# Acquisition Order of Semantics of English Preposition by Japanese EFL Learners

**Tomoki KANO[a]\* & Yuichi ONO[b]**
[a]*Master Program in Education, University of Tsukuba, Japan*
[b]*Faculty of Humanities and Social Sciences, University of Tsukuba, Japan*
\*s1820030@s.tsukuba.ac.jp

**Abstract:** English preposition has been regarded as a difficult grammatical category for EFL learners to acquire. Image-based instruction is widely recognized as effective teaching methods for them, but it is pointed out that the methodology has some issues. One of them is that the previous studies on the instruction does not consider the acquisitional order of the semantics of English prepositions by EFL learners. The current study, which assumes a knowledge-driven approach, explores how the result of our survey validates the "unidirectionality hypothesis" in Japanese EFL learners' prepositional acquisition, and we conclude that they acquire meanings of English prepositions in a more irregular way than assumed in the literature.

**Keywords:** English prepositions, acquisition order, data-based approach, unidirectionality hypothesis

## 1. Introduction

English prepositions are considered to be difficult for English as Foreign Language (hereafter, EFL) learners to acquire due to their polysemous meanings and arbitrary extensions in semantics. The previous studies propose various teaching methods and "image-based instruction" is one of the popular methodologies. In this methodology, an instructor teaches English prepositions by employing some images which are derived from literature on cognitive linguistics such as Tanaka and Matsumoto (1997) and Tyler and Evans (2003). A great many of researches focus on a positive effect on the learning and suggest the "image-used" instruction is more beneficial than traditional sentence-based or translation-based instructions (Fujii, 2016; Niemeier, 2017). Kano (2018), however, points out two issues of image-based instruction. First, image-use may block learners' understanding of more extended prepositional usages. Secondly, instructors have difficulties in giving learners the feedback as to the use of image. Moreover, more importantly, the acquisition order has not been examined on the basis of empirical data. Most previous researches assume that EFL learners acquire the prototypical meaning first and other extended meanings later or that EFL learners acquire the spatial meanings first, and temporal meanings and abstract meanings later (this is what we call "unidirectionality hypothesis"). A pilot study in Kano (2019), in contrast, indicates it could not be true that Japanese EFL learners acquire a prototype or spatial meanings of English preposition earlier than the other two usages, although the study has the limited number of questions and participants. Therefore, the purpose of this paper is to examine the overall acquisitional trajectory of English prepositions, and also to observe the acquisition order of English prepositions by Japanese EFL learners in more detail with focus on various uses of *over*.

## 2. Survey on Acquisition Order

### 2.1 Procedure

In order to examine the acquisitional order of English prepositions, we conducted a survey on whether or not Japanese EFL learners acquire prepositions in a manner in which previous

studies predict or whether or not the unidirectionality hypothesis holds for Japanese EFL learners. Participants consists of 186 Japanese university students.

Participants answered 80 multiple-choice questions containing target prepositions such as *over, above, under* and *below*, and also dummy prepositions such as *on* and *in*. Each question was shown with Japanese translation of the English sentences. The usage of target prepositions is divided into three types; spatial, temporal and abstract. Based on its semantics, each item was further categorized such as *proto, static, -contact*. Some examples of *over* are shown below.

Table 1
*Examples Used in the Study*

| No. | Sentences | Usage |
|---|---|---|
| 1 | He looked at himself in the mirror (    ) the table. | Spatial, *proto, static, -contact.* |
| 2 | Policemen jumped (   ) the wall. | Spatial, p*roto, dynamic, +obstacle, prep* |
| 3 | Many strikes (   ) the last few years have not ended successfully. | Temporal |
| 4 | He's never had any influence (   ) her. | Abstract, *control* |
| 5 | Think it (    ) carefully before you make a decision. | Abstract, *focus of attention* |

This study conducted two statistical analyses with R (R core team, 2019). As for *over*, multiple comparison test by Pearson's chi-squared test was implemented to observe sufficient differences in correct answer rates between spatial, temporal and abstract meanings. In the cases of *under*, *below* and *above*, Pearson's chi-squared test was conducted. Furthermore, to investigate the acquisition order of certain semantic usage, participants belonging to the top 25th percentile were divided into upper class and those belonging to the bottom 25th percentile were divided into lower class. Pearson's chi-square test was conducted to examine significant differences in correct answer rates between the upper class and the lower class.

*2.2 Result*

Table 2 shows the descriptive statistics for whole score by all participants.

Table 2
*Descriptive Statistics for Whole Scores*

| | M | SD | 95%CI |
|---|---|---|---|
| Participants (N = 186) | 28.60/64.00 | 11.313 | [27.0, 30.2] |

In the case of the preposition *over*, the result of multiple comparison shows that there are not significant differences in correct answer rate between the three semantics. The result is shown below as Table 3.

Table 3
*Result of Multiple Comparison by Chi-square Test*

| Comparisons | Chi-squared | *p*-value | Result |
|---|---|---|---|
| Spatial vs Temporal | 2.04 | .152 | *n.s.* |
| Spatial vs Abstract | 3.45 | .063 | *n.s.* |
| Temporal vs | 0.27 | .060 | *n.s.* |

*Note. n.s.* = not significant, *p* < .0167

As for the other three target preposition, namely *under*, *above* and *below*, there is a significant difference between spatial usage and abstract usage in the cases of *below* (chi-squared = 22.90, *p* < .001) and *under* (chi-squared = 18.15, *p* < .001). Concerning *above*, no significant difference is found (chi-squared = 1.00, *p* = .316). The correct answer rate in spatial usage of *below* (39.8%) is lower than that of abstract usage (52.2%), so the results suggests abstract meanings might be acquired earlier than spatial meaning. On the contrary, the correct answer rate in spatial usage of *under* (62.4%) is higher than that of abstract usage (53.0%), so it is indicated that spatial semantics can be acquired earlier than abstract ones.

Table 4 shows the answer rates of prototypical usage of *over* by upper and lower classes.

Table 4

*Correct Answer Rate of Prototypical Usage of Over and p-value of Pearson's Chi-squared Test*

| Usage | Upper class (%) | Lower class (%) | Chi-squared | *p*-value |
|---|---|---|---|---|
| Static, -contact | 45/50 (90.0) | 10/47 (21.3) | 46.60 | < .001*** |
| Static, +contact | 10/50 (20.0) | 7/47 (14.9) | 0.47 | .508 |
| Dynamic, +obstacle, prep | 45/50 (90.0) | 27/47 (57.4) | 13.42 | < .001*** |
| Dynamic, -obstacle, prep | 43/50 (86.0) | 11/47 (23.4) | 38.47 | < .001*** |
| Dynamic, -obstacle, adv | 16/50 (32.0) | 4/47 (8.5) | 8.167 | .004** |

*Note.* * *p* < .05, ** *p* < .01, *** *p* < .001

Table 4 indicates a certain meaning such as *static, +contact* can be answered regardless of participants' proficiency levels. However, questions containing the other types of usage are not answered at the same rate by each group of learners. These facts suggest Japanese EFL learners do not acquire all of prototypical meanings in the same way. Contrary to the widely held assumption that a prototypical meaning would be acquired in the same manner, the acquisition order of English prepositions by Japanese EFL learner cannot be explained simply in term of its semantics.

*2.3 Discussion*

The result of this study indicates that Japanese EFL learners do not acquire semantic usage of English in the order as spatial first, temporal and abstract later. Furthermore, it is suggested that the acquisitional patterns are quite different among the target prepositions. This study also points out the acquisitional pattern cannot be predicted from the view of its meaning. Considering these findings, it is implied Japanese EFL learners, therefore, acquire the semantics of English prepositions more randomly than expected in the previous studies.

## 3. Conclusion

From this study, it becomes clear that the acquisition order of semantics of English prepositions could not be predicted by unidirectionality hypothesis in the literature. For the future research, we need to elaborate other factors which intervene EFL learners' learning, which affect

acquisitional pattern of English prepositions in more details. In addition, more data-based study on the acquisition is necessary to devise an alternative teaching method to enlarge the effectiveness on grammar learning.

## References

Fujii, K. (2016). Exploration into the effects of the schema-based instruction: A bottom-up approach. *Journal of Pan-Pacific Association of Applied Linguistics, 20*(1), 75–94.

Kano, T. (2018). Issues on teaching English preposition to EFL learners: Focusing on the image schema of English preposition. In Y. Ono & M. Shimada (Eds.) *Data Science in Collaboration, Volume 2.* Tsukuba: General Affairs Supporting Center.

Kano, T. (2019). *Issues of image-based instruction: Focusing on errors of Japanese EFL learners.* Poster presented at ELSJ International Spring Forum 2019, Tokyo.

Niemeier, S. (2017). *Task-based grammar teaching of English: Where cognitive grammar and task-based language teaching meet.* Tübingen: Narr Francke Attempto Verlag.

R Core Team (2019) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/

Tanaka, S., & Matsumoto, Y. (1997). *Kukanto ido no hyogen* [Expressions about space and movement]. Tokyo: Kenkyusha.

Tyler, A., & Evans, V. (2003). *The semantics of English prepositions: Spatial scenes, embodied meaning and cognition.* Cambridge: Cambridge University Press.