

## 【Grant-in-Aid for Scientific Research (S)】

### Broad Section A



### Title of Project : Field-based Cognitive Neuroscientific Study of Word Order in Language and Order of Thinking from the OS Language Perspective

KOIZUMI, Masatoshi  
(Tohoku University, Graduate School of Arts and Letters, Professor)

Research Project Number : 19H05589 Researcher Number : 10275597

Keyword : Psycholinguistics, Neurolinguistics, Cognitive Science

#### 【Purpose and Background of the Research】

Many studies have shown that sentences in which Subject precedes Object (SO sentences) have a processing advantage, and hence are preferred, over OS sentences. This empirical evidence of the preference for SO word order, however, is not conclusive, because it comes exclusively from SO languages. It is not clear, therefore, whether the SO word-order preference represented the basic word order of individual languages (= individual grammar view) or reflected a more universal cognitive characteristic of humans (= universal cognition view).

In order to clearly distinguish the impacts of these two types of factors, it is necessary to verify them based on OS languages. This study compares SO languages (Japanese, Tongan) with OS languages (Truku, Kaqchikel) in order to clarify factors that determine word-order preference in human languages and the relationship between word order in language and order of thinking.

#### 【Research Methods】

Specifically, this study will examine the following:

**(A) Effects of word order and context on sentence processing load in natural discourse:** We will investigate the main effects and interactions (and their timing) of (i) individual grammatical factors, (ii) universal cognitive factors, and (iii) contextual factors, affecting sentence processing load in natural discourse comprehension and production, by means of behavioral experiments, functional brain imaging, and so on.

**(B) Effects of context on word order choice in sentence production:** We will investigate the main effects and interactions (and their timing) of (i) individual grammatical factors, (ii) universal cognitive factors, and (iii) contextual factors, affecting the choice of word order during natural discourse production, by means of corpus studies, behavioral experiments, eye tracking, and functional brain imaging.

**(C) Language acquisition:** We will investigate the developmental changes in (A) and (B) above during language acquisition, using naturally occurring utterances, behavioral experiments, eye tracking, functional brain imaging, and so on.

**(D) Order of thought:** It has been suggested that the most natural order of thought is universally “Actor-Patient-Act” regardless of the mother tongue of the speakers (e.g., Goldin-Meadow et al. 2008). We will test whether this generalization holds true of native speakers of OS languages through the analysis of gesture production, eye tracking, and other.

#### 【Expected Research Achievements and Scientific Significance】

Research such as the above will correct past theories that were biased towards the properties of SO languages and contribute to clarifying cognitive mechanisms that determine language. Furthermore, past research on the relationship of language and thought mainly studied meanings or ideas at the vocabulary level, but this research transcends this to positively clarify the “relationship of language and thought” at higher levels such as the sentence or conversation level. In addition, the United Nations has decided that “endangered languages must be preserved to secure and encourage cultural diversity,” and one key significance of this study is its ability to contribute to society in this regard. In conclusion, this study intends to create a new research area that may be called “the Integrated Field-based Comparative Cognitive Neuroscience of Language,” which is expected to foster the academic development of young researchers and produce many academic and social ripple effects such as those described above.

#### 【Publications Relevant to the Project】

- Koizumi, Masatoshi, Yoshiho Yasugi, Katsuo Tamaoka, Sachiko Kiyama, Jungho Kim, Juan Esteban Ajsivinac Sian, Lolmay Pedro Oscar García Mátzar. On the (non)universality of the preference for subject-object word order in sentence comprehension: A sentence-processing study in Kaqchikel Maya. *Language* 90: 722-736. 2014.
- Yasunaga, Daichi, Masataka Yano, Yoshiho Yasugi, and Masatoshi Koizumi. Is the subject-before-object preference universal? An ERP study in Kaqchikel Maya. *Language, Cognition and Neuroscience* 30: 1209-1229. 2015.

【Term of Project】 FY2019-2023

【Budget Allocation】 153,500 Thousand Yen

#### 【Homepage Address and Other Contact Information】

<https://researchmap.jp/read0184124/?lang=english>