



# Modeling Morphological Representations of the Mental Lexicons of Japanese EFL Learners

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Modeling Morphological Representations of the Mental Lexicons of Japanese EFL learners （日  
本人英語学習者のメンタルレキシコンにおける形態的表象のモデル化）

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## 論文要旨

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論文題目

### Modeling Morphological Representations of the Mental Lexicons of Japanese EFL Learners

—日本人英語学習者のメンタルレキシコンにおける  
形態的表象のモデル化—

論文要旨

This dissertation investigates the morphological knowledge and morphological representation in the mental lexicon of intermediate level Japanese EFL learners and advanced Japanese speakers of English. Focusing on morphological knowledge, it explores whether low-intermediate level Japanese EFL learners at university can extract the meaning of derivatives when they know the meaning of the relevant base words (stems). The results of this dissertation show that such learners can extract the meaning of derivatives at a rate of around 80% when they possess the base word knowledge. This indicates that even if their suffix knowledge is not good as that in previous L2 studies, Japanese EFL learners at the university level can relate derivatives to their stems. Concerning morphological representation, the dissertation explores whether there are derivational relationships and whether there are morpheme-level representations in the mental lexicon of low-intermediate and intermediate level Japanese EFL learners and advanced Japanese speakers of English. The results of masked priming experiments show that there are indeed derivational relationships in their mental lexicon. For example, the derivative *happiness* and its stem *happy* are related in the learners' mental lexicon. The results also show, however, that morpheme-level representations do not exist in the mental lexicon of intermediate level Japanese EFL learners or in

that of advanced Japanese speakers of English. In other words, suffixes such as the *-ness* in *happiness* or the *-er* in *officer* do not have their own independent representations in such learners' mental lexicons. L1 speakers of English are said to have independent morpheme-level (suffix) representations. Therefore, it can be said that Japanese EFL learners and advanced Japanese speakers of English have different mental representations from that of L1 speakers of English.

This dissertation consists of twelve chapters. Chapter 1 introduces key concepts related to the study such as vocabulary learning, derivational morphology, and psycholinguistic experiments. Chapter 2 reviews literature related to the dissertation: L1 studies of morphological structures in the mental lexicon, L2 studies of the structures of mental lexicons, and L2 studies of morphological knowledge. Four models are presented from previous L1 research. One recent study (Longtin and Meunier, 2005) shows that pseudo-derivatives (e.g., quickify) prime their stems (e.g., QUICK), indicating their lexicons have morpheme level (stems, affixes) representations. According to a distinction proposed by Tyler and Nagy (1989), there are three levels in morphological knowledge; RK (relational knowledge), SK (syntactic knowledge), and DK (distributional knowledge). Learners with RK can extract the base form of a certain derivative when facing derivatives. SK refers to the knowledge related to the understanding of the syntactic information contained in certain suffixes. Learners with DK become aware of which part of speech a certain suffix attaches to. Tyler and Nagy (1989) showed that native speakers' acquisition order was RK→SK→DK. Previous L2 studies have only explored the SK (Schmitt and Meara, 1997; Mochizuki and Aizawa, 2000), showing the relatively poor knowledge of Japanese EFL learners at high school and university.

Chapters 3 and 4 explore the morphological knowledge of Japanese EFL university-level learners. This section investigates their RK. Chapter 3 explores this knowledge by conducting three tests (a vocabulary test [VLT], a suffix test, and a self-made derivative comprehension test). The results show that learners can figure out the meaning of derivatives through their knowledge of the stems (base words) at a relatively high rate (60 - 90%), even if they do not have suffix knowledge. Chapter 4 confirms the results of Chapter 3 by conducting interviews. The results of this part of the study show that 81.2% of derivatives were able to be comprehended through the use of stem (base

word) knowledge.

Chapter 5 employs lexical decision tasks to explore the morphological representation in the mental lexicon of Japanese EFL learners whose vocabulary size is between 1,000 and 3,000 word families. The results show that stems whose inflectional family frequency is higher are not recognized more quickly, but stems whose derivational family frequency is higher are, indicating that inflections are not decomposed into constituents when they are recognized, and that members of the same derivational family have their own independent mental representation at the semantic level, but are linked each other.

Chapters 6 and 7 conduct a series of masked-priming experiments to explore the morphological representation of Japanese EFL learners whose vocabulary size is between 3,000 and 5,000 word families. The results show that derivative primes quicken the reaction times of their stems, but pseudo-derivative primes do not quicken the reaction times of their stems. This indicates that derivational relationships exist in the mental lexicon of intermediate level Japanese EFL learners but morpheme-level (suffix) representations do not. The morphological representation of intermediate Japanese EFL learners seems to be different from that of L1 speakers of English.

Chapter 8 investigates the morphological representation of advanced Japanese speakers of English who have TOEIC scores of 890 or above or have a similar ability in English. The results indicate that their mental representation is similar to that of intermediate level Japanese EFL learners. In other words, their mental representation seems to be different from that of L1 speakers of English. It can be said that the mental lexicon of Japanese learners and speakers of English may be not developmentally but qualitatively different from that of L1 speakers of English.

Chapter 9 looks at the factors that affect the morphological knowledge of low-intermediate Japanese EFL learners, in other words, under what conditions they can more easily extract the meaning of derivatives with the knowledge of their stems. It is a re-analysis of the data obtained in Chapter 3. The results show that contextual help requires a minimal vocabulary size. Learners whose vocabulary size is large can receive help from the semantic relatedness between derivatives

and their stems. Suffix difficulty does not affect the comprehension of derivatives with the use of derivational relationships. The results also show that high frequency derivatives are always comprehended more easily.

Chapter 10 focuses on morphological representation of intermediate level Japanese EFL learners in great detail. A re-analysis of the data obtained in Chapter 7 is conducted here. The results show that even if pseudo-derivatives are divided into groups by suffix difficulty or part of speech difference, this does not quicken the reaction times of their stems, indicating that there are no morpheme-level (suffix) representations in the mental lexicon of intermediate level Japanese EFL learners even if suffixes are easier or of a certain part of speech.

Chapter 11 is the general discussion section. It summarizes the results obtained in this study and discusses matters such as morphological knowledge and morphological representation of Japanese EFL learners and advanced Japanese speakers of English. Pedagogical implications of this study are also discussed here. Chapter 12 concludes the dissertation, summarizing the significant results obtained.

論文審査の結果の要旨

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論文題目	Modeling Morphological Representations of the Mental Lexicons of Japanese EFL Learners (日本人英語学習者のメンタルレキシコンにおける形態的表象のモデル化)		
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要 旨

1. 本論文の目的および考察対象

本論文は、第一言語形態素処理に関する心理言語学的モデルを踏まえ、日本人英語学習者の形態的知識およびメンタルレキシコンにおける脳内における形態素表象の構造の解明を目指したものである。

2. 本論文の構成と内容

Chapter 1 Introductionでは、語彙学習、派生形態素、心理言語学実験の手法に関する基本概念を導入し、Chapter 2 Literature review では、第一言語メンタルレキシコンにおける形態素表象の構造、第二言語におけるメンタルレキシコンおよび形態素表象構造など関連する先行研究がまとめられる。とくに、これまでに提案されてきた形態素表象モデル (Longtin & Meunier(2005)など) を4タイプにまとめ、日本人英語学習者のメンタルレキシコンにおける形態素表象構造の解明の基盤とする。

Chapter 3 Exploring derivational knowledge by paper and pencil testsおよびChapter 4 Exploring derivational knowledge further by interviewは、日本人英語学習者の形態素に関する静的な知識に関する調査を報告するものであるが、日本人大学生を対象に、3種類のオフライン法によるテスト (語彙サイズ、接尾辞、派生語) を実施し、その結果、3000ワード・ファミリー程度の語彙を有するかどうかで接尾辞の知識に大きな差異が見られ、それ以下の学習者は接尾辞

の知識が不十分であることと同時に、接尾辞知識が不十分であっても派生語の知識について、各語彙レベルの単語の派生語の8割程度は理解できることが明らかになり、接尾辞の知識、派生語の知識が語彙サイズと連動している可能性を示した。また、インタビューの質的分析によっても、この見解が支持された。Chapter 5 Exploring derivational structures by lexical decision tasks: frequency as a criterionおよびChapter 9 Factors affecting morphological knowledge では、派生語の理解において文脈および意味的な関連性を利用する際には、最低限の語彙数が必要であること、頻度が高い派生形の方がより学習が容易であること、接尾辞は影響しないことなどが観察された。

Chapters 6-7 Exploring derivational structures by a masked-priming experiment I-IIおよびChapter 10 Investigation of derivational representations in detailでは、3000-5000ワード・ファミリーを有する中級日本人英語学習者を対象に行ったプライミング実験では、派生語関係ではプライミング効果が見られ、表記関係語ではプライミング効果が見られなかったことから学習者のメンタルレキシコン内に派生形態素関係の存在が示唆されること、擬似派生語ではプライミング効果が見られなかったことから脳内では語分割が行われていないこと、接尾辞表象が存在しないことを明らかにした。Chapter 8 A masked-priming experiment III to highly proficient speakersでは、上級日本人学習者を対象として同様の調査を行ったが、概して上級者も中級者と同様の傾向が見られ、日本人英語学習者の心的な形態素表象は母語話者とは質的に異なり、外国語環境での学習のある種の限界を示しているのではないかと考察している。Chapter 11 General DiscussionおよびChapter 12 Conclusionは、本研究の総合考察、要約および結論である。

3. 本論文の独創性と意義

本研究は、形態素 (語根・接辞) レベルにおける日本人英語学習者の心内表象の解明および語彙サイズの増加・言語運用能力の熟達度の向上に伴う形態素レベルの心内表象の変化の解明を目的とし、学習実験および心理言語学実験に基づき、日本人英語学習者のメンタルレキシコンには形態素関係は存在するものの、形態素表象が不十分であること、派生語の形態分割が行われていないことを結論として導いている。日本人英語学習者の外国語処理の非自動性の大きな要因である可能性を示すものであることを実証したことの意義は大きく、ここ数十年の間のコミュニケーション重視の外国語教育によって軽視されてきた形態素の知識と処理という言語のボトムアップ処理の根幹に、静的な言語知識と動的な言語処理および言語学習者の熟達化による可変性といった多次元的視点から焦点を当てた取り組みは、外国語教育研究のあたらしいパラダイムの形成に大きく寄与するものとして高く評価できる。

(関連業績) ※すべてレフェリー付き論文である。

1. The Relationship between the Two Constructs of Explicit Suffix Knowledge and derivative Comprehension with Respect to Japanese EFL Learners. 九州英語教育学会『紀要』第34号, pp.41-48, 2006.
2. What Makes Comprehension of Derivatives Easier?: Pedagogical Implications for the Order of Vocabulary Introduction. *Annual Review of English Language Education*, 18, 131-140, 2007.
3. How Do Japanese EFL Learners Comprehend Derivatives?: A Qualitative Analysis from the Perspective of Vocabulary Expansion, *JACET Journal*, 45, pp.15-29, 2007.
4. Exploring the Organization of Mental Lexicon among Japanese EFL Learners from the Perspective of Morphological Relationships, *Studies in English Language Teaching*, 32, pp. 11-20, 2009

以上、独創性、実証性、論理性、英語教育への応用効果のいずれも優れており、坂田直樹氏の論文は、審査委員全員一致で博士学位論文として十分な学術的価値を有していることを認めるものである。