

The Implicit Prosody in L2
Sentence Processing by
Chinese Learners of English

中国英语学习者二语
句子加工中内隐韵律研究

李鹏飞 朱坤玲◎著



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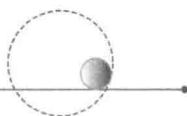
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Abstract



In recent years, the inner voice during silent reading has attracted huge attention among researchers. Directed at this phenomenon, Fodor's (1998, 2002) Implicit Prosody Hypothesis (IPH) states that in silent reading there is a default prosodic contour which can influence syntactic ambiguity resolution. In particular, the IPH provides a sound account for the cross-linguistic variation of the relative clause attachment when its head is a complex noun phrase (NP1 of NP2 RC). However, little research on the IPH has been conducted in the L2 context.

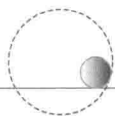
Based on the assumption that the implicit prosody can be accessed through the overt prosody, this monograph addressed the potential role of the implicit prosody in L2 sentence processing by examining and comparing the RC attachment preferences and the overt prosodic structure produced by Chinese EFL learners from a local university in Mainland China. The 120 participants, based on their proficiency level and whether they skimmed the stimuli in advance, were divided into four groups. Then the judgment and production experiments were conducted via MouseTracker.

The results of the study indicated no fixed pattern in the RC attachment preferences: the advanced skim and the intermediate no-skim groups performed in a native-like way: they preferred to attach the RC to NP2, i. e. low attachment, while the advanced no-skim and the intermediate skim groups preferred to attach the RC to NP1, i.e. high attachment.

Meanwhile, the monograph revealed that the overt prosodic structures that the four groups generated were highly alike. They tended to make a larger break

after NP2 than after NP1, phrasing the structure as “(NP1 NP2) // RC”, and place the pitch accent on NP1, which, according to the IPH, would promote high attachment.

The mismatch between the prosodic structure and the RC attachment preferences suggests that the IPH alone cannot account for the L2 sentence processing. The monograph showed that in addition to the implicit prosody, L1 transfer, language proficiency, grammatical knowledge, and reading strategy may also get involved in the ambiguity resolution. Another possibility for the discrepancy is that the implicit prosody may be intrinsically different from the overt prosody produced in reading aloud, for the latter may be the byproduct of the syntactic analysis, so that better methods should be developed to access the implicit prosody.

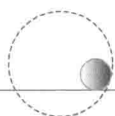


摘要

近年来,默读时的内心声音引起了研究者们巨大关注。针对这一现象,福多的内隐韵律假说(1988, 2002)提出:在默读中,有一个默认的韵律轮廓影响阅读者句法歧义结构的解决。对于中心词为复合名词短语的定语从句附着(如英语中的“名词短语1 of 名词短语2+定语从句”结构)中存在的跨语言差异现象,内隐韵律假说提供了一个合理的解释。但目前对于这一假说的研究很少针对二语进行。在假设内隐韵律可以通过外显韵律来获取的基础上,本书对比研究了中国高校英语学习者的定语附着倾向性和外显韵律结构,目的是检测内隐韵律在二语句子加工中的潜在作用。根据120名被试者的英语水平和是否预览过实验材料,他们被分为四组,然后通过鼠标跟踪法进行了判断实验和生产实验。研究结果表明在定语附着上被试者没有固定的倾向性:预览过材料的高级学习者和未预览过材料的中级学习者表现出与英语母语者相同的倾向性——他们都倾向于把定语从句附着在名词短语2上,即低附着,而未预览过材料的高级学习者和预览过材料的中级学习者倾向于把定语从句附着在名词短语1上,即高附着。与此同时,本研究显示这四组产生的外显韵律结构高度相似。他们在名词短语2后的停顿大于在名词短语1后的停顿,将歧义结构分成“(名词短语1 of 名词短语2) // 定语从句”,并且将音高重音放在名词短语1上,而根据内因韵律假说,这应产生高附着。这种韵律结构和定语从句附着倾向间的不匹配表明内因韵律假说不能完全解释二语句子加工。本研究表明,除了内隐韵律,母语迁移、语言水平、语法知识和阅读策略都可能在歧义消除中产生作用。产生这种分歧的另一种可能是内因韵律可能与朗读时的外显韵律有本质的不同,因为后者可能是句法分析的产物,所以需要开发更好的方法来获取内隐韵律。

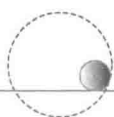
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Chapter 1 Introduction

One interesting but mysterious phenomenon that has aroused my interest is the “inner voice” that appears in silent reading. My personal experience and my past seven-year teaching experiences tell me that many Chinese learners of English heavily rely on the sound system of English to help process the written text. Many students report that they fail to effectively identify an English word solely by its spelling. Meanwhile, they also regard the inner voice as a kind of disturbance for they have to read word by word, thus tremendously slowing down the reading speed. Some teachers suggest that the inner voice be erased by forcefully increasing the eye movement during silent reading. So how do we treat this dilemma? Is the inner voice during silent reading universal to all readers or merely a bad reading habit? What should we do with it to improve the reading efficiency?

In general, the current study attempts to address these questions concerning the inner voice in silent reading. Since the inner voice is a vague and broad concept, the focus of the study eventually falls on one important aspect of the sound system—prosody. Fodor’s (1998, 2002) Implicit Prosody Hypothesis provides a link between prosody and silent reading and serves as the foundation of the present study. But before we proceed to the details of this theory, let us first have a look at L2 reading and the nature of the inner voice in silent reading.

1.1 Background

1.1.1 L2 Reading and Research on L2 Reading

It is undeniable that reading is one of the essential skills for educational and

professional success (Alderson, 1984). Reading is an indispensable tool in acquiring information and learning; in addition, it is a primary goal of education. Rivers (1981), in highlighting the importance of reading comprehension, stated that “reading is the most important activity in any language class, not only as a source of information and a pleasurable activity, but also as a means of consolidating and extending one’s knowledge of the language” (p.147). Once the learner has progressed beyond the beginner level, the vast majority of his or her input will be in written form. This is particularly so in the case of learners of foreign languages—rather than second language (L2) students living in the target country—where the number of contact hours with a teacher or foreign-language assistant are often limited. The tendency for written tests to gain importance as input will be even more pronounced in the university phase of education—in literature, area studies, or L2 for academic purposes courses—where the expectation is that learners will read extensively in the L2.

In China, English is the major foreign language taught in middle schools, colleges and universities. A national survey indicated that among 415.95 million foreign-language learners, 390.16 million (93.8%) had learnt English (SGO, 2006). Although, along with China’s opening-up and economic growth, the Chinese Ministry of Education is shifting the focus of English learning and teaching to developing students’ listening and speaking competence, the dominant position of reading remains unchanged. This can be reflected from the fact that the test of reading ability is given a big weight in major national English proficiency tests in China. For example, Table 1.1 lists the score distribution among the four skills—listening, speaking, reading, and writing—in National Matriculation English Test (NMET), College English Test for non-English majors Band 4 and Band 6 (CET4/6), and the English test of Graduate Entrance Examination (GEE) in 2015, which shows that reading comprehension and reading-related tasks accounted for at least half of the total score. On the other hand, the overall English learning environment is still quite poor, especially in under-developed western part of China. English learners still heavily rely on reading as a main source of language input and accumulation.

Table 1.1 The score distribution among listening, speaking, reading, and writing in NMET, CET4/6 and the English test of GEE in 2015

Tests	Listening	Speaking	Reading	Writing
NMET	20%	0	63.4%	16.6%
CET4/6	35%	0	50%	15%
GEE (English)	0	0	70%	30%

However, reading is such a complex phenomenon that its processes are not easily understood. It involves not only the reader's linguistic knowledge, but also his/her cognitive capability, cultural background, prior knowledge, and reading strategies. Such difficulty is more than doubled when it comes to L2 reading, which differs a lot from L1 reading. The difference lies in several ways. First of all, most L2 readers have experience in reading in their native language before they learn to read in a second language. The skills and strategies they have learned from reading in L1 may be transferable in L2 reading. Secondly, unlike L1 readers who have already developed adequate oral fluency before they learn to read, L2 readers learn to speak and read at the same time; their oral ability in the target language is not stronger than their reading ability. In fact, many L2 learners have difficulties pronouncing words exactly as native speakers do. Thirdly, research on L2 reading is cross-linguistic and cross-cultural in nature. Variations in language forms, syntax, semantics, and cultural background knowledge have an inevitable role in reading comprehension of any L2 passage.

On the other hand, compared with research on L1 reading, research on L2 reading is comparatively new. Until the 1980s, research on L2 reading was mainly based on theoretical principles derived from L1 research (Koda, 1994). Besides, previous L2 studies mainly focused on L2 competence, with little effort spared on the cognitive processes involved.

1.1.2 Subvocalization and the Implicit Prosody

Subvocalization, also known as implicit speech, inner vocalization, or subvocal articulation, is an inner speech that occurs during silent reading. Scholars have long assumed that the inner voice is an indispensable part of normal reading (Huey, 1908, 1968; Slowiaczek & Clifton, 1980; Rayner & Pollatsek, 1989).

On internally generated prosody in particular, Chafe (1988) comments: "I am not alone in believing that writers when they write, and readers when they read, experience auditory imagery of specific intonations, accents, pauses, rhythms, and voice qualities, even if the writing itself may show these features poorly, if at all. This 'covert prosody' of written language is evidently something that is quite apparent to a reflective writer or reader" (p.397). Rayner & Pollatsek (1989) cite Brown (1970), claiming that "When you read a letter from someone you know very well, such as your mother, you often can hear her accent, or stress, or intonation pattern" (p.216). Rayner & Pollatsek (1989) added: "Also, when you read text such as this book, you do not hear your voice in a monotone (unless perhaps you always speak in a monotone). Rather, you are aware of providing stress and intonation patterns to the words" (p.216).

Advocates of speed reading generally regard subvocalization as a bad reading habit, which can place an extra burden on the cognitive resources, and thus, slow the reading down. Speed reading courses often prescribe lengthy practices to eliminate subvocalizing in silent reading. However, earlier electromyographic (EMG) research in which the movements of the muscles of the speech organs—lips, tongue, chin, larynx, throat—are detected has proven that subvocalization is almost impossible to get rid of (Edfeldt, 1960; McGuigan, 1970; Sokolov, 1972).

The development in the field of cognitive psychology indicates that subvocalization plays an important role in silent reading. According to the Baddeley-Hitch Model of working memory (Baddeley & Hitch, 1974; Baddeley, 1986, 2002), one component of the working memory is the phonological loop, which consists of the phonological store and the articulatory rehearsal system. The phonological store holds phonological representations for a brief period of time. The articulatory rehearsal system enables us to covertly or overtly rehearse materials, thus prolonging their stay in the phonological store. The model assumes that there are phonological representations of both auditory and visual materials. That is, when visual materials such as printed letters are presented, we may convert them into phonological representations and thus hold them in the phonological store. Therefore, one way in which subvocalization could facilitate reading involves holding words and word order information in the working memory (Rayner & Pollatsek, 1989).

Another way in which the inner speech may aid comprehension is that it may provide information about prosodic structure (Slowiaczek & Clifton, 1980). Studies in

auditory language processing have shown that listeners are sensitive to the prosodic structure and that they use it in sentence processing (see Slowiaczek & Clifton, 1980). In contrast with the rich prosodic structure provided in spoken language, written language provides impoverished cues. If prosodic information is used in sentence processing, the reader must find some way to compensate for the lack of prosody in reading. Slowiaczek & Clifton argued that this is a role of the inner speech in reading—the reader can reorganize the sentence into a prosodic structure. Based on Slowiaczek & Clifton's statements, Fodor (1998, 2002) put forward her Implicit Prosody Hypothesis (IPH), which states that readers project a prosodic structure onto the text, indicating that prosody is treated as part of the input of the written material.

In a recent work, Breen (2014) reviewed empirical evidence for the role of implicit prosody in reading in each of the four components of prosody: intonation, stress, rhythm, and phrasing. She concludes that “suprasegmental representations are not epiphenomenal... Rather, implicit prosody plays a functional role in on-line language comprehension. That is, the generation of an implicit prosodic representation of written words can serve to direct readers' interpretations of ambiguous structures and can facilitate processing of written language, or, conversely, can impair comprehension of an intended message” (p.47).

Based on the above discussion, we can come to the conclusion that subvocalization is a normal part of natural silent reading and helps the mind to comprehend and remember what is read (Rayner & Pollatsek, 1989). We can then safely make an inference that even in the L2 reading, subvocalization is unavoidable and cannot be easily erased. But what role does it play in the L2 reading? When it comes to L2 prosody, what sense does it make in silent reading? Does it also play an indispensable role, just like L1 prosody, in the comprehension for L2 learners? To see the function of prosody in L2 reading, we need to move to another linguistic phenomenon: the different ambiguity resolution across languages.

1.1.3 Cross-linguistic Difference in Relative Clause Attachment

It has been known that languages differ in resolving the ambiguity structure where the head noun of a relative clause (RC) is a complex noun phrase which contains two nouns (in a sequence of NP1 of NP2 RC) and the RC is not biased towards modifying either NP (Cuetos & Mitchell, 1988). For example, in (1), the sentence structure is ambiguous. The RC, *who was on the balcony*, can either attach

low and modify the adjacent NP *the actress*, or attach high and modify the non-adjacent NP, *the servant*. Different attachments can result in different interpretations of the sentence.

(1) *Someone shot the servant of the actress who was on the balcony.* (Cuetos & Mitchell, 1988)

Low attachment: *It was the actress that was on the balcony.*

High attachment: *It was the servant who was on the balcony.*

In processing sentences like (1), studies reveal that speakers of Spanish (Cuetos & Mitchell, 1988), French (Zagar, Pynte & Rativeau, 1997), Dutch (Brysbaert & Mitchell, 1996), German (Hemforth et al., 1998), Croatian (Lovric, 2000, 2001), Japanese (Kamide & Mitchell, 1997), Greek (Papadopoulou & Calhsen, 2003), Hindi (Vasishth et al., 2004), and Chinese (Cai, 2007) prefer high attachment of an RC, while speakers of English (Frazier & Clifton, 1996), Arabic (Quinn, Abdelghany & Fodor, 2000), Norwegian, Romanian, and Swedish (Ehrlich et al., 1999; Fodor, 1998; Fernández, 2003; Augurzy, 2006) prefer low attachment of an RC.

This cross-linguistic difference has called into question the view that there exists a universal mechanism in sentence processing which guides a parser, such as minimal attachment, late closure, or right association (Frazier & Fodor, 1978; Frazier, 1979; Frazier & Rayner, 1988; Fodor, 1998; Kimball, 1973). The main idea of the universal parsing mechanism is to parse efficiently without building an unnecessary structure and changing an existing structure at the level higher than the current clause or phrase, which suggests having fewer syntactic nodes and thus attaching low in sentence (1) cross-linguistically.

In order to explain this cross-linguistic difference of RC attachment preference, several accounts have been proposed, e.g. argument/adjunct distinction and discourse-based *Construal* (e.g. Gilboy et al., 1995; Frazier & Clifton, 1996, 1997), the frequency-based *Tuning Hypothesis* (e.g. Cuetos, Mitchell & Corley, 1996; Mitchell et al., 1995; Brysbaert & Mitchell, 1996), memory-based *Recency and Predicate Proximity* (e.g. Gibson et al. 1996), and prominence and discourse-based *Anaphoric Binding* (e.g. Hemforth et al., 1998). However, all these models have encountered counter-evidence and have had trouble in explaining why constituent length can trigger different attachment preferences—research reveals that an RC tends to attach low when it is short but high when it is long (e.g. Pynte & Colonna, 2000 on French; Fernández & Bradley, 1999 on Spanish; Fernández, 2003 on Spanish and English;