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# 南方汉语幼儿咿呀学语 与早期语言发展个案研究

A Case Study of Babble and Early Speech Development  
in a Southern Mandarin Speaking Child

陈晓湘 著



湖南大学出版社

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## 内 容 简 介

针对语言发展阶段是连续的还是非连续的这一议题展开研究,并以一名6—28月龄的南方汉语幼儿作为个案,旨在检验并批判性分析Jakobson(1941/1968)有关咿呀学语与早期语言发展阶段的非连续性假说,揭示了前语言阶段与语言阶段的关联性。

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NANFANG HANYU YOUER YIYA XUEYU YU ZAOQI YUYAN  
FAZHAN GEAN YANJIU

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作 者:陈晓湘 著

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**Chen Xiaoxiang**  
**Hunan University, Changsha**  
**March, 2015**

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# Chapter 1 Introduction

## 1.1 Purpose of the Study

For all normal children, the capacity to acquire a native language is universal, yet how language comes to children is a Cinderella's puzzle. Each language has a complicated system of symbols, words, and grammatical rules, but how can children acquire such a system in a few years? There are four fundamental issues concerning L1 acquisition: 1) Language is human-specific or not; 2) Child L1 development is a result of Nature or Nurture; 3) L1 developmental stages are discontinuous or continuous; 4) Children follow one course or different courses in language development. In this book, the main focus is on the third issue of continuity versus discontinuity, especially on Jakobson's (1941/1968) postulations of discontinuity between babble and early speech development.

Language acquisition can be explained in terms of specific capacities of humans, general facts about the physical world, and interactions of organisms with the environment during L1 development. When it comes to L1 acquisition of speech, empirical studies of phonetics and phonology consider phonetic and phonological theories as a natural science. This is done through improved methodology, explicit modeling, and accumulation of empirical research findings (Pierrehumbert, 1999).

Pierrehumbert (1999) maintained that phonology covers less and phonetic implementation covers more than traditional theories suggest. She previously developed MESM (Modified Extended Standard Modularization) in an attempt to separate phonetics from phonology, but then she concluded that the phonetics

and phonology distinction is flawed. It is not a good attempt to extract phonetic effects from phonological theories, partly because knowledge of sound structure is continuous, spanning across both phonetics and phonology. In this book, I adopt her position of no separation between phonetics and phonology.

The research of child L1 phonetic and phonological development has been conducted within different theoretical frameworks such as the behaviorist theory (Mowrer, 1952), structuralist theory (Jakobson, 1941/1968), generative linguistic theory (Chomsky, 1965; Smith, 1973; Stampe, 1979), cognitive theory (Ferguson & Farwell, 1975; Ferguson & Macken, 1983; Menn, 1976, 1980, 1983, 1991; Oller, et. al, 1976; Oller, 2000), cognitive continuity theory (Elbers, 1982), Frame/Content theory (Davies, MacNeilage, & Matyear, 2002; MacNeilage & Davies, 1991; 2001 MacNeilage & Barbara, 1990; MacNeilage, 1998). These linguistic theories are mainly concerned with products not with processes. Furthermore, the empirical findings are often conflicting with linguistic theories.

Researchers have put forward many different hypotheses about child L1 acquisition. Jakobson's (1941/1968) postulations of discontinuity on child L1 developmental stages and Lenneberg's (1967) Independence Hypothesis assumed that babble did not contribute to language development in any functional sense. Brown (1958) came up with the Babbling Drift Hypothesis, claiming that babble drifts in the direction of the ambient language a child hears. Nakazima (1962), Weir and Maccoby (1966), Boyssons-Bardies et al. (1989), and Vihman (1996) supported the Babbling Drift Hypothesis based on their empirical findings; however, the findings from Atkinson, MacWhinney, and Stoel (1968), Tuaycharoen (1977) were against it. In opposition to Jakobson (1941/1968), Locke (1983) proposed a continuity model, maintaining that child language development is influenced by physiological, perceptual, and cognitive factors. Boysson-Bardies et al. (1989) maintained that the influence of the ambient language on child L1 development could be traced at a very early age, so they put forward the Hypothesis of Early Interaction. Chen and Kent's (2009) data from 24 Mandarin-speaking children support this hypothesis. Yet, Oller (2000) did not fall for the Hypothesis of Early Interaction. He considered it tricky to judge whether the effects of ambient language could be discernible.

In examining the early processes of language acquisition, researchers come



to notice an interesting phenomenon called “babbling”. What do all normal infants babble? What is the relationship between babble and speech development? Are the stages between CB/RB/VB (Canonical Babble/Reduplicated Babble/Variiegated Babble) and speech development in a continuous or discontinuous relationship? Jakobson (1941/1968) postulated discontinuity between babbling and early speech. He regarded babble as “wild sounds of babbling exercises” (pp. 25-26). He even presupposed “silent period” (p. 50) between babbling and early speech, and argued against any connection between them.

Since the 1970s, more and more researchers have supported the continuity view on language development (Boysson-Bardies, Sagart, & Bacri, 1981; Boysson-Bardies et al., 1992; Elbers, 1982; Li, 1994; Oller et al., 1976; Oller, 1980; 1995). However, they differed on how the pre-linguistic and linguistic stages are connected, so they advanced different hypotheses. Subsequent research has come up with widely different and inconsistent findings regarding these hypotheses. Moreover, most studies are cross-sectional or cross-linguistic, and longitudinal case studies are rare. Concerning child phonetic/phonological development, though there are several studies in support of the continuity view on early language development, they are mainly based on English data, and to date, the continuity relationship among different developmental stages is unclear. Regarding Mandarin Chinese, Li (1994, 1995) explored child language development and particularly assessed the discontinuity versus continuity issue on the basis of studying a baby girl named D, but he did not provide detailed and systematic data on babbling and early speech development. Zhu and Dodd (2000) explored the phonological acquisition in 129 monolingual Mandarin-speaking children, aged from 1;6 (one year and six months or 18 months) to 4;6 (4 years and six months or 54 months), but their study did not mention the babbling period. Few acoustic studies of child language development are available. Not much is known about how babble is related to phonetic and phonological development. In order to bridge these gaps in the literature, the present research systematically investigates an infant’s early and late babble along with their relationship to the phonological system of Mandarin Chinese.

Given that Chinese is a tone language, the present research further explores the tonal development of the infant during her early speech stage. Despite the large amount of work on segmental production in babbling and

first-word stages, only a few studies focus on children's tonal production, for example, Whalen, Levitt, and Wang (1991) studied pitch contour production at the babbling stage and Hallé, Boysson-Bardies, and Vihman (1991) studied tone patterns in Japanese children. In both studies, the ambient language in the pre-linguistic stage has been found to have a global effect on children's vocalization.

Does tone in the infant's vocalizations share some, if any, properties in the one-word stage and beyond? What kind of mechanism can be found when the child is approaching the adult tonal system? The present research is an attempt to answer these questions by exploring tone acquisition in early language development via analyzing the longitudinal data of the Mandarin-speaking child living in Changsha. It concerns two aspects of the child's speech development: segmental development and tonal development.

## 1.2 Research Questions

In order to extend our understanding of the concrete processes of language acquisition, the present study examines whether there is a systematic relationship between infants' production of babbling, late babble (CB/RB/VB) in particular, and early speech, and what language-particular patterns are continuous. Specifically, it explores the following research questions:

Question 1: How is the phone repertoire in babble related to the Mandarin sound inventory? What has been programmed into the Mandarin phonological system since babble?

Question 2: Is there a basic continuity in the output patterns from babbling to early speech development?

Question 3: Of the four Mandarin tones, which tone is acquired first? Are the rising and dipping tones more challenging than others? At what age does the young child acquire the four tones?

Question 4: How is the continuity from late babble to early speech reflected in the acoustic features of segments and tones? Does babble drift in the direction of the ambient language?

## 1.3 Outline of the Book

Chapter 1 outlines the research background and the main research questions that have guided each part of the study. Chapter 2 provides the literature review concerned. Chapter 3 describes research methodology. Chapter 4 and 5 respectively report the results of the CB/RB/VB and early speech production of segments and tones. Chapter 6 discusses the results and implications of the current study. Chapter 7 summarizes the main findings of the present study and outlines directions for future research.

# Chapter 2 Literature Review

## 2.1 Major Theories Concerning Child L1 Development

L1 acquisition has been explained within different theoretical frameworks such as the structuralist theory, behaviorist theory, generative linguistic theory, cognitive theory, cognitive continuity theory, and Frame/Content theory. Accordingly, there are different approaches, hypotheses, and models. This literature review focuses on two types of theories: Discontinuous and Continuous.

### 2.1.1 Discontinuous Theories on Child L1 Development

The discontinuous theory in psychology refers to passing through a series of distinct and separate stages which are not linked to each other. Within the linguistic field, researchers with a discontinuous view consider stages of language development discontinuous.

As linguists and researchers examine the stages of language development, they have taken different positions on the nature and roles of babbles. Before the 1970s, quite a number of researchers assumed a discontinuous relationship between babbling and speech. Grégoire (1937) called babbling “unformed, unorganized” (p. 215). Moskowitz (1970) contended: “By the late babbling period, there are only random strings of babbled sounds. The syllables and segments that appear when the period of word learning begins are in no way related to the vast repertory of babbling sounds.” (quoted from Boysson-Bardies, Sagart, & Bacri, 1981:512) Carroll claimed: “The particular sound types uttered by the babbling child have little relevance for later learning, for the types ap-

pear in more or less random sequences which bear little relation to the sequence observed after true language learning starts.” (1971;205-206) The notion of randomness in babbling was restated many times (Lenneberg,1969;Mowrer,1952;Osgood,1953). Jakobson (1941/1968) regarded babble as “wild sounds of babbling exercises” (p. 215). He (1941/1968) and Lenneberg (1967) argued against any connection between CB/RB/VB and early speech. The following section will focus on Jakobson and Lenneberg’s hypotheses.

### **2. 1. 1. 1 Structuralist Approach (Jakobson,1941/1968)**

Child phonology research partially starts with Jakobson’s (1941/1968) “Child Language,Aphasia,and Phonological Universals”. Concerning child language,he made the following four postulations but incurred much criticism:

1) “A child,during his babbling period,can accumulate articulations which are never found within a single language or even a group of languages — consonants of any place of articulation,palatalized and rounded consonants,sibilants,affricates,clicks,complex vowels,diphthongs,etc.” (p. 21) He agreed with Grégoire (1937) that “the child at the height of his babbling period can produce all conceivable sounds” (1941/1968;21). However,after having observed the babbling of his Norwegian daughter named Hilde, Vanvik (1971) said:“I am not convinced that Hilde’s repertoire was as great as that.” (p. 271)

2) Then the child “loses nearly all of his ability to produce sounds in passing over from the pre-language stage to the first acquisition of words...” (p. 21-22). The “loss of ability” here was likewise inferred by Velten (1943,1971),who said that the infant’s “ability to produce a multitude of speech sounds seems to vanish overnight” (p. 281;quoted from Locke 1983). On the contrary,Blount observed that “babbling behavior continued to be exhibited during the early one-word utterance stage” (1972;82). Labov and Labov commented that their daughter Jessie “did not stop babbling when she began to use words” (1978;833;quoted from Locke,1983;52).

3) “In place of the phonetic abundance of babbling,the phonemic poverty of the first linguistic stages appears,a kind of deflation which transforms the so-called ‘wild sounds’ of the babbling period into entities of linguistic value.” (p. 25-26) According to Jakobson,“phonetic abundance” was replaced by “phonemic poverty” (1941/1968;27). The sounds of infants in babbling are

said to change dramatically only at the onset of meaningful speech, in favor of universal CV syllable patterns, the patterns for which no such preference is seen before meaningful speech. On the other hand, quite a number of researchers objected to that postulation. Oller et al. (1976) examined ten infants' babbling and early speech. Their research shows a clear parallel between the babbling of children (00-0;6-0;8) and the phonological structure of the first words. Far from being random vocalizations, babbling appeared to be governed by the general restrictions of human phonological capacities. Locke did not think that babbling was "an entirely random activity, unrelated to the later systematic unfolding of speech sound oppositions" (1983:2). Stoel-Gammon and Cooper (1984) spoke from the facts that for each subject (3 subjects), over half the phones in the babbling sample also occurred in the production of real words. Vihman et al. (1985) found that the so-called "wild sounds" like bilabial thrills and syllabic consonants were still present in early words.

4) Jakobson (1941/1968) even presupposed a "silent period" between babbling and speech (quoted from Oller, 2000). Muteness separates babbling from the first word stage. Nevertheless, Menn concluded that the "silent period" was "a rare phenomenon" (1983:6). Locke (1983) argued that evidence was lacking for such a period. Boysson-Bardies (1999) remarked that Jakobson had posited a radical discontinuity view between the productions of babbling and those belonging to language.

### **2. 1. 1. 2 Independence Hypothesis (Lenneberg, 1967)**

Lenneberg (1967) hypothesized that pre-linguistic productions were constrained by physiological and biological maturational processes and thus were universal. In other words, motor and perceptual components of a language are considered to develop separately. This view gives rise to the Independence Hypothesis, that is, language development does not depend on the infant's linguistic environment.

In viewing the stages of language development, Lenneberg (1967) adopted the view similar to Jakobson's (1941/1968). He claimed that at the onset of speech, "the mass of random sounds begin to be lined up into some fundamental classes that contrast with one another in terms of articulatory mechanisms, roughly corresponding to some of the distinctive features described by Jakob-

son” (Lenneberg, 1967:279; quoted from Oller, 2000:44). Infants’ early vocalizations suggest that the articulating organs “move somewhat erratically and discoordinately” (Lenneberg, 1967: 277). By about six months, the babbled sounds “still occur somewhat randomly” (Lenneberg, 1967:278). The onset of speech takes place between the second and third year of life. There is a disconnection between babbling and the phonological system. If there is any connection, babble is related to PAROLE (‘Speech’) instead of LANGUE (‘Language’). Nevertheless, Locke said: “I have been able to find no testimony that babbling and speech are temporarily discontinuous.” (1983:52)

Lenneberg (1967) also put forward the Critical Period Hypothesis which contends that language is innate but has to be acquired before the age of puberty as a result of the lateralization of the brain. So far, the Critical Period Hypothesis has been widely accepted, for the evidence has been presented in support of the existence of a critical period for language acquisition. After puberty, children are unable to fully acquire language. Yet his position on the relation between babble and early language is not supported by empirical findings.

Touching the above discontinuity postulations, more and more researchers have held opposite views (Locke, 1983; Menn, 1983; Oller et al. , 1976). Today, the notion of continuity between babbling and early speech is widely supported by empirical studies. A number of longitudinal investigations of infant vocalizations have been conducted since the 1970s, and all of them have assumed that babble is a precursor to early speech (Boysson-Bardies, Sagart & Bacri, 1981; Boysson-Bardies et al. , 1992; Cruttenden, 1970; Elbers, 1982; Holmgren et al. 1986; Koopmans-van Beinum, & van der Stelt, 1986; Labov & Labov, 1978; Nakazima, 1962, 1975, 1980; Oller et al. , 1976; Oller, 1980, 1995; Stark, 1980; Zlatin, 1975). Contrary to Jakobson’s (1941/1968) discontinuity claim that babbling and phonemic development at the onset of speech are unrelated, more recent research indicates that there may be a drift in the babbling output structure towards the phonic patterns of the ambient language (Brown, 1958). The drift may start during the second half of the first year of life. This view is also called the Babbling Drift Hypothesis and it has been supported by some researchers (e. g. Boysson-Bardies et al. , 1989, 1992; Boysson-Bardies, 1999; Roug, Landberg, & Lundberg, 1989; Vihman et al. , 1985; Vihman, Ferguson, & Elbert, 1986). In a word, neither the claim that babbling had no relation to later

productions (e. g. , the discontinuity postulation) nor the universal pattern (e. g. , the Independence Hypothesis) proposed for phonological development has been borne out by the current analysis of children's production.

## **2. 1. 2 Continuous Theories on Child L1 Development**

In psychology, the continuity theory means that change proceeds gradually and continuously, and it is quantitative in nature. Development is gradual and cumulative. Researchers with this continuity view look upon stages of language development as being connected and continuous.

### **2. 1. 2. 1 Behaviorist Approach (Mowrer, 1952)**

Behaviorism views learning within the environmental learning framework. Environmental learning is the major cause of developmental change especially via types of reward and punishment. The behaviorist learning theory assumes that babbling provides the basis for selective reinforcement, which, together with imitation of the adults, could lead the child to the sounds of speech. It denies the biological foundation of language development (Mowrer, 1952). A behaviorist perspective on phonological development was first addressed by Mowrer (1952). Four steps were postulated: 1) attention to and identification with the caretaker; 2) the development (in the learner, or child) of an association between caretaker vocalizations and such "primary reinforcement" as expressions of affection (speech sounds are "positively conditioned"); 3) the extension of reinforcement value to the child's own vocalizations by virtue of their similarity to those of the caretaker; 4) additional selective reinforcement of sound patterns closest to those of the caretaker, both "extrinsic" through caretaker responses and "intrinsic" through the child's own experience of the similarity (quoted from Vihman, 1996: 14). Children imitate sounds and patterns they hear and receive positive reinforcement. Encouraged by the reinforcement, they continue to imitate and practice sounds and patterns. When an infant is able to produce the adult-like forms, he or she is more likely to get positive reinforcement from his or her parents. This should lead the child to pay more attention to the forms of adults, which sets him or her onto the path of adults' speech.



Yet acquisition of more complex grammatical structures of language requires a different sort of explanation, as positive and negative reinforcement is insufficient to explain the processes of whole language development.

### **2. 1. 2. 2 Babbling Drift Hypothesis (Brown, 1958)**

Brown also took an opposing view to Jakobson's discontinuity position. He said that: "The most important thing about babbling is the fact that it drifts in the direction of the speech the infant hears." (1958:199; quoted from Locke, 1983:3) He thought the occurrence of babbling was due to instinct. Environmental differences would be reflected in the infants' babbling. As the infant grew older, he or she seemed to become increasingly aware of phonological categories in the language of his environment. These receptive changes appeared to reflect experience such as imitating adults' speech. As a result, the infants' speech was getting more and more like adults' speech.

A number of researchers have supported the Babbling Drift Hypothesis. Nakazima (1962; quoted from Locke, 1983: 16) recorded the babble of several Japanese and American infants, three of whom were 7-10 months old. He indicated that the environment indeed had a clear influence but not until about 1 year. Weir and Maccoby (1966; quoted from Locke, 1983: 13) conducted some researches on the babbling of infants reared in different linguistic environments. Weir and Maccoby (1966) found that they were usually able to tell the pitch patterns of a Chinese infant aged 6-8 months from those of an American and two Arabic infants of the same age, but they were unable to distinguish between the two Arabic babies from the American one. Many scholars refer to the Weir and Maccoby's (1966) study as evidence in support of the Babbling Drift Hypothesis. Vihman also supported this hypothesis by saying that the studies of the earliest period of development had revealed influence from the ambient language on both perception and production (1996:8).

Nevertheless, a number of other researchers think that the empirical support for the Babbling Drift Hypothesis is rather weak and based on methodologically shaky evidence. Atkinson, MacWhinney and Stoel (1968) used Weir and Maccoby's (1966) recordings to perform a thorough analysis, and they reported that: "Adults can neither identify babbling infants raised in different language communities... nor judge whether two samples from infants at a