Japanese ESL Student Correctness Decisions for Noun Phrases Exhibiting Short and Long Distance Adjective Disordering

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Abstract

English adjective order is determined by the features of specific adjectives although not by explicit syntactic rules. Using a noun phrase correctness decision task, the present study investigated the effects of rearranged adjective order on the ability of Japanese university ESL students to correctly process English noun phrases. Error rates and reaction times indicated no difference between high and low English reading comprehension groups. Since only the most basic of English adjectives were selected for stimulus items, and since error rates were high among ESL students at both high and low levels, Japanese university students are seen to lack knowledge of rules outlining the correct usage of adjectives in English. The present study further examined the effects of two conditions of adjective disordering - 'short distance' disordering and 'long distance' disordering - from correct adjective ordering. Findings showed no difference in reaction times between the higher and lower comprehension groups. Error rates for noun phrases exhibiting 'short-distance' disordering were harder for participants to reject.

Keywords: order of adjectives, correctness decision task, short and long distance adjective disordering, Japanese ESL students

Introduction

The order of adjectives in Japanese phrases is completely free, while this is not the case with English. For instance, the English expression, 'a sporty red Italian car' can be written in Japanese as *supootsu-taipu-no akai Itaria-no kuruma*. This noun phrase can be re-ordered in five other correct ways, *akai supootsu-taipu-no Itaria-no kuruma* ('a red sporty Italian car'), *akai Itaria-no supootsu-taipu-no kuruma* ('a red Italian sporty car'), *Itaria-no supootsu-taipu-no akai kuruma* ('an Italian sporty red car'), *Itaria-no akai supootsu-taipu-no kuruma* ('an Italian red sporty car') and *supootsu-taipu-no Itaria-no akai kuruma* ('a sporty Italian red car'). However, none of these five expressions is correct in English. English adjective order is determined by the features of specific adjectives although not by explicit syntactic rules. The absence of a determined order of adjective features in the Japanese language may cause Japanese ESL (English as a Second Language) students to experience difficulties understanding (i.e., comprehending as well as producing) English adjective order. In terms of passive comprehension, the order of adjectives in noun phrases might not be expected to have serious consequences for effective understanding of any intended meaning. However, in terms of production (whether spoken or written), even slight variations in the ordering of adjectives before the nouns they describe (or modify) can mean the difference between clear expression and unintended statements which are distinctively awkward to the native ear.

Order of Adjectives in English

There is a lack of consensus among English grammarians and 'authoritative' texts as to the ultimately correct (i.e., canonical) order of adjectives

(for two examples of popular reference works offering differing views on adjective order, see Morenberg, 2002 and Swan, 1995). Rules pertaining to the ordering of words in noun phrases are replete with exceptions; adjective order is therefore a very difficult aspect of English grammar for even the most experienced teachers (both native and non-native speaking) to confidently and effectively teach. It is impossible to explain why we say *little white duck* and not *white little duck* or why we say *red Swedish luxury sedan* and not *Swedish red luxury sedan*. It takes a great deal of practice with and exposure to a language before this order becomes instinctive, because the order often seems arbitrary. Sometimes adjectives appear in a string, and when they do, they appear in a set order according to category. While there are many exceptions to the pattern, for the purposes of the present experiment, the order of adjectives considered as 'correct' is borrowed from Swan (1995). This order, including examples, is presented in Table 1.

Simply stated, the order of adjectives before a noun can be categorized as follows: 1) determiner (e.g., *a / an / the*), 2) general observation (e.g., *fantastic, pretty*); 3) physical description (descriptions of size, shape, age and color, in that order); 4) origin (e.g., *American, French*); 5) material (e.g., *cotton, plastic*) and 6) qualifier (e.g., *cycling, bathing*). Adjectives of colour, origin, material and purpose generally appear in that order. Other adjectives usually go before words of colour, origin, material and purpose. Examples are *wonderful, complete, radically, sublime, tasty*, and *weird*. Numbers usually go before adjectives. *First, next* and *last* most often go before *one, two, three*, etc. Age normally goes after adjectives of size, length and height, but before colour, origin, material and purpose. It is very unlikely that anyone would use more than two or three adjectives in a noun phrase, save for in cases of emphatic verbal expression.

Table 1. Order of adjectives in noun phrases

Determiner (articles and other limiters)	**Observation** (post determiners, limiter adjectives and adjectives subject to subjective measure)	**Physical Description** (adjectives subject to objective measure)				**Origin** (denominal adjectives denoting source of noun)	**Material** (denominal adjectives denoting what something is made of)	**Qualifier** (final limiter)	**Noun**
		Size	**Shape**	**Age**	**Color**				
a	beautiful			antique		British		touring	car
five		small	round		green				balls
his			long		brown				hair
many	smart			young		Japanese			students
an				old			wooden	rocking	chair
their	expensive	big			white				house
that	tasty		round			Belgian			chocolate
one		large			red		silk		scarf

Source: *The Royal Order of Adjectives* was created by Dr. Charles Darling, Professor of English, Capital Community College, Hartford, Connecticut, USA. This table is reported in *Guide to Grammar and Writing*, accessed by the homepage of http://depts.gallaudet.edu/englishworks/grammar/partsofspeech.html.

This experiment assumes that the extent of disorder among adjectives in noun phrases will determine the extent that a phrase is interpreted as being either correct or incorrect. As previously noted, "the rules for adjective order are very complicated, and different grammars disagree about the details" (Swan, 1995, p. 8). As such, slighter variations in adjective order may leave even native speakers with slight feelings of uncertainty or indecision as to the correctness of a sentence. Larger variations in the distance between items of the above outlined categories, however, generally trigger a stronger sense of certainty as to correctness. In other words, the larger the deviation from the canonical order, the greater the sense will be that a sentence is incorrect, and likewise. In the reaction time paradigm using noun phrase correctness decision tasks, larger deviations from the canonical order are expected to be more easily identified, and therefore are expected to result in shorter reaction times and lower error rates.

Two Questions of the Present Study

To date, there have been no systematic experiments which attempt to gauge Japanese ESL students' knowledge of adjective order in English noun phases. The present study therefore investigated the effects of rearranged adjective order on the ability of ESL students to correctly process English noun phrases. The intentions of the present study are therefore two-fold.

First, the experiment sought to determine whether or not native Japanese speaking ESL students at the university level can effectively identify correct adjective order in common English noun phrases. This was done using timed noun phrase correctness decision tasks, which measured the speed with which the student participants could accurately

identify examples of both correct and incorrect adjective ordering in common English noun phrases. The study provides an indication as to the extent to which Japanese university students are seen to have grasped rules outlining the correct usage of adjectives in English. Furthermore, the results of the present experiment can reflect the general English comprehension skills of Japanese ESL learners at the university level.

Second, it is assumed that the primary source of errors in the noun phrase correctness decision tasks would be the extent of student inability to discern slight (i.e., 'short distance' disordering) to greater (i.e., 'long distance' disordering) departures from correct adjective ordering. As shown in the distance effects of noun phrases in the processing of Japanese sentences (Tamaoka, Sakai, Kawahara, Miyaoka, Lim & Koizumi, 2005), it was assumed that speakers would need extra time to process noun phrases depending on the extent to which they departed from the canonical order. This study therefore examined whether or not accurate response times were affected by the degree of adjective disorder.

In efforts to maintain both practical focus and simplicity of analysis, the present experiment omitted determiners and qualifiers, considering the ordering of the four 'middle' categories in Table 1, above - observation, physical description, origin and material.

Method

Participants

Forty-five undergraduate students (33 females and 12 males) at Hiroshima Shudo University in Japan, all native speakers of Japanese, participated in the experiment. Ages ranged from 23 years and 2 months to 18 years and 9 months. The average age was 20 years and 3 months with a standard deviation of 1 year and 0 months on the respective day of

testing.

A multiple-choice cloze reading exercise based on a placement test developed by Poel and Weatherly (1997) was given to the 45 students prior to the experiments, in order to determine the influence, if any, of students' English comprehension levels on their responses. The test had been previously tested for reliability in assigning college students to the appropriate level of English courses. Although the test was administered without a time limit, all the students completed the test within ten minutes. The average score on the test for all participants was 10.43 out of a maximum of 15 with a standard deviation of 2.56. The students were divided into two groups, those who attained higher than 10 points, and 10 and lower; the higher reading level (22 students) had a mean score of 12.45 with a standard deviation of 1.14, while the lower reading level (23 students) showed a mean of 8.48 with a standard deviation of 2.02. A *t*-test showed that mean scores of the two groups were statistically different [$t(43) = 8.077$, $p < .001$].

Materials

A total of 80 phrases were used for the experiment. These consisted of 30 correct and 30 incorrect phrases for the target stimuli, combined with 10 correct and 10 incorrect, 'dummy' phrases. For correct 'Yes' responses, each phrase was constructed using three adjectives and a noun, such as 'quiet young Chinese student'.

The present study investigated how sensitively Japanese ESL students could detect incorrect order of adjectives in simple noun phrases, as would be indicated by correct 'No' responses. Noun phrases with disordered adjectives were created on the basis of canonical phrases. In an effort to ensure that word difficulty did not affect participant performance, only the

most basic and familiar English adjectives were selected from beginner-level university textbooks for inclusion in the experiment. The stimulus noun phrases were constructed in two ways based on the degree of adjective disorder. The first condition, termed 'short-distance' disordering, repositioned an adjective within the category of 'physical description' (size, shape, age, colour) before a noun. This condition, in other words, created the slightest disorder possible by merely switching the order of adjectives that in a canonical noun phrase would already be side by side. For example, *big fat green frog* was presented as *fat big green frog*. The second condition, 'long-distance' disordering, repositioned an adjective of physical description to a greater degree before a noun, involving a 'jump' over more than two places from the canonical order of adjectives within the category. For example, *big fat green frog* was presented as *green big fat frog*.

This procedure resulted in the creation of incorrect 90 noun phrases. It was expected that reading times would become shorter when participants saw phrases containing the same words. Thus, in order to prevent this problem of repeatedly encountering the adjectives and nouns in correct 'No' responses, a counterbalanced design (or a Latin square design) was used to assign participants to different noun phrases. Three lists of phrases were given to three groups of participants.

Consequently, a total of 80 noun phrases in each list consisted of 30 correct, 30 counterbalanced incorrect, 10 correct dummy and 10 incorrect dummy noun phrases.

Data Gathering Procedure

The presentation was controlled by a computer program Microsoft Visual Basic 6.0 + Microsoft DirectX8. Stimuli with both 'Yes' and 'No' correct responses were presented to participants in random order in the center of

a computer screen 600 milliseconds after the appearance of an asterisk '*' indicating an eye fixation point. Participants were instructed to respond as quickly and as accurately as possible in deciding whether or not the phrase made sense. Response was registered by pressing a key marked 'Yes' or 'No'. Twenty practice trials were given to the participants prior to the commencement of actual testing.

Analysis and Results

Only stimulus items of correct responses were used in the analyses of reaction times. Extremes (less than 400 milliseconds and longer than 12,000 milliseconds) among properly-judged correctness decisions were replaced by the mean of each individual to neutralize disproportionate influences upon reaction times. Before performing the analysis, reaction times outside of 2.5 standard deviations at both the high and low ranges in each individual participant were replaced by boundaries indicated by 2.5 standard deviations from the individual means of participants in each category.

Table 2 Reaction times and error rates for correct 'Yes' responses of noun phrase correctness decisions in function of English reading comprehension abilities

	English Reading Comprehension Ability			
	Higher (n=22)		Lower (n=23)	
Measurement	M	SD	M	SD
Reaction Times (ms)	4536	999	4499	1090
Error Rates (%)	32.45%	13.66%	32.83%	11.43%

Note: 'M' refers to a mean and 'SD' refers to a standard deviation.

The means and standard deviations of correct 'Yes' reaction times and error rates are presented in Table 2. A *t*-test on reaction times and error

rates for correct 'Yes' responses (correct noun phrases) was used to compare two groups of higher (n=22) and lower (n=23) English reading comprehension ability. The result of reaction times [t(43)=0.117, *n.s.*] and error rates [t(43)=–0.104, *n.s.*] revealed no difference between the two groups.

The means and standard deviations of correct 'No' reaction times and error rates are presented in Table 3. A 2 (high and low English reading comprehension groups) X 2 (two types of noun phrases with disordered adjectives) two-way analysis of variance (ANOVA) repeated measures conducted for reaction times. The results indicated no significant man effects of the high and low groups [F(1,43)=0.803, *n.s.*] and adjective orders [F(1,43)=2.609, *n.s.*], and no significant interaction of these two variables [F(1,43)=1.152, *n.s.*]. Since the two groups displayed a large difference in scores of English reading comprehension ability test, these null effects were highly unexpected.

Table 3 Reaction times and error rates for correct 'No' responses of noun phrase correctness decisions in function of English reading comprehension abilities

Measurement	Misplacement of Adjectives in Noun Phrases	English Reading Comprehension Ability			
		Higher (n=22)		Lower (n=23)	
		M	SD	M	SD
Reaction Times (ms)	Short Distance	5560	1488	5058	1472
	Long Distance	5118	1168	4969	1181
Error Rates (%)	Short Distance	64.55%	13.24%	61.16%	11.49%
	Long Distance	56.36%	21.84%	54.78%	15.95%

Note: 'M' refers to a mean and 'SD' refers to a standard deviation.

The same ANOVA was conducted for error rates. There was no significant main effect of the two groups [F(1,43)=0.466, *n.s.*] while the

main effect of adjective order was significant [$F(1,43)=5.453$, $p<.05$]. The interaction of these two variables was not significant [$F(1,43)=0.084$, *n.s.*].

In order to further examine accuracies in correctness decisions for each noun phrase, 30 correct phrases were re-ordered by accuracies as shown in Table 4. There seem to be particular items which were exceptionally easy and exceptionally difficult for participants to accurately identify as correct noun phrases (i.e., correct 'yes' responses). While 30 phrases cannot suffice to make concrete generalizations, the phrases within each group share certain characteristics worthy of closer examination. Words which are frequently used in Japanese as English loan words presented in the katakana moraic script such as コンピューター /koNpuRtaR/ (/N/ for nasal and /R/ for long vowel) for *computer*, モダン /modaN/ for *modern*, ブラック /buraQku/ (/Q/ for geminate) for *black* are seen to be included in phrases which were most often accurately identified as correct (i.e., higher than 80% accuracy). These noun phrases also contained what could be called the most basic of the basic adjectives (i.e., *little, big, black, moon, yellow*) used in this experiment, with students having had repeated exposure to them since their very first year of English language study.

There are some potential explanations to account for noun phrases that were not accurately identified (falling below 55% accuracy). Some grammatically correct noun phrases may have been rather uncommon, due to redundancy (i.e., *small thin, tiny flat*) self-evidence (i.e., *brown cookie*) or lack of familiarity (i.e., *old cookie*). Finally, while care was taken to select words with which participants would already be familiar, some may nevertheless have presented difficulty for lower level students (e.g., *medium-length*).

Table 4 Mean reaction times and accuracies for correct noun phrases with three adjectives

ID #	Adjective 1	Adjective 2	Adjective 3	Noun	Accuracy (%)	RTs (ms)
1	large	modern	black	machine	84.44%	4146
2	little	flat	modern	computer	80.00%	4978
3	big	round	yellow	moon	80.00%	4148
4	big	thick	red	marker	77.78%	4676
5	little	narrow	green	leaf	77.78%	3944
6	large	wide	antique	chair	75.56%	4258
7	huge	high	modern	tower	75.56%	4522
8	tiny	thin	orange	paper	75.56%	4555
9	little	modern	black	camera	75.56%	3822
10	huge	modern	red	rocket	75.56%	4868
11	large	thin	pink	shirt	73.33%	4835
12	small	short	middle-aged	fireman	71.11%	5323
13	small	antique	silver	spoon	71.11%	4178
14	large	square	brown	bed	71.11%	4800
15	small	narrow	ancient	gate	71.11%	5411
16	small	new	black	bag	68.89%	3405
17	big	fat	green	frog	68.89%	3740
18	tiny	square	white	stereo	68.89%	4790
19	tiny	round	silver	bell	66.67%	3887
20	miniature	antique	red	model	64.44%	4864
21	tall	ancient	green	wall	62.22%	4370
22	big	long	red	pencil	62.22%	4178
23	miniature	square	gray	television	60.00%	5643
24	huge	new	clear	window	60.00%	5331
25	little	round	white	dish	60.00%	4126
26	small	thin	old	book	53.33%	3781
27	tiny	flat	new	dictionary	53.33%	4276
28	thin	old	brown	cookie	51.11%	4179
29	fat	old	white	dog	46.67%	3552
30	medium-length	new	navy	coat	42.22%	5148

Discussion

The aim of this study was two-fold. The first, more general objective was to achieve a sense as to where Japanese ESL students studying at the university level are in terms of their understanding of noun phrases with correct adjective order. The second aim was to take a more detailed look at how the 'distance' of an adjective's disordering (i.e., the degree to which an adjective is dislocated from its correct, or 'canonical' position in a series) affects students' ability to accurately identify a noun phrase as being either incorrect or correct.

It was assumed that the primary source of errors in the noun phrase correctness decision tasks would be the extent of student inability to discern various degrees of adjective disorder in noun phrases. It was further assumed that participants would need extra time to process noun phrases depending on the extent to which they departed from the canonical order. Regarding the results for correct 'yes' responses, there was no difference in reaction times or error rates between the higher and lower English reading comprehension groups. The same lack of difference held true for both groups in terms of correct 'no' responses. However, there was a difference found in the error rates between 'short-distance' and 'long-distance' adjective disordering for the participants group as a whole. As expected, it was more difficult for students to reject noun phrases exhibiting 'short-distance' adjective disordering than it was for them to reject those stimulus items with 'long-distance' disordering.

Surprisingly, in terms of error rates and in reaction times for noun phrases exhibiting the correct order of adjectives, there was no difference between the high and low English reading comprehension groups — both groups performed at a lower level than had been expected. This also held

true for the ability of both groups to correctly identify disordered noun phrases. Error rates for both English reading comprehension groups were extremely high (well above 50% for both groups and both types of stimulus items). These error rates are, in fact, worse than could be expected to result from random chance.

Given that only the most basic of English adjectives were selected for item creation, this can only lead to the regrettable observation that Japanese university students have little command of the rules outlining the correct usage of adjectives in English. When asked whether or not they had received formal training in the ordering of adjectives, participants said they had not. The ordering of adjectives is not specifically addressed in high school textbooks approved for use in Japanese junior and senior high schools. This suggests that Japanese students have either 1) received little or no prior instruction on this grammatical point, or 2) have somehow, somewhere been exposed to such instruction, yet have not retained it for effective use.

This experiment focused on students ability to passively understand rather than produce noun phrases with correct adjective order. Here, the more philosophical question arises as to whether the ability to readily and correctly produce, let alone recognize, the correct order of adjectives in noun phrases can actually be taught through existing classroom approaches. In that there are no concrete, syntactic rules governing adjective order as there are with, for example, subject-verb agreement, it may be unlikely that Japanese ESL students can ever be taught to produce correctly ordered noun phrases naturally, without having a chart nearby such as is presented in Table 1. This underscores the need for further research into students' ability to produce, as well as passively identify, correct noun phrases.

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