o</b> , Mary-wa sakana-o tabeta. John-top meat-dob, Mary-top fish-dob ate
Binding	<b>Local</b> e.g. John <sub>i</sub> asked Tom <sub>j</sub> to punch himself <sub>i</sub> */ <sub>j</sub> . <b>Subject/Object orientation</b> e.g. <b>John<sub>i</sub></b> told Tom <sub>j</sub> about himself <sub>i</sub> / <sub>j</sub> .	<b>Local/Long-distance</b> e.g. <b>John<sub>i</sub>-wa Tom<sub>j</sub>-ni zibun<sub>i</sub>/j-o</b> naguru youni itta. John-top Tom-iob self-dob punch to said <b>Subject orientation</b> e.g. <b>John<sub>i</sub>-wa Tom<sub>j</sub>-ni zibun<sub>i</sub>/j*</b> nituite hanashita. John-top Tom-iob self about told
Subjacency	<b>Wh-movement</b> e.g. <b>Who<sub>i</sub></b> does John know <b>t<sub>i</sub></b> ?	<b>In-situ</b> e.g. John-wa <b>dare-o</b> sitteimasu ka. John-top who-dob know q
PRO-drop	<b>[-]PRO-drop</b> e.g. Who thinks <b>he</b> is a genius?	<b>[+]PRO-drop</b> e.g. Dare-ga [ ] tensai da to omotteimasu ka. Who-sub genius is that think q
Empty Category Principle	<b>[-]Case marker</b> e.g. * <b>Who</b> went how? Note: The trace of <i>how</i> is not properly governed.	<b>[+]Case marker</b> e.g. Dare- <b>ga</b> douyatte ikimashita ka. Who-sub how went q
Structure Dependency	<b>Movement</b> e.g. <b>Is</b> [the girl who is in the corner] <b>t</b> crying?	<b>In-situ</b> e.g. [Kado ni iru onnanoko]-wa naiteimasu <b>ka</b> . corner in is girl-top crying q

Keys: top=topic marker; dob=direct object marker; iob=indirect object marker; q=question particle; t=trace

With the lack of negative evidence that suggests the ungrammaticality of the sentences like those given in Table 1, the proximate performance by Japanese learners to native speakers of English would imply the role of UG in SLA and the development of L2 intuition.

The second aim of the study is to examine whether or not the amount of daily reading in English affects Japanese learners' ability of rejecting ungrammatical English sentences. If it did, it could suggest a specific way to develop L2 intuition in pedagogy—the implementation of extensive reading in English classrooms.

## Methodology

The intuition test consists of 52 items (4 items of the total of 13 types of sentences) as shown in Table 3 below. Each of the 13 types of sentences is given with a sample item.

Table 3. Types of sentences

Sentence type		Sample
Gapping	1. Transitive Verb	*John, meat, and Mary ate fish.
	2. Verb + Object	*I, last week, and Mike took it last month.
	3. Copula	*Jason, very friendly, and Emily is a bit shy.
Binding	4. Monoclausal, Subject	*John <sub>i</sub> told Tom about him <sub>i</sub> .
	5. Monoclausal, Object	*Mary asked Jenny <sub>i</sub> questions about her <sub>i</sub> .
	6. Biclausal, Subject	*John <sub>i</sub> told Tom to punch himself <sub>i</sub> .
	7. Biclausal, Object	*Jenny told Amy <sub>i</sub> that Mary voted for herself <sub>i</sub> .
Subjacency	8. Complex Noun Phrase	*What did you go to the store that had?
	9. Coordinated Structure	*What do you like apples and?
	10. Wh-island	*What are you wondering why you ate?
11. Pro-drop		*Who thinks is a genius?
12. Empty Category Principle		*Who went how?
13. Structure Dependency		*Is the girl who in the corner crying?

The test is given to 37 native speakers of English (English Group) and 51 Japanese learners of English (Japanese Group) through an online survey system. Table 4 below provides the demographic information on the participants.

Table 4. Demographic information on English Group and Japanese Group

		English Group (N=37)	Japanese Group (N=51)
Gender	Male	11	4
	Female	26	47
Age	50 or older	1	4
	40~49	2	5
	30~39	5	2
	18~29	29	40
Highest degree (Completed or In progress)	Ph.D.	5	0
	M.A.	11	1
	B.A.	19	47
	Other	2	3

Moreover, the Japanese Group is divided into 4 groups according to the reported amount of daily reading in English (Highest Group (N=6), High Group (N=6), Low Group (N=7), and Lowest Group (N=32)). The results are analyzed to test the following hypotheses:

Hypothesis 1: The mean score of the English Group is 90% or higher.

Hypothesis 2: The mean score of the Japanese Group is 50% or higher.

Hypothesis 3: There is a significant difference in the mean scores between the two groups.

Hypothesis 4: There is no significant difference in the mean scores between the English Group and Highest Group.

The evidence for Hypothesis 1 would support for the current UG assumptions, and that for Hypothesis 2 would imply a UG role in SLA since the learners' performance is better than chance. If both Hypotheses 3 and 4 were supported, it would indicate that increasing amount of reading has a positive impact on the development of L2 intuition.

The intuition test is a grammaticality judgement task where ungrammatical sentences are presented with grammatical counterparts so as to prevent the participants from accepting ungrammatical sentences or rejecting grammatical sentences for irrelevant reasons that are highly uncontrollable. Each item follows a brief explanation that is meant to provide context. The instructions and a sample question are given below, and the whole test is provided in Appendix A.

### **【Instructions】**

Read the short context and choose the sentence that sounds odd or strange in the given context. The odd (ODD) sentence might be grammatically incorrect or not make sense in the given context. Choose "Can't tell" only when you cannot decide between the two alternatives. If there are words that you don't know in the context or test sentences, you can look them up in a dictionary.

### **【Sample】**

Your father asked you what Alicia and Jake bought at the mall. Which sentence is ODD?

- Alicia bought a pen, and Jake, a ruler.
- Alicia, a pen, and Jake bought a ruler.
- Can't tell.

The research is intended to reveal 1) that native speakers of English invariably demonstrate the ability to reject ungrammatical sentences, 2) that the development of L2 intuition is achievable even when negative evidence is not available, and 3) that the amount of reading plays a role in developing L2 intuition.

## **Results and discussion**

Table 5 shows the mean scores of the English Group, Japanese Group, Highest Group, High Group, Low Group, and Lowest Group on the intuition test. The Highest Group consists of the Japanese learners who report that they read English more than two hours daily, the High Group, one to two hours, the Low Group, 30 minutes to one hour, and the Lowest Group, less than one hour.

Table 5. Mean scores on the intuition test

Group	Number	Mean score out of 52	Percentage
English	37	49.03	94.29%
Japanese	51	32.08	61.69%
Highest	6	43.17	83.02%
High	6	36.00	69.23%
Low	7	26.29	50.56%
Lowest	32	30.53	58.71%

The mean score of the English Group is 49.03 out of 52, accounting for 94.29%, and therefore, Hypothesis 1 is supported. This result suggests that the native speakers of English understand the linguistic features corresponding to the proposed UG theory. Hypothesis 2 is also supported since the mean score of the Japanese Group is 32.08 out of 52, accounting for 61.69%, which is higher than the random score of 50%. This result potentially indicates that UG is intact in SLA, and L2 intuition is achievable. In order to test Hypotheses 3 and 4, a two sample t-test is performed to compare the mean scores of the English Group and Japanese Group and those of the English Group and Highest Group. There is a significant difference at  $p < .05$  between the English Group ( $M=49.03$ ,  $SD=3.24$ ) and Japanese Group ( $M=32.08$ ,  $SD=8.15$ ) ( $t(86)=11.97$ ,  $p=1.99$ ), supporting for Hypothesis 3; however, there is also a significant difference at  $p < .05$  between the English Group ( $M=49.03$ ,  $SD=3.24$ ) and Highest Group ( $M=43.17$ ,  $SD=5.01$ ) ( $t(41)=3.80$ ,  $p=2.02$ ), rejecting Hypothesis 4.

Based on the findings so far, it is suggestive that the Japanese learners can somewhat develop syntactic intuition for English, but the development of the totality of syntactic intuition, involving multiple linguistic features evoked from various UG rules, turns out to be rather weak. Moreover, the role of reading in the development is not clearly observed. The performance by types of sentences; however, reveals additional insights on these issues. Table 6 provides the mean scores of the English Group and Highest Group on the 13 types of sentences.

Table 6. Mean scores of English Group and Highest Group by sentence type

Sentence type		Mean score			
		English (N=37)		Highest (N=6)	
Gapping (N=12)	1. Transitive Verb (N=4)	11.35	3.76	11.00★	3.50★
	2. Verb + Object (N=4)		3.81		3.83★
	3. Copula (N=4)		3.78		3.67★
Binding (N=16)	4. Monoclausal, Subject (N=4)	14.54	3.68	12.67	3.67★
	5. Monoclausal, Object (N=4)		3.11		1.83
	6. Biclausal, Subject (N=4)		3.84		3.50★
	7. Biclausal, Object (N=4)		3.92		3.67★
Subjacency (N=12)	8. Complex Noun Phrase (N=4)	11.46	3.95	9.00	3.50
	9. Coordinated Structure (N=4)		3.68		3.33★
	10. Wh-island (N=4)		3.84		2.17
11. Pro-drop (N=4)			3.95		3.67★
12. Empty Category Principle (N=4)			3.78		3.83★
13. Structure Dependency (N=4)			3.95		3.00

The mean scores of the Highest Group that are not significantly different from those of the English Group are given a star (★). A two sample t-test reveals no significant difference between the mean scores of the two groups on Gapping, Pro-drop, and Empty Category Principle as well as all the subcategories of Gapping, three out of four Binding items, and Coordinated Structure from Subjacency. The statistics results are provided in Appendix B. These additional findings indicate that the Japanese learners who read English more than two hours daily can achieve native-like understanding on Gapping (the direction of verb gapping), Pro-drop (the deletion of pronominal subjects), and Empty Category Principle (the occurrence of multiple question words) as well as certain aspects of Binding (the antecedent of reflexive pronouns) and Subjacency (the movement of question words).

What they cannot readily achieve, on the other hand, is Structure Dependency (the extraction of elements out of relative clauses) and certain other aspects of Binding and Subjacency. Table 3 is reposted below as Table 7, demonstrating which types of sentences the Highest Group is not good at rejecting with a triangle (▲).



Table 7. Types of sentences Highest Group is not good at rejecting

Sentence type		Sample
Gapping	1. Transitive Verb	*John, meat, and Mary ate fish.
	2. Verb + Object	*I, last week, and Mike took it last month.
	3. Copula	*Jason, very friendly, and Emily is a bit shy.
Binding	4. Monoclausal, Subject	*John <sub>i</sub> told Tom about him <sub>i</sub> .
	5. Monoclausal, Object	*Mary asked Jenny <sub>i</sub> questions about her <sub>i</sub> . ▲
	6. Biclausal, Subject	*John <sub>i</sub> told Tom to punch himself <sub>i</sub> .
	7. Biclausal, Object	*Jenny told Amy <sub>i</sub> that Mary voted for herself <sub>i</sub> .
Subjacency	8. Complex Noun Phrase	*What did you go to the store that had? ▲
	9. Coordinated Structure	*What do you like apple and?
	10. Wh-island	*What are you wondering why you ate? ▲
11. Pro-drop		*Who thinks is a genius?
12. Empty Category Principle		*Who went how?
13. Structure Dependency		*Is the girl who in the corner crying? ▲

One of the four actual test items for type 5 is given below:

Type 5. Monoclausal, Object

Mary interviewed Jenny. She asked about Jenny’s major, skills, work experience, and so on. Which sentence is ODD?

- Mary asked Jenny questions about herself.
- Mary asked Jenny questions about her.
- Can’t tell.

In this item, the context suggests the object antecedent in the monoclausal sentence. The English reflexive pronoun *herself* can refer to either the subject or object, and thus the first option is compatible with the situation. On the other hand, the pronoun *her* has to refer to someone other than *Mary* and *Jenny*, and therefore, the second option should be chosen as the ODD sentence. The performance of the Highest Group on this type of Binding items is not great, the mean score being 1.83 out of 4, which is significantly different from the mean score of 3.11 of the English Group (see Table 6). However, note that the English Group also has difficulties ruling out the second option. The mean score of 3.11 is the lowest in all of the 13 types of sentences. A possible explanation for the weak performance is that the participants favor the subject *Mary* as the antecedent of *herself*, and this interpretation is not compatible with the context, and the preference can be stronger for the Japanese learners because the Japanese reflexive pronoun can only refer to a subject.

One actual test item of each of types 8, 10, and 13 is provided below.

Type 8. Complex Noun Phrase

Your friend went to a store. You want to know what you can buy in the store and so you ask him. Which sentence is ODD?

- What did the store that you went to have?
- What did you go to the store that had?
- Can't tell.

Type 10. Wh-island

Amanda ate something unusual and she's not sure why she did that. You want to ask about it. Which sentence is ODD?

- Why did you eat what you ate?
- What are you wondering why you ate?
- Can't tell.

Type 13. Structure Dependency

There's a girl in the corner. She looks like she's crying. You want to check with your friend about it. Which sentence is ODD?

- Is the girl who is in the corner crying?
- Is the girl who in the corner is crying?
- Can't tell.

Unlike type 5, the English Group does not seem to have any trouble rejecting the ungrammatical sentence for types 8, 10, and 13. The mean scores are 3.95, 3.84, and 3.95 out of 4, respectively, which make a sharp contrast with the mean scores of the Highest Group, 3.50, 2.17, and 3.00 (see Table 6). What makes it harder for the learners to judge these types of sentences as opposed to the rest of the sentences that they judge so well? One plausible answer is the complexity of the sentences. The Subjacency Condition, from which types 8 and 10 are evoked, regulates how far a wh-word can move in the formation of a wh-question. Type 8 deals with the movement of a wh-word out of a complex noun phrase—a noun modified with a relative clause, and type 10, out of an embedded clause led by a wh-word. Similarly, type 13 examines whether yes-no question formation is guided by a structure dependent rule so as not to extract a

verb out of a subject noun phrase with a relative clause. As mentioned earlier, relevant linguistic data is not available in Japanese for types 8, 9, 10, and 13 because a question is formed without a movement in the language. In contrast, relevant data is available in Japanese for the rest of the sentence types, but it just works differently from English. The complexity and complete lack of relevant data in L1 might prolong the acquisition of L2 intuition.

The role of reading in the development of L2 intuition is evaluated by Pearson Correlation Coefficient. Figure 2 below shows the correlation between the intuition test scores of the Japanese Group (N=51) and their reported hours of daily reading. It is found that there is a significant medium positive relationship between them.

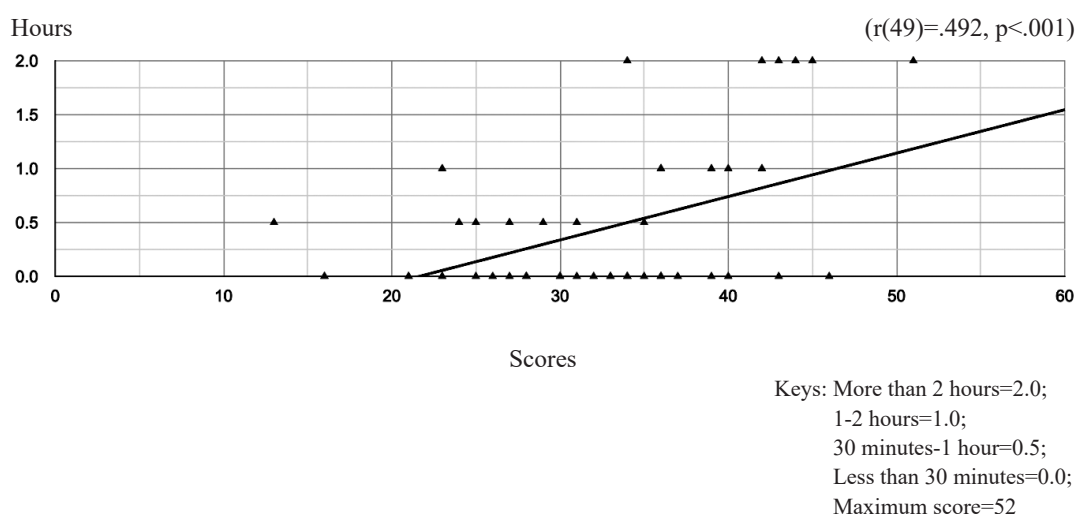


Figure 2. Correlation between daily reading hours and scores on the intuition test

The Japanese Group is also asked to provide the amount of time spent in English-speaking countries and scores of standardized English tests. There are 42 responses to the former, and 18 to the latter, and the correlation with the intuition test scores is presented in Figures 3 and 4, respectively. There is a significant medium positive relationship between the time spent in English-speaking countries and the intuition test scores, and there is a significant large positive relationship between the TOEIC scores and the intuition test scores. It is likely that those who read the most are among those who have spent time in English-speaking countries the most and also among those who are the most proficient in English.

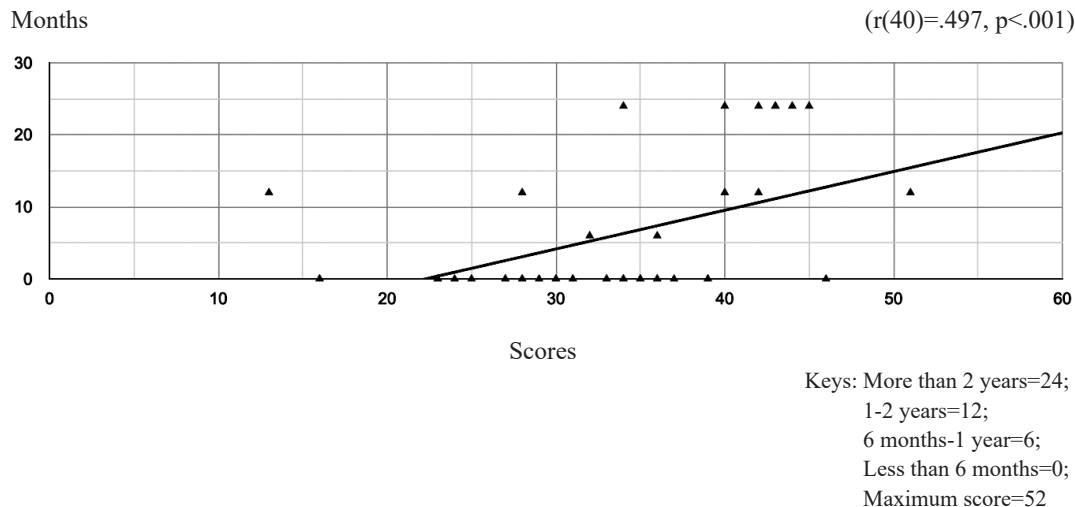
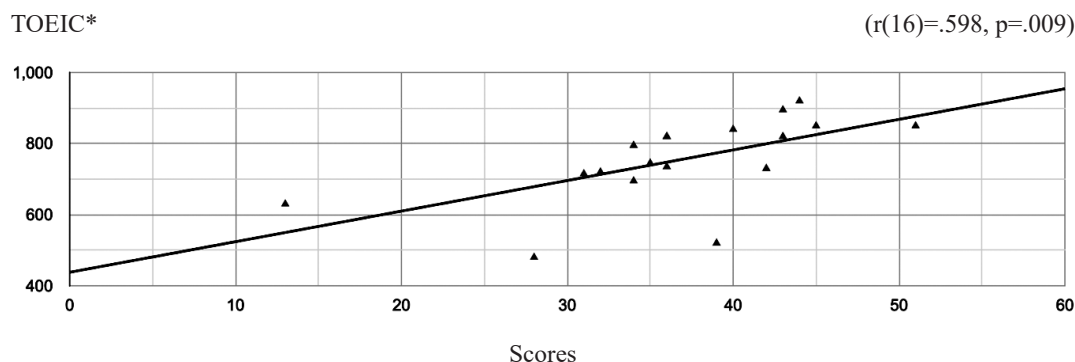


Figure 3. Correlation between time spent in English-speaking countries and scores on the intuition test



Note\*: 16 out of 18 report TOEIC scores, and two, other test scores, which are converted into equivalent TOEIC scores.

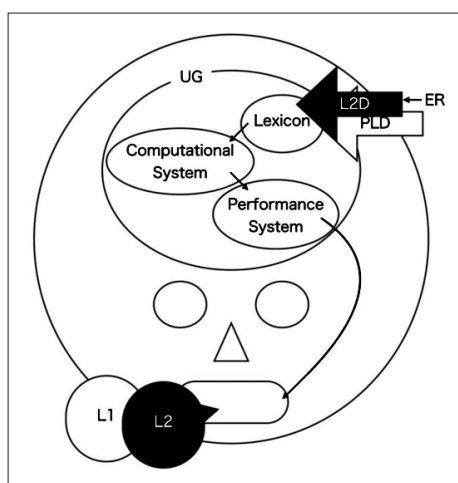
Figure 4. Correlation between TOEIC scores and scores on the intuition test

## Conclusion

The present paper examines whether or not Japanese learners of English can develop syntactic intuition in English and if it is promoted by reading. The overall performance on the intuition test is above chance, which indicates a positive answer to the former question. Those who read English the most demonstrate performance comparable to that of native speakers of English on most items in the test. There is also found a positive relationship between the amount of reading and the intuition test scores. These findings imply the plausibility of the latter question as well.

The study intends to capture the totality of syntactic intuition by employing not just a few linguistic properties but as many as six. These properties are inspired by UG, function differently between English and Japanese, and explicit explanations are not normally available. The performance of the learners in the

current study does not show collective success on the different properties but yields various degrees of success in understanding them. It appears to take longer time to obtain native-like understanding in processing complex sentences especially when no relevant data is available in L1. It is suggestive that receiving abundant positive evidence through reading helps learners recognize the ungrammaticality of certain simple sentences. The gapping structure, for instance, is expected to be highly visible in the act of extensive reading. It might be the case that seeing a sentence like *John ate meat, and Mary, fish* a number of times helps the reader deduce that the opposite pattern *John, meat, and Mary ate fish* is wrong. The visibility, simplicity, and volume of the input might be key factors for the development of L2 intuition. Despite the fact that the present research suffers from a number of limitations including the small number of participants, it is hoped to take a step forward in seeking the efficiency of second language learning as presented in Figure 5.



Keys: L2D=second language data; ER=extensive reading

Figure 5. Possible UG model for SLA

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## Appendix A

### The intuition test

#### [Instructions]

Read the short context and choose the sentence that sounds odd or strange in the given context. The odd (ODD) sentence might be grammatically incorrect or not make sense in the given context. Choose "Can't tell" only when you cannot decide between the two alternatives. If there are words that you don't know in the context or test sentences, you can look them up in a dictionary.

**【Practice】**

<Context> Alice has scratched her eyes and is covering them with her hands. Which sentence is ODD?

- Alice is hard to see. (It does not make sense, and thus you choose it.)
- Alice can't see.
- Can't tell.

1. Your teacher asked you what classes John and Mary had this morning. Which sentence is ODD?

- John, math, and Mary had physics.
- John had math, and Mary, physics.
- Can't tell.

2. You've heard Meredith ate something unusual. You want to know what she ate and so you ask your friend. Which sentence is ODD?

- What do you know the fact Meredith ate?
- What do you know about what Meredith ate?
- Can't tell.

3. Your teacher asked you what you and Alex became after graduation. Which sentence is ODD?

- I became a pilot, and Alex, a police officer.
- I, a pilot, and Alex became a police officer.
- Can't tell.

4. Alison scratched Jane's arm, and Jane told her mother about it. Which sentence is ODD?

- Jane told her mother that Alison scratched herself.
- Jane told her mother that Alison scratched her.
- Can't tell.

5. Mary interviewed Jenny. She asked about Jenny's major, skills, work experience, and so on. Which sentence is ODD?

- Mary asked Jenny questions about herself.
- Mary asked Jenny questions about her.
- Can't tell.

6. There are a few people working in the kitchen. You want to know what they are doing and so you ask your friend. Which sentence is ODD?

- Are the people who are in the kitchen cooking or washing the dishes?
- Are the people who in the kitchen are cooking or washing the dishes?
- Can't tell.

7. Your father asked you about the occupations of the fathers of your two friends, Jason and Emily. Which sentence is ODD?

- Jason's father, a dentist, and Emily's father is a teacher.
- Jason's father is a dentist, and Emily's father, a teacher.
- Can't tell.

8. You want to know who changed the plan and why he did it. Which sentence is ODD?

- Who changed it why?
- Who changed it and why?
- Can't tell.

9. Someone is proclaiming loudly, "I'm the fastest runner!" You want to know who that is. Which sentence is ODD?

- Who believes is the fastest runner?
- Who believes he is the fastest runner?
- Can't tell.

10. Jessica admires Ashley. Kim knew about it and told Ashley. Which sentence is ODD?

- Kim told Ashley that Jessica admires her.
- Kim told Ashley that Jessica admires herself.
- Can't tell.

11. There's a man talking to people with a few drawings. He looks like a salesperson. You want to check with your friend about it. Which sentence is ODD?

- Is the man who talking to people is selling his drawings?
- Is the man who is talking to people selling his drawings?
- Can't tell.



12. Kyle and David are brothers. They asked their parents many questions about what they did before they got married. Which sentence is ODD?

- Kyle and David asked their parents about them.
- Kyle and David asked their parents about themselves.
- Can't tell.

13. Your father asked you where you and your brother, John, watched the movie. Which sentence is ODD?

- I, at home, and John watched it at school.
- I watched it at home, and John, at school.
- Can't tell.

14. You want to know who went to a concert and how he went. Which sentence is ODD?

- Who went and how?
- Who went how?
- Can't tell.

15. The instructor asked you when Jake and Emily learned how to ski. Which sentence is ODD?

- Jake learned how to ski when he was six, and Emily, when she was eight.
- Jake, when he was six, and Emily learned how to ski when she was eight.
- Can't tell.

16. John talked about his job, family, hobbies, and so on. Tom listened. Which sentence is ODD?

- John told Tom about him.
- John told Tom about himself.
- Can't tell.

17. Alan and Jenny told their friends how they met, how long they have been together, and so on. Which sentence is ODD?

- Alan and Jenny told their friends about them.
- Alan and Jenny told their friends about themselves.
- Can't tell.

18. You would like to offer your friend orange juice or something else. Which sentence is ODD?

- Would you like to have orange juice or something?
- What would you like to have orange juice or?
- Can't tell.

19. Your teacher asked you when you and your friend, Mike, took the examination. Which sentence is ODD?

- I, last week, and Mike took it last month.
- I took it last week, and Mike, last month.
- Can't tell.

20. Cathy met Amy at a party and talked about her job, family, friends, and so on. Amy listened. Which sentence is ODD?

- Cathy told Amy about herself.
- Cathy told Amy about her.
- Can't tell.

21. Chris and David told their aunt and uncle what they are good at, what they like to do on the weekend, and so on. Which sentence is ODD?

- Chris and David told their aunt and uncle about themselves.
- Chris and David told their aunt and uncle about them.
- Can't tell.

22. Your teacher asked you what colors your parents' cars are. Which sentence is ODD?

- My father's is red, and my mother's, white.
- My father's, red, and my mother's is white.
- Can't tell.

23. You and your friend are talking about an actress who plays many roles. Your friend wants to know which ones are your favorite. Which sentence is ODD?

- Which roles do you like the actress who plays?
- Which of the actress's roles are your favorite?
- Can't tell.

24. You know your friend likes apples. You want to know what else she likes. Which sentence is ODD?

- What do you like besides apples?
- What do you like apples and?
- Can't tell.

25. Mary voted for Amy in a class election. Jenny knew about it and told Amy. Which sentence is ODD?

- Jenny told Amy that Mary voted for her.
- Jenny told Amy that Mary voted for herself.
- Can't tell.

26. Your friend went to a store. You want to know what you can buy in the store and so you ask him. Which sentence is ODD?

- What did the store that you went to have?
- What did you go to the store that had?
- Can't tell.

27. You and your friend are talking about a man who wrote many books. Your friend wants to know which ones are your favorite. Which sentence is ODD?

- Which of the man's books do you like?
- Which books do you like the man who wrote?
- Can't tell.

28. At a football game, a coach says, "No one wants to lose." Which sentence is ODD?

- No one wishes they would lose.
- No one wishes would lose.
- Can't tell.

29. Alex is Michael's academic advisor. He asked Michael where he lives, how he goes to school, what classes he would like to take, and so on. Which sentence is ODD?

- Alex asked Michael questions about himself.
- Alex asked Michael questions about him.
- Can't tell.

30. You know Ann has an allergy to kiwi fruit. You want to make sure what else she is allergic to. Which sentence is ODD?

- What is Ann allergic to kiwi fruit and?
- What is Ann allergic to besides kiwi fruit?
- Can't tell.

31. You want to know what Kate left yesterday and where she left it. Which sentence is ODD?

- What did Kate leave and where?
- What did Kate leave where?
- Can't tell.

32. You would like to know if your friend wants a dog or something else as a pet. Which sentence is ODD?

- What would you like to have a dog or?
- Would you like a dog or something else?
- Can't tell.

33. At a speech contest, someone says, "We all want to win." Which sentence is ODD?

- Everyone wishes they could be the winner.
- Everyone wishes could be the winner.
- Can't tell.

34. Jason doesn't like Eathon. Pete knew about it and told Eathon. Which sentence is ODD?

- Pete told Eathon that Jason doesn't like himself.
- Pete told Eathon that Jason doesn't like him.
- Can't tell.

35. Someone is shouting, "I'm genius! I'm genius!" You want to know who that is. Which sentence is ODD?

- Who thinks is a genius?
- Who thinks he is a genius?
- Can't tell.

36. Your father asked you what Alicia and Jake bought at the mall. Which sentence is ODD?

- Alicia bought a pen, and Jake, a ruler.
- Alicia, a pen, and Jake bought a ruler.
- Can't tell.

37. You've heard that John lost something. You want to know what he lost and so you ask your friend. Which sentence is ODD?

- What do you know the news John lost?
- What do you know about what John lost?
- Can't tell.

38. Your mother asked you what John and Mary ate. Which sentence is ODD?

- John ate meat, and Mary, fish.
- John, meat, and Mary ate fish.
- Can't tell.

39. John said to Tom, "Punch me." Which sentence is ODD?

- John told Tom to punch himself.
- John told Tom to punch him.
- Can't tell.

40. You want to know when Josh went to the concert and how he went there. Which sentence is ODD?

- When did Josh go to the concert how?
- When did Josh go to the concert and how?
- Can't tell.

41. Your teacher asked you how often Jim and Tom clean their rooms. Which sentence is ODD?

- Jim, once a week, and Tom cleans his room once a month.
- Jim cleans his room once a week, and Tom, once a month.
- Can't tell.

42. Your mother has received a letter with some surprising information. You want to know what it is and so you ask her. Which sentence is ODD?

- What did you receive the letter that contained?
- What is it about the letter that surprised you?
- Can't tell.

43. There are some students in the backyard. It seems like they are playing soccer. You want to check with your friend about it. Which sentence is ODD?

- Are the students who in the backyard are playing soccer?
- Are the students who are in the backyard playing soccer?
- Can't tell.

44. John cut Tom's finger, and Tom told his father about it. Which sentence is ODD?

- Tom told his father that John cut himself.
- Tom told his father that John cut him.
- Can't tell.

45. There's a girl in the corner. She looks like she's crying. You want to check with your friend about it. Which sentence is ODD?

- Is the girl who is in the corner crying?
- Is the girl who in the corner is crying?
- Can't tell.

46. Your mother asked you what your two friends, Jason and Emily, are like. Which sentence is ODD?

- Jason, very friendly, and Emily is a bit shy.
- Jason is very friendly, and Emily, a bit shy.
- Can't tell.

47. Your friend asked you which season you and your brother like. Which sentence is ODD?

- I, spring, and my brother likes winter.
- I like spring, and my brother, winter.
- Can't tell.

48. Emily and Sarah are classmates. They asked their teachers why they became teachers, how they like to teach, and so on. Which sentence is ODD?

- Emily and Sarah asked their teachers about them.
- Emily and Sarah asked their teachers about themselves.
- Can't tell.

49. You see Martin looking high and low for something. You want to ask about it. Which sentence is ODD?

- What are you wondering where you put?
- Where did you put what you are looking for?
- Can't tell.

50. Emma asked Becky, "Could you do my makeup?" Which sentence is ODD?

- Emma asked Becky to put makeup on herself.
- Emma asked Becky to put makeup on her.
- Can't tell.

51. Mike spread a rumor about Ken. Joseph knew about it and told Ken. Which sentence is ODD?

- Joseph told Ken that Mike spread a rumor about himself.
- Joseph told Ken that Mike spread a rumor about him.
- Can't tell.

52. Amanda ate something unusual and she's not sure why she did that. You want to ask about it. Which sentence is ODD?

- Why did you eat what you ate?
- What are you wondering why you ate?
- Can't tell.

**Appendix B**Non-significant t-test results by sentence type at  $p < .05$ 

Sentence type	Mean and SD		t(df) and p value
	English	Highest	
Gapping (N=12)	M=11.35, SD=1.36	M=11.00, SD=1.83	t(41)=0.56, p=2.02
1. Transitive Verb (N=4)	M=3.76, SD=0.59	M=3.50, SD=0.76	t(41)=0.95, p=2.02
2. Verb + Object (N=4)	M=3.81, SD=0.51	M=3.83, SD=0.37	t(41)=-0.10, p=2.02
3. Copula (N=4)	M=3.78, SD=0.53	M=3.67, SD=0.75	t(41)=0.48, p=2.02
4. Monoclausal, Subject (N=4)	M=3.68, SD=0.87	M=3.67, SD=0.47	t(41)=0.02, p=2.02
6. Biclausal, Subject (N=4)	M=3.84, SD=0.37	M=3.50, SD=0.50	t(41)=1.98, p=2.02
7. Biclausal, Object (N=4)	M=3.92, SD=0.27	M=3.67, SD=0.47	t(41)=1.88, p=2.02
9. Coordinated Structure (N=4)	M=3.68, SD=0.77	M=3.33, SD=0.75	t(41)=1.01, p=2.02
11. Pro-drop (N=4)	M=3.95, SD=0.23	M=3.67, SD=0.75	t(41)=1.89, p=2.02
12. Empty Category Principle (N=4)	M=3.78, SD=0.70	M=3.83, SD=0.37	t(41)=-0.17, p=2.02