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
Meerman and Tamaoka: Adjective disordering in Noun Phrases

(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

<table>
<thead>
<tr>
<th>Determiner (articles and other limiters)</th>
<th>Observation (adjectives subject to subjective measure)</th>
<th>Physical Description (adjectives subject to objective measure)</th>
<th>Origin (denominational adjectives denoting source or noun)</th>
<th>Material (denominational adjectives denoting what something is made of)</th>
<th>Qualifier (final limiter)</th>
<th>Noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>beautiful</td>
<td>Size</td>
<td>Shape</td>
<td>Age</td>
<td>Color</td>
<td>British</td>
</tr>
<tr>
<td>five</td>
<td>small, round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>his</td>
<td>long, brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>many</td>
<td>smart, young</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>an</td>
<td>old</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>their</td>
<td>expensive, big</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>that</td>
<td>tasty, round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one</td>
<td>large, red, round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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](http://depts.gallaudet.edu/englishworks/grammar/partsofspeech.html).
Meerman and Tamaoka: Adjective disordering in Noun Phrases

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 phrases. 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 E.SL. 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
Meerman and Tamaoka: Adjective disordering in Noun Phrases

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

<table>
<thead>
<tr>
<th>Measurement</th>
<th>English Reading Comprehension Ability</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher (n=22)</td>
<td>Lower (n=23)</td>
<td></td>
</tr>
<tr>
<td>Reaction Times (ms)</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Error Rates (%)</td>
<td>32.45%</td>
<td>13.66%</td>
<td>32.83%</td>
</tr>
</tbody>
</table>

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 \(\{t(43)=0.117, \text{n.s.}\}\) and error rates \(\{t(43)=-0.104, \text{n.s.}\}\) 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) \(\times\) 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 main effects of the high and low groups \([F(1,43)=0.803, \text{n.s.}]\) and adjective orders \([F(1,43)=2.609, \text{n.s.}]\), and no significant interaction of these two variables \([F(1,43)=1.152, \text{n.s.}]\). Since the two groups displayed a large difference in scores of English reading comprehension ability test, these null effects were highly unexpected.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Misplacement of Adjectives in Noun Phrases</th>
<th>English Reading Comprehension Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher ((n=22))</td>
<td>Lower ((n=23))</td>
</tr>
<tr>
<td>Reaction Times (ms)</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Short Distance</td>
<td>5560</td>
<td>1488</td>
</tr>
<tr>
<td>Long Distance</td>
<td>5118</td>
<td>1168</td>
</tr>
<tr>
<td>Error Rates (%)</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Short Distance</td>
<td>64.55%</td>
<td>13.24%</td>
</tr>
<tr>
<td>Long Distance</td>
<td>56.36%</td>
<td>21.84%</td>
</tr>
</tbody>
</table>

*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 \([F(1,43)=0.466, \text{n.s.}]\) while the
main effect of adjective order was significant \( F(1,43)=5.453, p<0.05 \). 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>
<thead>
<tr>
<th>ID #</th>
<th>Adjective 1</th>
<th>Adjective 2</th>
<th>Adjective 3</th>
<th>Noun</th>
<th>Accuracy (%)</th>
<th>RTs (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>large</td>
<td>modern</td>
<td>black</td>
<td>machine</td>
<td>84.44%</td>
<td>4146</td>
</tr>
<tr>
<td>2</td>
<td>little</td>
<td>flat</td>
<td>modern</td>
<td>computer</td>
<td>80.00%</td>
<td>4978</td>
</tr>
<tr>
<td>3</td>
<td>big</td>
<td>round</td>
<td>yellow</td>
<td>moon</td>
<td>80.00%</td>
<td>4148</td>
</tr>
<tr>
<td>4</td>
<td>big</td>
<td>thick</td>
<td>red</td>
<td>marker</td>
<td>77.78%</td>
<td>4676</td>
</tr>
<tr>
<td>5</td>
<td>little</td>
<td>narrow</td>
<td>green</td>
<td>leaf</td>
<td>77.78%</td>
<td>3944</td>
</tr>
<tr>
<td>6</td>
<td>large</td>
<td>wide</td>
<td>antique</td>
<td>chair</td>
<td>75.56%</td>
<td>4258</td>
</tr>
<tr>
<td>7</td>
<td>huge</td>
<td>high</td>
<td>modern</td>
<td>tower</td>
<td>75.56%</td>
<td>4522</td>
</tr>
<tr>
<td>8</td>
<td>tiny</td>
<td>thin</td>
<td>orange</td>
<td>paper</td>
<td>75.56%</td>
<td>4555</td>
</tr>
<tr>
<td>9</td>
<td>little</td>
<td>modern</td>
<td>black</td>
<td>camera</td>
<td>75.56%</td>
<td>3822</td>
</tr>
<tr>
<td>10</td>
<td>huge</td>
<td>modern</td>
<td>red</td>
<td>rocket</td>
<td>75.56%</td>
<td>4868</td>
</tr>
<tr>
<td>11</td>
<td>large</td>
<td>thin</td>
<td>pink</td>
<td>shirt</td>
<td>73.33%</td>
<td>4835</td>
</tr>
<tr>
<td>12</td>
<td>small</td>
<td>short</td>
<td>middle-aged</td>
<td>fireman</td>
<td>71.11%</td>
<td>5323</td>
</tr>
<tr>
<td>13</td>
<td>small</td>
<td>antique</td>
<td>silver</td>
<td>spoon</td>
<td>71.11%</td>
<td>4178</td>
</tr>
<tr>
<td>14</td>
<td>large</td>
<td>square</td>
<td>brown</td>
<td>bed</td>
<td>71.11%</td>
<td>4800</td>
</tr>
<tr>
<td>15</td>
<td>small</td>
<td>narrow</td>
<td>ancient</td>
<td>gate</td>
<td>71.11%</td>
<td>5411</td>
</tr>
<tr>
<td>16</td>
<td>small</td>
<td>new</td>
<td>black</td>
<td>bag</td>
<td>68.89%</td>
<td>3405</td>
</tr>
<tr>
<td>17</td>
<td>big</td>
<td>fat</td>
<td>green</td>
<td>frog</td>
<td>68.89%</td>
<td>3740</td>
</tr>
<tr>
<td>18</td>
<td>tiny</td>
<td>square</td>
<td>white</td>
<td>stereo</td>
<td>68.89%</td>
<td>4790</td>
</tr>
<tr>
<td>19</td>
<td>tiny</td>
<td>round</td>
<td>silver</td>
<td>bell</td>
<td>66.67%</td>
<td>3887</td>
</tr>
<tr>
<td>20</td>
<td>miniature</td>
<td>antique</td>
<td>red</td>
<td>model</td>
<td>64.44%</td>
<td>4864</td>
</tr>
<tr>
<td>21</td>
<td>tall</td>
<td>ancient</td>
<td>green</td>
<td>wall</td>
<td>62.22%</td>
<td>4370</td>
</tr>
<tr>
<td>22</td>
<td>big</td>
<td>long</td>
<td>red</td>
<td>pencil</td>
<td>62.22%</td>
<td>4178</td>
</tr>
<tr>
<td>23</td>
<td>miniature</td>
<td>square</td>
<td>gray</td>
<td>television</td>
<td>60.00%</td>
<td>5643</td>
</tr>
<tr>
<td>24</td>
<td>huge</td>
<td>new</td>
<td>clear</td>
<td>window</td>
<td>60.00%</td>
<td>5331</td>
</tr>
<tr>
<td>25</td>
<td>little</td>
<td>round</td>
<td>white</td>
<td>dish</td>
<td>60.00%</td>
<td>4126</td>
</tr>
<tr>
<td>26</td>
<td>small</td>
<td>thin</td>
<td>old</td>
<td>book</td>
<td>53.33%</td>
<td>3781</td>
</tr>
<tr>
<td>27</td>
<td>tiny</td>
<td>flat</td>
<td>new</td>
<td>dictionary</td>
<td>53.33%</td>
<td>4276</td>
</tr>
<tr>
<td>28</td>
<td>thin</td>
<td>old</td>
<td>brown</td>
<td>cookie</td>
<td>51.11%</td>
<td>4179</td>
</tr>
<tr>
<td>29</td>
<td>fat</td>
<td>old</td>
<td>white</td>
<td>dog</td>
<td>46.67%</td>
<td>3552</td>
</tr>
<tr>
<td>30</td>
<td>medium-length</td>
<td>new</td>
<td>navy</td>
<td>coat</td>
<td>42.22%</td>
<td>5148</td>
</tr>
</tbody>
</table>
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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広島修大論集

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―人文編―

論文
The Return of the Native
熟語的伝統への挑戦としての悲劇の開花
遠藤利昌…11
英語教育における語用論的能力の概念
大澤貞也…19
The Periphrastic Dative and the Wycliffite Bible
吉川史子…33
Japanese ESL Student Correctness Decisions for Noun Phrases
Exhibiting Short and Long Distance Adjective Disordering
Arthur D. Meerman・玉岡賀津雄…55

戦前における単科大学制度の創設

文部省政策問題史研究
森川泉…71

食の問題行動に関する臨床発達心理研究

偏食の発生要因
今田・長谷川智子・坂井信之・瀬戸山裕・増田公男…97

再帰的親密性の登場

現代コミュニケーション変容
相田美穂…141

コミュニケーションの際の効果の検討
米倉照・山本和紀…175

居住環境の違いが食事の好みとその摂取頻度
瀬戸山裕・今田純雄…191

ストレスとリラクゼーションの心身相関
志和・資明・東山正邦・谷好充・瀬戸山裕…213

講演記録

子どもに愛は伝わっていきますか

豊かな時代の親子関係を考える（前編）
春日耕夫…227

2006年2月

広島修道大学人文学会
Articles
A Study of The Return of the Native

—Tragedy as a Weapon to the Convention of Realism—

........................................................................................................ Toshiaki Endou... 1

Possible Implications of Pragmatic Competence

in English Language Education.................................................. Shinya Ozawa... 19

The Periphrastic Dative and the Wycliffite Bible........................ Fumiko Yoshikawa... 33

Japanese ESL Student Correctness Decisions for Noun Phrases

Exhibiting Short and Long Distance Adjective Disordering

........................................................................................................ Arthur D. Meerman and Katsuo Tamaoka... 55

Sanctioning the Establishment of Colleges by the

Imperial Ordinance of 1918.................................................. Izumi Morikawa... 71

Clinical Developmental Studies in Eating Problem (1)

—An Empirical Definition of Henshoku—

.......................................................... Sumio Imada, Tomoko Hasegawa, Nobuyuki Sakai,

Hiroshi Setoyama and Kimio Masuda... 97

Human Rights Education in the Periods for Integrated Study

........................................................................................................ Shoji Sasao and Nobutaka Oba... 115

The Emergence of Reflexive Intimacy

—Considering the Transformation of Communication——— Miho Aida... 141

The Effects of R-S Intervals on Sidman Avoidance-Extinction

Training in Goldfish.................................................. Akira Shishimi and Kazunori Yamamoto... 175

Like/dislike and Frequencies to Eat Ordinary Foods and

Motives of Food Choice in Japanese College Students:

the Difference of Resident Status.......................... Hiroshi Setoyama and Sumio Imada... 191

Psychosomatic Correlation of Stress and Relaxation

.......................................................... Shiro Shiwa, Masayasu Higashiyama,

Yoshimitsu Tani and Hiroshi Setoyama... 213

Lecture

Do Your Children Actually Feel Your Love? (part 1)........... Kofu Kasuga... 227

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