

# EFL 学习者对派生后缀词汇的加工

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**摘要:** 词汇加工是心理语言学的研究焦点之一, 其中语素复杂词汇的加工备受关注。纵观前人文献, 主要存在着三种模型: 整词加工模型、分解模型以及双通道模型。有些研究者虽支持分解模型, 但在语素分解是基于形态拼写信息还是基于语义信息这个问题上存在着争议。前人研究主要关注母语者对于语素复杂词汇的加工, 二语学习者的相关研究较少且存在着争议。本研究将语素加工延伸到字母换位领域, 采用掩蔽式启动范式, 研究发现: 二语学习者是通过整词和分解双通道来加工语素复杂词汇的, 从而支持了双通道加工模型。同时也证明语素分解是基于形态拼写信息的。

**关键词:** 词汇加工; 语素复杂词汇; 二语学习者; 字母换位效应

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## 1. 引言

纵观前人关于形态复杂词汇的加工研究, 主要存在三种模型: 整词加工模型, 分解模型以及双通道模型。整词加工模型认为所有词汇是以整词的形式储存在大脑词库中, 词汇识别过程是通过在内部词库中直接搜寻完整形式完成的(Manelis & Tharp, 1977; Silva & Clahsen, 2008)。分解模型认为在整词表征被激活之前, 语素复杂词汇会被自动分解为词干与词缀(Taft & Forster, 1975; Diependaele *et al.*, 2011)。有些研究者虽支持分解模型, 但是在语素分解的本质问题上存在着争议, 即语素分解是如何发生的, 是基于形态拼写信息还是基于语义信息。双通道模型认为整词加工和分解加工通道同时存在。涉及语素分解的本质, 即语素分解是如何发生的, 是基于形态拼写信息还是基于形态-语义信息。有些研究者提出了形态第一的观点, 也被称为词前假设, 认为形态分析发生在词前的形式表征层次, 也就是说, 早期语素分解过程是纯粹由字母串的形态拼写信息引发的, 其中语义信息并未起作用(Marslen-Wilson *et al.*, 1994; Longtin & Meunier, 2005)。有的学者则认为在形态复杂词汇是在形式语义信息的基础上被分解的, 此观点被称为词外假设(Giraud & Grainger, 2001; Feldman *et al.*, 2009)。此外, 有少量研究者则认为形态复杂词汇会被并行映射到形态拼写表征和形态语义表征。

有研究者发现单词内字母调换位置并不会影响读者对该单词的理解。字母换位假词(比如 *jugde*)比字母替换假词(比如 *jubpe*)更容易促进目标词的识别(比如 *judge*), 称为换位启动效应(Grainger & Whitney, 2004; Perea & Lupker, 2004; Gomez *et al.*, 2008)。换位效应的发现对特定位置编码理论(McClelland & Rumelhart, 1981)和 Wickel 编码理论(Seidenberg & McClelland, 1989)提出了质疑, 而对开放二元编码理论(Grainger & van Heuven, 2003)与空间编码理论(Davis, 1999)提出了支持。在对跨语素边界的字母换位研究中也存在着不同结论: 有些研究者发现跨语素边界的字母换位中并不存在字母换位效应, 而有些研究者则发现跨语素换位中也存在字母换位效应, 而且产生的字母换位效应大小与语素内换位中的效应大小并无差异。

本研究将二语学习者对语素复杂词汇的加工研究延伸到了字母换位领域, 以英语中的派生后缀词汇为例, 旨在利用字母换位启动效应为探究二语学习者对语素复杂词汇的加工情况提供一个新的视角。本文主要探究以下三个问题: 1) 语素内字母换位中是否会存在字母换位效应? 2) 语素边界对字母换位效应有什么影响? 3) 二语学习者如何加工语素复杂词汇?

## 2. 研究方法

### 2.1 实验受试

为了探究二语水平者如何加工语素复杂词汇，本研究以 30 个通过大学英语四级但未通过大学英语六级的湖南大学非英语专业大学生为实验对象。

### 2.2 实验材料

本研究的实验材料分为含适当后缀和含不符词法后缀两种情况，如下表。其中，含适当后缀情况中采用的是真词干与真词缀，且词干与词缀的结合是符合词法的（比如 teach+er），而含不符词法后缀情况中真词干与真词缀的结合是不符合词法规则的（比如 teach+ly）。两种情况皆含有控制项（即未换位的原词）、字母换位假词和字母替换假词三种启动类型，从而对比检测出是否存在字母换位效应。其中，含适当后缀情况中的换位进一步细分为语素内换位（比如 taecher）和跨语素换位（比如 teacehr）两种类型。整个实验材料是分 8 种启动类型，30 个目标词，所以共有 240 个目标启动对，此外还设置有 120 个填充词。

情况	启动类型	启动词—目标词
含适当后缀情况	控制项	teacher-teach
	语素内换位假词	<u>t</u> aecher-teach
	语素内替换假词	<u>tu</u> ocher-teach
	跨语素换位假词	te <u>a</u> ce <u>h</u> r-teach
	跨语素替换假词	te <u>a</u> ck <u>o</u> r-teach
含不符词法后缀情况	控制项	teachly-teach
	语素内换位假词	<u>t</u> aechly- teach
	语素内替换假词	<u>tu</u> ochly- teach

### 2.3 实验设计

实验采用掩蔽式启动范式与词汇判断任务。利用 E-Prime2.0 对实验流程进行编程。实验在安静的房间内进行，受试坐于电脑前，屏幕中央首先出现一排#（#作为前掩蔽的同时也是注视点），然后#号消失，出现启动项，300 毫秒后启动项消失，紧接着出现一串红色的后掩蔽+（+作为后掩蔽），500 毫秒后目标刺激出现，如果该字母串是英语中的真词按 F 键，假词则按 J 键。目标刺激在受试做反应后便消失，目标刺激最多呈现 1500 毫秒。在下轮试次开始前，会呈现 500 毫秒的空白屏幕作为缓冲间隔时间。受试一对一单独进行实验，在实验前受试被告知详细的实验流程，实验共分为练习实验与正式实验两个阶段。练习实验有 20 个试次，以便受试熟悉实验流程、方法与节奏，练习实验的流程设置与正式实验一致，只是在做完反应后增加了正误反馈。

## 3. 实验结果

本研究的实验结果是通过以启动类型为自变量，反应时为因变量，用 SPSS22.0 对收集到的数据进行单因素方差分析后得出的。结果发现，含适当后缀情况中，控制项与语素内换位项的反应时无显著差异，而控制项与语素内替换项存在显著差异，说明存在字母换位效应。而控制项与跨语素换位项无显著差异，却与跨语素替换项有显著差异，说明也存在字母换位效应。但是语素内换位效应大小与跨语素换位效应大小存在显著差异。含不符词法后缀情况中，控制项与换位项的反应时无显著差异，但与替换项存在显著差异，说明存在字母换位效应。

#### 4. 讨论与发现

如果二语学习者是通过分解通道加工语素复杂词汇的,那么该词汇(e.g., teacher)会被切分为相应的语素成分(e.g., teach+er)。在这种情况下,跨语素字母换位(e.g., teacehr)会阻碍词缀(e.g., -er)的切分,从而会导致对跨语素字母换位词的反应时比未换位的控制项的反应时长。而如果二语学习者是通过整词加工通道加工语素复杂词汇的,那么跨语素字母换位词的反应时和未换位的控制项的反应时无显著差异。在这种情况下,由于含不符词法后缀情况中的词都是无意义的,大脑词库中并无这样的词汇,所以含不符词法后缀情况中不会出现字母换位效应。

经过对数据进行分析讨论,本文主要发现:

第一,含适当后缀情况中的语素内字母换位存在字母换位效应,说明二语学习者在早期词汇加工过程中对词汇字母位置的编码存在灵活性,从而支持了开放二元编码理论与空间编码理论。

第二,含适当后缀情况中的跨语素字母换位中也存在字母换位效应,但相比于语素内换位效应,跨语素字母换位效应明显减弱。说明语素边界不会导致跨语素字母换位效应的消失,但是会导致跨语素字母换位效应减弱。

第三,含适当后缀情况中的跨语素字母换位中存在字母换位效应,说明了二语学习者在加工语素复杂词汇时会采取整词加工通道。而含不符词法后缀情况中也存在字母换位效应,说明中国英语学习者在语素复杂词汇的加工中也采用了分解加工通道。综上所述,二语学习者是通过整词加工和语素分解加工来加工语素复杂词汇的,从而支持了双通道加工模型。同时由于含不符词法后缀情况中词干与后缀的组合是不符词法的,产生的词汇是无意义的,因此,本研究也证明了二语学习者的语素分解过程是基于形态拼写信息的。

## 参考文献

- [1] Baayen, R. H., Dijkstra, T. & Schreuder, R. 1997. Singulars and plurals in Dutch: Evidence for a parallel dual-route model [J]. *Journal of Memory and Language* 37: 94-117.
- [2] Balota, D. A., Yap, M. J., Cortese, M. J., Hutchison, K. A., Kessler, B., Loftis, B., Neely, J. H., Nelson, D. L., Simpson, G. B. & Treiman, R. 2007. The English lexicon project [J]. *Behavior Research Methods* 39: 445-459.
- [3] Beyersmann, E., Castles, A. & Coltheart, M. 2011. Early morphological decomposition during visual word recognition: Evidence from masked transposed-letter priming [J]. *Psychonomic Bulletin & Review* 18: 937-942.
- [4] Beyersmann, E., Castles, A. & Coltheart, M. 2012. Morphological processing during visual word recognition in developing readers: Evidence from masked priming [J]. *The Quarterly Journal of Experimental Psychology* 65(7): 1306-1326.
- [5] Beyersmann, E., Coltheart, M. & Castles, A. 2012. Parallel processing of whole words and morphemes in visual word recognition [J]. *The Quarterly Journal of Experimental Psychology* 65(9): 1798-1819.
- [6] Beyersmann, E., Duñabeitia, J. A., Carreiras, M., Coltheart, M. & Castles, A. 2012. Early morphological decomposition of suffixed words: Masked priming evidence with transposed-letter nonword primes [J]. *Applied Psycholinguistics* 1-24.
- [7] Beyersmann, E., McCormick, S. F. & Rastle, K. 2013. Letter transpositions within morphemes and across morpheme boundaries [J]. *The Quarterly Journal of Experimental Psychology* 66(12): 2389-2410.
- [8] Bloomfield, L. 1933. *Language* [M]. New York: Henry Holt.
- [9] Butterworth, B. 1983. *Language Production* [M]. London: Academic Press.
- [10] Caramazza, A., Laudanna, A. & Romani, C. 1988. Lexical access and inflectional morphology [J]. *Cognition* 28, 297-332.
- [11] Christianson, K., Johnson, R. L. & Rayner, K. 2005. Letter transpositions within and across morphemes [J]. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 31: 1327-1339.
- [12] Coltheart, M., Rastle, K., Perry, C., Ziegler, J. & Langdon, R. 2001. A dual route cascaded model of visual word recognition and reading aloud [J]. *Psychological Review* 108: 204-256.
- [13] Coughlin, C. & Tremblay, A. 2014. Morphological decomposition in native and non-native French speakers [J]. *Bilingualism: Language and Cognition*, 1-19.
- [14] Davis, C. J. 1999. The Self-organising Lexical Acquisition and Recognition (SOLAR) Model of Visual Word Recognition [D]. Ph.D Dissertation. Sydney: University of New South Wales.
- [15] Dipendaele, K., Dunabeitia, J. A., Morris, J. & Keuleers, E. 2011. Fast morphological effects in first and second language word recognition [J]. *Journal of Memory and Language* 64: 344-358.
- [16] Dipendaele, K., Sandra, D. & Grainger, J. 2009. Semantic transparency and masked morphological priming: the case of prefixed words [J]. *Memory & Cognition* 37: 895-908.
- [17] Duñabeitia, J. A., Perea, M. & Carreiras, M. 2007. Do transposed-letter similarity effects occur at a morpheme level? Evidence for morpho-orthographic decomposition [J]. *Cognition* 105: 691-703.
- [18] Duñabeitia, J. A., Perea, M. & Carreiras, M. 2014. Revisiting letter transpositions within

- and across morphemic boundaries [J]. *Psychonomic Bulletin and Review* 21: 1557-1575.
- [19] Feldman, L. B., O' Connor, P. A. & Moscoso Del Prado Mart í n, F. 2009. Early morphological processing is morpho-semantic and not simply morpho-orthographic: a violation of form-then-meaning accounts of word recognition [J]. *Psychonomic Bulletin & Review* 16: 684-691.
- [20] Giraudo, H. & Grainger, J. 2001. Priming complex words: Evidence for supralexical representation of morphology [J]. *Psychonomic Bulletin and Review* 8: 127-131.
- [21] Gómez, P., Ratcliff, R. & Perea, M. 2008. The overlap model: A model of letter position coding [J]. *Psychology Review* 115: 577-601.
- [22] Gor, K. & Jackson, S. 2013. Morphological decomposition and lexical access in a native and second language: A nesting doll effect [J]. *Language and Cognitive Processes* 28:1065-1091.
- [23] Grainger, J. & van Heuven, W. J. B. 2003. Modeling letter position coding in printed word perception [A]. In P. Bonin (ed.). *Mental lexicon: Some words to talk about words* [C]. New York: Nova Science. 1-23.
- [24] Grainger, J. & Whitney, C. 2004. Does the huamn mind raed wrods as a wlohe? [J]. *Trends in Cognitive Science* 8: 58-59.
- [25] Gu, J. J. & Li, X. S. 2015. The effect of character transposition within and across words in Chinese reading [J]. *Attention perception psychophysics* 77: 272-281.
- [26] Kim, S. Y., Wang, M. & Taft, M. 2015. Morphological decomposition in the recognition of prefixed and suffixed Words: Evidence from Korean [J]. *The Quarterly Journal of Experimental Psychology* 00: 1-21.
- [27] Ktori, M., Kingma, B., Hannagan, T., Holcomb, P. J. & Grainger, J. 2014. On the time-course of adjacent and non-adjacent transposed-letter priming [J]. *Journal of Cognitive Psychology* 25(6): 491-505.
- [28] Liang, L. J. & Chen, B. G. 2014. Processing morphologically complex words in second-language learners: The effect of proficiency [J]. *Acta Psychologica* 150: 69-79.
- [29] Longtin, C. M. & Meunier, F. 2005. Morphological decomposition in early visual word processing [J]. *Journal of Memory and Language* 53: 26-41.
- [30] Manelis, L. & Tharp, D. 1977. The processing of affixed words [J]. *Memory & Cognition* 5: 690-695.
- [31] Marslen-Wilson, W. D., Bozic, M. & Randall, B. 2008. Early decomposition in visual word recognition: Dissociating morphology, form, and meaning [J]. *Language and Cognitive Processes* 23: 394-421.
- [32] McClelland, J. L. & Rumelhart, D. E. 1981. An interactive activation model of context effects in letter perception [J]. *Psychological Review* 88: 375-407.
- [33] Mousikou, P., Kinoshita, S., Wu, S. & Norris, D. 2015. Transposed-letter priming effects in reading aloud words and nonwords [J]. *Psychonomic Bulletin & Review* 22(5):1-6.
- [34] Neubauer, K. & Clahsen, H. 2009. Decomposition of inflected words in a second language: An experimental study of German participles [J]. *Studies in Second Language Acquisition* 31: 403-435.
- [35] Norman, T., Degani, T. & Peleg, O. 2017. Morphological processing during visual word recognition in Hebrew as a first and a second language [J]. *Reading and Writing* 30: 69-85.
- [36] Perea, M. & Carreiras, C. 2006. Do transposed-letter effects occur across lexeme boundaries?

- [J]. *Psychonomic Bulletin & Review*, 13(3): 418-422.
- [37] Perea, M. & Lupker, S. J. 2004. Can CANISO activate CASINO? Transposed-letter similarity effects with nonadjacent letter positions [J]. *Journal of Memory & Language*, 2: 231-246.
- [38] Rastle, K. & Davis, M. H. 2008. Morphological decomposition based on the analysis of orthography [J]. *Language and Cognitive Processes* 23: 942-971.
- [39] Rueckl, J. G. & Rimzhim, A. 2011. On the interaction of letter transpositions and morphemic boundaries [J]. *Language and cognitive processes* 26: 482-508.
- [40] Silva, R. & Clahsen, H. 2008. Morphologically complex words in L1 and L2 processing: Evidence from masked priming experiments in English [J]. *Bilingualism: Language and Cognition* 11: 245-260.
- [41] Taft, M. & Ardasinski, S. 2006. Obligatory decomposition in reading prefixed words [J]. *The Mental Lexicon* 1: 183-199.
- [42] Taft, M. & Forster, K. I. 1975. Lexical storage and retrieval of prefixed words [J]. *Journal of Verbal Learning and Verbal Behavior* 14: 638-647.
- [43] Whitney, C. 2001. How the brain encodes the order of letters in a printed word: The SERIOL model and selective literature review [J]. *Psychonomic Bulletin & Review* 8: 221-243.
- [44] Zargar, E. S. & Witzel, N. 2016. Transposed-letter priming across inflectional morpheme boundaries [J]. *Journal of Psycholinguistic Research* 46: 125-140.
- [45] Zhang, Q. G., Liang, L. J., Yao, P. P., Hu, S. S. & Chen, B. G. 2016. Parallel morpho-orthographic and morpho-semantic activation in processing second language morphologically complex words: Evidence from Chinese-English bilinguals [J]. *Journal of Bilingualism* 1-15.
- [46] 卞迁, 崔磊, 阎国利, 2010, 词素位置颠倒对汉语句子阅读影响的眼动研究[J], 《心理研究》3(1): 29-35。
- [47] 刘晓环, 王军, 2016, 错序句阅读的眼动特征及其认知理据解读[J], 《现代外语》1(39): 74-85。
- [48] 彭聃龄, 丁国盛, 王春茂, Marcus Taft, 朱晓平, 1999, 汉语逆序词的加工—词素在词加工中的作用[J], 《心理学报》(1): 36-46。

## EFL Learners' Processing of English Words with Derivational Suffix

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**Abstract:** Lexical processing is one of the research focuses in psycholinguistics, and the processing of morphologically complex words has attracted much attention. From previous literature, there are three models: Full-listing Model, Decomposition Model and Dual-route Model. Some researchers supported Decomposition Model but they disagreed on whether morphological decomposition is based on morpho-orthographic information or morpho-semantic information. Previous research mainly focused on native speakers' morphological processing, whereas studies on second language learners are relatively

few and controversial. By extending morphological processing into the field of letter transposition, this study used masked priming paradigm. Here are the major findings: both whole-word processing and decomposition are used in second language learners' morphological processing, supporting Dual-route Model. It also proved that morphological decomposition was based on morpho-orthographic information.

**Keywords:** Lexical processing; Morphologically complex words; Second language learners;  
Transposed-letter effect

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