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Explorations in Language and Literacy Learning: A Two-Year Case Study on a Nine-Year-Old Chinese-English Bilingual Child's Chinese Invented Spelling

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Abstract

In today's world where everyone is considered a member of the global village, English has long been regarded as one of the most popular languages for people speaking different mother tongues to communicate with one another. English learning thus appears to be a hot trend in many countries where English is not the official language. Taiwan is a good example to illustrate the current craze of English learning. The authorities concerned and many parents seem to be strong upholders for the popular folk belief that the younger a child starts learning English, the better ultimate proficiency level he or she is likely to achieve, and thus urge young children learn English as early as possible. A number of scholars and parents, however, have raised concerns about whether young children' native language (L1) development would be affected by such overinvestment of time and energy on the second language (L2). Little research has been done to investigate how Chinese young children's L1 development may be affected by their simultaneous learning of an L2. In this paper, the Chinese invented spelling of a 9-year-old bilingual child, who has been attending English-only school since the age of 4, was analyzed from the perspectives of developmental patterns, sociocultural nature, and political and interpretive functions. By examining the child's early written production over a period of two years, the present study aims to discuss how the learning of a second language might affect the literacy development of a bilingual child's L1.

A Short Biodata Statement

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INTRODUCTION

In today's world where everyone is considered a member of the global village, the English language has long been regarded as one of the most popular communication tools among people speaking different mother tongues. We thus can find that English learning seems to be a hot trend in many countries where English is not the official language. Taiwan is a good example to illustrate the current craze of English learning. In fact, this matter appears to be a particularly urgent issue for her government to deal with because many Chinese learners of English in Taiwan have often been criticized that after learning this language for many years, they still have great difficulties employing this language to conduct a simple everyday conversation with native English speakers successfully. In addition, based on the official report released by the Educational Testing Service (2005), they, compared with EFL (English as a foreign language) learners in other countries, had a much poorer TOEFL (Test of English as a Foreign Language) performance. Accordingly, many parents and scholars have long pressed an immediate call for English curriculum reform and strongly urged that the authorities concerned introduce EFL curricula in grade school as early as possible, rather than keep the then-extant one in which English was not taught until students attended junior high school (Yu, 2003).

To catch up with the global trend of promoting English education and to meet the public's demand of foreign language education reform, the Ministry of Education in Taiwan decided that a comprehensive English education program needed to be implemented to the third graders in elementary schools starting the 2004 academic year. In fact, before this new policy was carried out, many schools in urban areas had taken the initiative in having their students learn English since the first grade. With the overwhelming official emphasis on the importance of English learning, it seems that the authorities hold that the younger the child starts learning English, the better ultimate proficiency level he or she is likely to achieve. Many parents also seem to be strong believers of this line of argument. Under the craze of learning English, now it appears to be a hot trend that many parents send their young children to attend English-only school to learn this foreign language as early as possible in the hope that their offspring can get a head start this way in today's ever increasingly competitive society.

A number of scholars and parents, however, have raised concerns about whether young learners' native language (L1) development would be affected by such overinvestment of time and energy on a second language (L2). In fact, anecdotal reports have pointed out that if young children are overexposed to English before their mother tongue has been well established, their L1 may not develop fully enough like a native. Little research has been done to investigate whether and, if so, how Chinese young children's L1 development might be affected by their simultaneous learning of an L2. Furthermore, in examining the beginning stage of L1 acquisition process, researchers often have as one of focus areas invented spelling, which plays a crucial role in determining literacy development. Today much empirical work has been done to investigate the process and infer the general rules of children's invented spelling and its relationship with learners' literacy development, but little is done in the study of Chinese-English bilingual learners' L1 invented spelling. In this paper, a 9-year-old bilingual child's Chinese invented spelling will be specifically analyzed from the

perspectives of his developmental patterns, along with those of sociocultural nature, and political and interpretive functions. By examining the observed child's early written production over a two-year period, the present study aims to discuss how the learning of an L2 might affect the language and literacy development of a bilingual child's L1.

BACKGROUND

Nowadays it is a well-recognized fact that understanding and being capable of using print plays an important role in an individual's life because this ability may make great changes in his or her world views and the meaning that events may have for him or her (Burns, Griffin, & Snow,1999; Nathenson-Mejia, 1989). In all children's early development, it is a matter of time that the written word becomes an important entity. There is no denying that a child's life will be heavily affected by his or her relationship with print, no matter whether this child learns to write and read early, late, or not at all. As Nathenson-Mejia (1989) nicely puts, through the growing ability to recognize words in print, to use that recognition for a practical purpose, and to be able to reproduce the print for oneself, an individual can "negotiate meaning on a personal level instead of having to depend upon the meaning given by others" (p.516). Due to the great importance of the ability to use print in a given person's life, many researchers take a strong interest in finding out how children learn to read and write, that is, how their literacy ability develops.

Young children's invented spelling is often one area of great interests in literacy studies. Invented spelling generally refers to learners' attempts to use their best judgments about spelling. In examining the writing of thirty preschoolers who were able to identify and name the letters of the alphabet and to relate the letter names to the sounds of words, Read (1975), one of the pioneering researchers focusing on children's beginning attempts at learning to spell English words, found that different children employed the same phonetically motivated spellings to a degree that can hardly be accounted for as resulting from random choices or the influence of adults. In other words, learners had 'invented' spellings for words by arranging letters to express themselves. Indeed, even at an early age, children could detect phonetic characteristics of words that English spelling represents; thus, it appears no longer appropriate to see learning to spell simply as a matter of memorizing words, but this learning journey should be dealt with as a developmental process that culminates in a much greater understanding of English spelling than simple relationships between speech sounds and their graphic representations (Read, 1975; Lutz, 1986). In brief, invented spelling is quite different from the traditional spelling. The former usually refers to the beginners' or pre-readers' word-spelling which makes the most of their association of symbols with the sounds they hear in words that they wish to write, while the latter usually refers to learners' use of the standard spelling of words (Clarke, 1988). Children have been proved to be active constructors because they can discover, hypothesize, invent, and modify their behavior based on their interactions with the environment (C. Chomsky, 1970, 1971a, 1971b, 1972, 1979; Read, 1971, 1975; Clay, 1972, 1975, 1991; Durkin, 1974; Ferreiro, 1978; Vygotsky, 1978; Henderson & Beers, 1980; Harste, Burke, & Woodward, 1983; Dyson, 1985, 1991; Chi, 1988; Cullinan, 1992; Neuman & Roskos, 1997, to name but a few).

Research into spelling has indicated that children who are encouraged to employ invented spelling in the beginning phase of learning to write can gradually acquire the appropriate symbols for sounds and progress to traditional spelling when they are exposed to and become aware of conventional written words (e.g., Read, 1971;

Gentry, 1977, 1982, 2000, 2001; Beers, 1980; Zutell, 1980; Henderson, 1981; Weinberger, 1996). Therefore, a number of educators strongly urge children be encouraged to take advantage of invented spelling (Clark, 1988). In educational practice, spelling used to be taught as a separate subject, and memorization was thought to be the key to its mastery. Most grade schools thus often employed spelling series and treated spelling as a subject separate from the other language arts. However, studies have suggested that the acquisition of spelling rules should be regarded as a complex developmental process, and that the stages of this process can be identified. Practitioners can hence take advantage of what we know about the spelling stages to help students develop appropriate strategies for learning how to spell and then assess students' progress more accurately (Lutz, 1986).

Gentry (1982), building from Read's (1975) work on spelling learning in English, has suggested that as young children discover the intricacies of print, they generally go through five stages of spelling development, which are pre-communicative, semi-phonetic, phonetic, transitional, and correct. In the pre-communicative stage, learners are able to employ symbols from the alphabet but show no knowledge of letter-sound correspondence. They may also lack knowledge of the entire alphabetic system, the distinction between upper- and lower-case letters, and even the left-to-right direction of English orthography. Learners at the semi-phonetic stage may begin to understand letter-sound correspondence; i.e., sounds are in fact assigned to letters. At this stage, they often can exert simple logic. For example, they may use single letters to represent words, such as using 'C' for 'see.' During the phonetic stage, learners start employing a letter or group of letters to represent every speech sound they hear in a word. Although their spelling may often do not conform to conventionalized rules, it is systematic and easily understood. For example, they may use 'kan' for 'can' and 'kom' for 'come.' In the transitional stage, learners begin to assimilate the conventional alternative for representing sounds, and thus move from employing sounds for representing words to using visual representation and their understanding of the structure of words. They may, for instance, write 'egul' for 'eagle' and 'higheked' for 'hiked.' Finally, in the correct stage, learners know the English orthographic system and its basic rules. The correct speller basically can understand how to deal with such things as prefixes and suffixes, silent consonants, alternative spellings, and irregular spellings, and recognize incorrect forms; thus a large number of learned words are accumulated. Learners' generalizations about spelling and knowledge of exceptions are usually correct. Gentry further notes that the move from one stage to the next is a gradual one and that coexistence of spelling errors from more than one stage may occur in a particular sample of writing. However, children generally do not regress between stages, such as passing from phonetic back into semi-phonetic stage or from transitional back to phonetic (Lutz, 1986).

Educational practice has clearly shown that the developmental process would be affected by instruction in traditional spelling in important ways. Read's (1975) study reveals that though their invented spelling behavior may still persist for several years, young children's invented spelling would change after they are exposed to standard spelling instruction. However, even these children do not have any special difficulty adapting to standard spelling. According to C. Chomsky (1976), an important help we could provide for inventive spellers who are beginning to read is to have their questions answered and their mistakes corrected when necessary. Simply put, the successful process of learning to spell is based on a set of tacit hypotheses about phonetic relationships and sound-spelling correspondences, and that learners are able

to modify these hypotheses readily as they encounter new information about traditional spelling (Read, 1975; Lutz, 1986).

It can be readily seen that nowadays there has been much work conducted to investigate the process and infer the general rules of children's invented spelling in the existing literature. Despite the fact that the massive and persistent investment of time and energy is evidently noticed today and that this area receives increasing attention from researchers in many disciplines, such as education, psychology, and psycholinguistics, little is done in the study of native Chinese speakers' invented spelling, let alone that of Chinese bilingual learners. Chi's (1988) study is one of the very few studies that focus on native Chinese speakers' invented spelling. Her study showed that young Chinese children, like English counterparts, went through some specific steps in learning how to produce the correct writing. The children's development was found to progress from visually global to more differentiated features of characters. However, although based on the limited, few research findings in the scholarly literature, some developmental patterns also existed in Chinese children's invented spelling, we do not know whether Chinese bilingual children's early literacy development would be similar to that of monolingual ones. In this paper, the development of a 9-year-old bilingual child's Chinese invented spelling was explored and then analyzed from the perspectives of his developmental patterns, along with those of sociocultural nature, and political and interpretive functions. By examining the child's early written production, the present study aims to discuss how learners' L1 early writing and spelling development may be related to their simultaneous learning of a second language.

METHODOLOGY

Research Question

The main purpose of the present study was to examine the spelling-learning process of a Chinese-English bilingual child in terms of the developmental patterns. The specific question asked was what developmental patterns could be observed from the bilingual child's invented spelling. By investigating this question, this study would further explore the possibility of whether the learner's L1 literacy performance might be related to his second language learning.

Participant

The participant involved in the present study was the observed child Jason (9; 8 years), the only child in a Taiwanese family of Chinese ethnicity. Ever since the age of four, he has been studying in an English-only school. He is now a second grader in an American primary school in Taiwan, which was founded to meet the needs of expatriates coming from abroad to work here. The reason why his parents chose not to let him receive the local, regular Chinese schooling is that they both strongly believe that the younger a person starts learning a foreign language, the better ultimate proficiency level he or she is likely to achieve. Therefore, his parents, both of whom can be considered successful Chinese learners of American English, raised Jason bilingually and had their son receive English-only education ever since he entered the kindergarten at the age of four.

While Jason's parents is a strong upholder of 'the-younger-the-better' position when it comes to learning English, this does not mean that they play down their son's mother tongue learning. In fact, they consider Jason's Chinese learning equally important. Before Jason attended the English-only school at the age of four, Chinese was the dominant language exposed to him. Even after he went to English-only school for formal schooling, his parents tried their best to help Jason improve his Chinese

because they hoped their son could catch up with the children of the same age as him who receive Chinese schooling. Hence, his parents hired a tutor to teach him Chinese four nights a week. Also, although having a good command of English, they set up a policy that Chinese should be used at home as much as possible, thus conversing with Jason only in Chinese most of the time. Even so, Jason still often uses English spontaneously to express himself. Only when his parents know that he understands something only by English would they talk to him in English.

In brief, before Jason attended the English-only school, Chinese was the major language exposed to him on a predominant scale. Due to the fact that English is the main language employed at school, his linguistic exposure has been gradually tipped on the side of English after he started kindergarten at 4; 9, and this became more obvious at 5; 3. In particular, there are usually many extracurricular and social activities for the school children and their parents; thus, as many researchers (e.g., Ellis, 1994; Brown, 2000) have suggested, the strong influence of the peer group and school-related activities upon Jason's use of and attitude toward language has markedly emerged since the age of 4; 9 onwards. It hence can be easily noticed that the child gets increasingly dependent on English, only at the expense of his native language. According to his parents' observations, Jason became aware that he grew more dependent on English at the age of 5; 3. It appears that his English is now in rapid progress day by day; on the other hand, even though his parents have done lots of efforts to help him improve his Chinese, his Chinese ability seems to gradually show sign of stagnation or maybe regression as he grows older.

Procedure

The data of the present study were collected by the investigator over a two-year period (from February, 2003 to January, 2005). The method employed in this study was adapted from the previous research on the invented spelling and writing (e.g., Chi, 1988). Basically, the data were gathered every other week during the two-year period. In each data collection session, the investigator asked the child to perform two kinds of writing tasks, *Uninterrupted Writing*, and *Dictated Writing of Words*. For the Uninterrupted Writing task, the investigator first designated a specific theme, such as having a meal, going for a walk, playing with friends, reading books, and then encouraged the child to write down whatever he would like to say about the specific topic. This task did not end until the child expressed that he was not able to go on any more. As regards Dictated Writing of Words, each time the investigator chose 15 words which were included in the Chinese textbooks used by the first and second graders studying in Taiwan's elementary school, and asked the child to write down these specific words in the sentences dictated by the investigator. For example, the investigator would say, "do you know how to write the word '洗 *xǐ*' (wash) in the sentence '我現在要去洗澡 *Wǒ xiànzaì yaòqù xǐzaǒ*' (I am going to take a bath)?" In total, there were 48 data collection sessions during the two-year period. When necessary, the investigator would interview the child for his thoughts about his writing performance after each task.

Instruments

In addition to the written paper, the data collected in this study were in the forms of audio cassettes and videotapes as well as observational notes. Each data-collecting session was tape-recorded in the hope of catching the participant's feeling about and attitude toward the use of words. Using videotapes for interviews was also a desideratum, the purpose of which was to assist the investigator in the analysis so that the chance of speculating the participant's thoughts could be greatly reduced when the meaning of the child's recorded utterances was not easy to understand.

Furthermore, these data were supplemented by the observational notes taken by the investigator, for it was found that sometimes the participant's language use recorded could not be clearly understood.

Coding Scheme

The aim of the present study was to analyze the developmental pattern of a 9-year-old bilingual child's Chinese invented spelling. A number of researchers have empirically developed classification systems for the realization of invented spelling (e.g., Gentry, 1982; Chi, 1988). Based on Chi's (1988, pp. 288-289) coding scheme, the investigator generated his own coding to account for the observed child's developmental patterns. Both correct and erroneous productions of the child's written protocols were carefully considered to develop these coding categories. It turned out that nine mutually exclusive developmental patterns were identified in this study. These patterns in effect progress from global to more differentiated features of the Chinese character, which signifies the developmental order of the observed child's invented spelling. They are as follows:

(1) *Scribbling*, which refers to the case in which the writer makes meaningless marks when trying to write out a word.

(2) *Iconic Pictographic Writing*, which refers to the situation in which the writer, rather than writing out the specific word, draws an iconic picture. For example, when a writer tries to write the word star, he or she might draw instead.

(3) *Pictographic Invented Writing*, which refers to the case in which the writer combines strokes or stroke-like marks in a square frame, as well as employs the manner of stroke attachment and the spatial composition of components to invent unrecognizable characters. For example, when trying to write out the word '我', the writer may invent an unrecognizable character like 𠂢.

(4) *Invented Writing with Mildly Distinguishable Qualities*, which refers to the situation in which the writer uses the manner of stroke attachment and the spatial composition of components to invent recognizable characters. For example, when trying to write out the word '全', the writer may invent a recognizable character like㑒.

(5) *Invented Writing with Distinguishable Qualities*, which refers to the case in which the writer uses the manner of stroke attachment and the spatial composition of components to construct recognizable characters. For example, when trying to write out the word '匆', the writer may invent a recognizable character like勿.

(6) *Writing with Few Absent/Added or Wrong Strokes*, which refers to situation in which the writer writes out a word with some missing or added strokes. For example, the writer may write the word '大' for '犬'.

(7) *Writing with Homonym*, which refers to the case in which the writer writes with the same pronunciation as another word but with a different meaning and writing. For example, the writer may write '明' for '名'.

(8) *Writing with Phonemic Symbols*, which refers to the situation in which the writer writes with the same pronunciation as another word but with Chinese phonemic symbols. For example, the writer may write 'ㄕ' for '師'.

(9) *Correct Writing*, which refers to the case in which the writer writes correctly.

Data Analysis

To explore whether the observed child's L1 literacy development may be related to his L2 learning, the analysis conducted for the present study is mainly of qualitative

nature. However, descriptive statistics were first resorted to for the purpose of describing this child's development pattern. Following Chi's (1988) study, three sets of lexical cues inherent in Chinese orthography were employed as the fundamental linguistic framework to analyze the data collected descriptively; that is, (a) the stroke number of the character; (b) the component number of the character, and (c) the spatial composition of components of the character. The investigator employed these cues to analyze the words written by the participant. The total characters in the entire child's written production were first counted (but the repeated word in the same piece of work was counted only once), and each character was then classified into one of the above nine mutually exclusive categories. The frequency and percentage per category were tabulated by task. To show the developmental features of the observed child at the different point of time, the overall results from the 48-week data collection sessions were further broken down into four different phases, each of which consisted of 12 weeks (from February to July, 2003; from August, 2003 to January, 2004; from February to July, 2004; from August, 2004 to January, 2005). Each of the four phases roughly corresponded to the time frame for half an academic year.

Reliability of Coding

In order to achieve interrater reliability, 20% of the data was randomly selected to be independently coded by a second rater (Cohen, 1960). A corrected-for-chance level of kappa of at least .85 was considered acceptable in the present study. The interrater agreement coefficients were 88% in the present study.

RESULTS

Table 1 shows the overall distribution of the developmental patterns for the observed child's invented spelling across the two-year period. As mentioned above, the developmental order obtained in this study was from scribbling to iconic pictographic writing, pictographic invented writing, invented writing with mildly distinguishable qualities, invented writing with distinguishable qualities, writing with few absent/added or wrong strokes, writing by homonym character, writing by phonemic symbols, and finally correct writing.

[Insert Table 1 here]

The results of the present study indicate that the observed child went through some specific steps in his learning how to produce the correct writing. A similar finding has also been shown in other studies on invented spelling (e.g., Van & Zian, 1962; Gentry, 1982; Chi, 1988). It appeared that generally, Jason's Chinese character learning progressed from associating previously learned sound/meaning relation with the global configuration of a character to relating sound/meaning with components of a character, and to wrongly substituting some components from similarly shaped characters, and finally to making the correct associations between sound/meaning and the correct strokes of a character. In addition, the child's development seemed to progress from visually global to more differentiated features of characters (such as progressing from iconic pictographic writing, to invented writing with distinguishable qualities, and to correct writing). However, one thing worth noting was that his development was not linear all the time; that is, he would sometimes progress in a manner of limited regression, rather than an exclusively linear sequence. For example, the observed child might first write words with few absent or added or wrong strokes, and then step back to the phase of invented writing with distinguishable qualities, but then again proceed to writing with few absent or added or wrong strokes, and finally

produce correct writing.

Where the different developmental phases shown in the present study are concerned, two types of broad categories can be distinguished. One is non-invented writing, which consists of the developmental patterns 7-9: homonym characters, phonemic symbols, and correct writing; the other is invented writing, which comprises all the other patterns identified, i.e., patterns 1-6. In this study, there were 72.0% of Jason's writing protocols (1515 out of 2105) falling into the category of non-invented writing, that is, 2.3% for writing by homonym character (48 out of 2105), 1.0% for writing by phonemic symbols (22 out of 2105) and 68.7% for correct writing (1445 out of 2105). In contrast, there were 16.1% falling into the category of invented writing (341 out of 2105), that is, 2.0% for iconic pictographic writing (43 out of 2105), 3.9% for pictographic invented writing (83 out of 2105), 4.1% for invented writing with mildly distinguishable qualities (86 out of 2105), 3.7% for invented writing with distinguishable qualities (78 out of 2105), and 2.4% for writing with few absent/added strokes (51 out of 2105). Based on the different invented patterns shown in the child's writing, it seemed obvious that Jason did make the most of the set of lexical cues and internal qualities of characters inherent in Chinese logography to construct his own unique writing and spelling systems, which were logical, identifiable, and approximately close to conventional writing.

Another interesting finding emerged when the observed child's writing was examined from the perspective of high and low level of inventing spelling proposed by Chi (1988). The high level consists of the patterns 4-6, i.e., invented writing with mildly distinguishable qualities, invented writing with distinguishable qualities, and writing with few absent/added or wrong strokes; on the other hand, the low level comprises the patterns 1-3, i.e., scribbling, iconic pictographic writing, and pictographic invented writing. Generally, the higher the number of a given pattern is, the higher level of the invented writing that pattern is. It was found that overall, 62.5% of Jason's writing protocols (215 out of 344) in the invented patterns fell into the high level, whereas 37.5% of his work fell into the low level (129 out of 344). This finding is basically consistent with that in Chi's (1988) study. In her study, she divided the participants into two age groups and a higher percentage was found for the high level of invented writing than for the low level by the older children of ages of 5 and 6 (88.5% vs. 11.5%), while a higher percentage was in the low level for the younger children with the ages of 3 and 4 (55.6% vs. 44.4%). In other words, the more experience in written language a child encounters (generally speaking, the older the child is), the more orthographic awareness of characters he or she may develop. However, the high-level percentage of the 9-year-old Jason is much lower than Chi's 5- and 6-year-old participants (62.5% vs. 88.5%). Obviously, a somewhat different picture is shown in this study because 9-year-old Jason is supposed to perform better than 5- or 6-year-olds. The likely reason for Jason's poorer performance may be that although he indeed learns Chinese as a native language, he has not had much experience practicing his mother tongue since he studied in the English-only school at the age of four.

Other interesting findings regarding the high/low level of developmental patterns could be detected when the observed child's overall (i.e., two-year) performance was broken down into four different phases. Tables 2-5 show the frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes per six months. As can be seen from Tables 2, 3, 4, and 5, it seemed that as the child grew older, there was a downward trend for the percentage of the high level patterns in his invented spelling, while there was an

upward trend for the lower. This finding appeared to suggest that although Jason had been keeping learning Chinese, his spelling or writing ability not only did not improve, but showed signs of stagnation or even regression. In fact, other evidence can be found to support this supposition. For example, the percentage of correct writing for the observed child got lower and lower (from 80.7%, to 75.3%, 67.1%, and finally 54.3%), and he produced fewer and fewer Chinese words in the Uninterrupted Writing task (from 433, 390, 279, and finally 161).

QUALITATIVE ANALYSIS and DISCUSSION

Since Jason was learning two very different languages at the same time, the differences between these two languages may hold some key to accounting for his spelling and writing performance. There is a marked contrast between Chinese, a logographic script, and English, an alphabetic script. On the one hand, Chinese logographic system, which consists of pictogram, ideogram and phonogram, actually maps onto speech at the morpheme. For all the imaginable terms, there have to be distinctive characters corresponding to each morpheme because of its one-to-one grapheme-morpheme relation in the logographic system. It is thus inevitable that one must remember thousands of these distinctive characters before he or she can be considered fully literate. On the other hand, English alphabetic system, which embeds the morphophonemic grapheme-speech relation, maps onto spoken language at the level of the phonemic level; thus, a phonologically deep writing system characterizes English orthography, and its grapheme-sound relation, while close, becomes somewhat unclear. The opaqueness of the link between English script and phonology has been suggested to be a possible barrier to its acquisition (Friere & Macedo, 1987). Accordingly, the grapheme-sound mapping in Chinese is perceptually discrete in that each character is also a syllable, while there is a continuous and more abstract relation in English. When it comes to learning how to read and write the printed symbols constructed on different principles, the differences between these two languages may have critical implications for beginners and pre-readers because these learners are faced with different processing tasks. For Chinese learners, they encounter a written array which is dissected syllable by syllable and thus has a one-to-one correspondence with the syllabic boundaries of the spoken language (Hung & Tzeng, 1981), whereas, due to the multilevel representation, the English learners may have to go through a very abstract morphophonemic process; that is, they first have to parse words into morphemes and then apply symbol-sound relations (Venezky, 1970; Lesiak, 1997).

Therefore, it is generally recognized that employing different scripts needs different processing strategies. In other words, depending on how languages are represented by printed symbols, beginners and pre-readers have to develop different learning strategies and constructive patterns in order to become literate; otherwise, they might wind up having a certain type of dyslexia, which could have been avoided if other script has been acquired instead (Kaderavek & Sulzby, 1998; Kamberelis & Sulzby, 1988). Therefore, the way Jason learns language plays a critical role in our understanding of his Chinese performance. Before attending English-only school, Jason, who had developed the appropriate “linguistic awareness” (Mattingly, 1972) of a sign script such as Chinese logographs, certainly had no little trouble learning how to read or write Chinese. According to his parents, although he made a lot of mistakes when learning how to write, he could always progress little by little under the parental and teachers’ instruction. It was a pity that ever since he started learning English, an alphabetic script with a close grapheme-sound relation, his Chinese linguistic

awareness has lost its opportunity to fully develop. Someday he might even lose his Chinese literacy ability completely and could not read or write Chinese at all if this opportunity cannot be retrieved. This is because he has been spending most of his time working on the constructive patterns and learning strategies for English, a language embedded with a phonetic structure very different from his mother tongue, in order to develop the appropriate linguistic awareness for this new language (McGee & Richgels, 1996).

Obviously English is now having a crucial influence on Jason's competence of language use. Today his English ability is getting better and better every day; in the mean time, his Chinese seems to be fading away day by day. The fact that English is playing a dominant role in his daily life must be one of the main reasons for the seeming stagnation or even regression of his Chinese development reported above. We thus see that notwithstanding his parents' incessant efforts to maintain and improve his Chinese, his current Chinese ability appears to be much worse than that at the time when he attended the English-only kindergarten. In fact, his tendency to rely on English could be easily observed. For example, during each data collection session, although the child was specifically asked and constantly reminded to write down anything he could in Chinese, many of his writing protocols were still conducted in English, especially in his performance of the Uninterrupted Writing task. After each session, his parents and the investigator asked him which Chinese words or phrases he should use in place of the English counterparts he employed. He usually expressed that he had no idea at all. Suppose his parents or the investigator asked him to try again to write down the counterpart words in Chinese, he often showed signs of uneasiness and resistance, and the writing obtained, for the most part, was scribbling, iconic pictographic characters or pictographic invented characters, all of which fell into the low level of invented writing. Occasionally he would produce some invented characters with mildly distinguishable qualities or writing by phonemic symbols, but rarely did he produce correct writing even after having spent a couple of minutes trying really hard.

Research has suggested that learners' performance is closely related to their cognitive development (e.g., Brooks, 1977; Sipe, 2001). Jason's performance is certainly no exception. It is of great importance that the cognitive ability of the pre-reader matches with the task demand imposed by the specific orthographic structure of the scripts. It has been claimed that how the information is represented graphically plays a crucial role in the cognitive processes involved in beginners' progress from the whole printed array to the differentiation of the whole, and then to the synthesis of the parts into a more meaningful whole (Brooks, 1977; McGee & Richgels, 1996). It is, thus, reasonable to hypothesize that Jason requires different cognitive processes and strategies to achieve writing proficiency in the two very different writing systems, i.e., Chinese and English. Prior to the age of four, his cognitive processes had to simultaneously cope with both the Chinese orthographic structure and the English alphabetic system. However, before his cognitive requirements fully developed for Chinese, he could not help but mold cognitive processes and strategies to mainly deal with English because English has become the dominant language in his everyday life at the age of four, while Chinese becomes a language that is only partially used at home and in tutoring class. No wonder that his Chinese ability would show signs of stagnation or even regression, and that he, when writing Chinese, would try to employ a totally different orthographic structure of the script, i.e., English.

Nevertheless, the observed child's reference to English is quite different from the behavior of other bilingual beginners or pre-readers who are involved in working

through the similarities and differences between two ‘similar’ languages, say, alphabetic scripts such as English and Spanish, or logographic scripts such as Chinese and Korean. We can take for example a bilingual child who is learning English and Spanish simultaneously. Suppose this child’s native language is Spanish and he is in the beginning stages of English acquisition. Spanish rules for spelling would obviously dominate when this child is learning new English words, words to which the Spanish and English pronunciations were close, or where the English letter or sound does not exist in Spanish. This means that the child will employ what is most familiar to him or her to cope with English, which is the main reason why we can see that Spanish greatly influences the observed participant’s spelling strategies for learning English in Nathenson-Mejia’s (1989) study. As regards Jason, who is learning a logographic language and an alphabetic language at the same time, there seemed to be no direct mother tongue effect on his English spelling that can be observed. On the other hand, there also seemed to be no evident influence from English that can be found on his spelling strategies for Chinese. The only effect observed on him from English is that he often used English to express how he felt when he did not know or could not immediately remember the appropriate Chinese words.

Having said that, here the investigator does not mean that Jason’s cognitive learning strategies for Chinese play a very minor role in his cognitive strategies for English, or vice versa. N. Chomsky (1957) argues that there are some universal cognitive abilities that are likely to be involved in language learning. The investigator could not agree more. For instance, Jason’s Chinese invented spelling was dominated by the visual features of the script in the first place. This is one aspect of universal features among Chinese- and English-learning beginners and pre-readers. His knowledge of how language works in general when learning Chinese must be conducive to his English learning, and vice versa. The solution to the problem Jason has been experiencing is that he needs to be exposed to more Chinese literacy-related learning activities, such as reading and writing everyday. Helping him increase knowledge of his first language through constant reading and writing will certainly provide him with continuous opportunities to make logical connections between Chinese and English, to experiment, explore, and negotiate meanings between the two languages, and to learn about these languages through using them with confidence and success. The fact that many children are capable of reading and writing in more than one language has undoubtedly suggested that they have great linguistic potentials for multi-lingual meaning negotiating and problem solving. Therefore, the best parents or educators can do is to allow bilingual children to develop their innate language-learning abilities in a context ample in written and oral forms of the target languages (Nathenson-Mejia, 1989).

Furthermore, taking account of children’s level of cognitive functioning is an important prerequisite to understanding their strategies when confronted with written language in the early years of language acquisition (e.g., Ferriero & Teberosky, 1982). For example, an English-learning child’s mastery of short vowel sounds is in fact reflective of his or her level of cognitive functioning, rather than of a fairly mechanical learning process. In other words, children exposed to print will gradually develop their own theories, thus figuring out that the stuff they read is not numbers or pictures, but letters. In order to learn how to spell and read, the child has to know the relationship between sound patterns of the spoken language and phoneme sequences transcribed as letters. Matching acoustic patterns and phonemic elements is by no means a straightforward or an easy task. Children’s knowledge of how to deal with

this is basically gained through a developmental process of thinking, rather than just through a mere matter of learning an isolated piece of information with enough drill work or of memorizing it by rote. The journey of learning to use print not only involves both cognitive and linguistic processes, but also requires the active and exploring participation of the learner (Orton, 2000).

Accordingly, it comes as no surprise that the way Jason's parents teach him proves to be of little help. They usually asked him to memorize a list of Chinese characters which were extracted from books. Beers (1980) suggested that the more children know about word in general, the better spellers they become. In fact, spelling and reading abilities are closely related to each other and should be coped with in a combined matter in learning activities. Thus, it is conceivable that Jason's Chinese is unlikely to be improved much from the practice of isolated spelling because this de-contextualized learning hardly encourages essential active participation and concept formation that are indispensable for successful acquisition.

For a child like Jason who has basically figured out English abstract morphophonemic process and mastered sound-symbol relations, how can he or she retrieve his or her learning strategies and constructive patterns in order to be capable of dealing with Chinese written array, which, as noted above, is dissected syllable by syllable and thus has a one-to-one correspondence with the syllabic boundaries of the spoken language? The investigator asked Jason how he felt about simultaneously learning these two languages. He thought that English, an alphabetic script, was much easier for him to learn than his mother tongue Chinese, a logographic script, because once he had a rough grasp of the principles of English sound-letter correspondence as well as knew how to pronounce the word, he at least had some clues to spell the word even if he might not do it correctly. As for Chinese, he said that all he could do was to try very hard to memorize each distinctive character without any clue, but it was truly difficult for him because oftentimes every new word he encountered looked just like another different picture to him. Worst of all, what made him feel discouraged when learning his mother tongue was that even though he remembered how to pronounce a word, he, without any impression about what the word looked like, still had much trouble spelling it right. Indeed, the way he saw the two languages made good sense. Even if in the early 20th century a phonemic symbol was invented to help children learn the Chinese language, or even if in 1950s Chinese was Romanized, both ways cannot give learners any clues about how to spell a given Chinese character.

It thus seems not so surprising after all that Jason's cognitive strategies for Chinese, which were realized through the developmental patterns mentioned earlier, not only showed signs of stagnation or occasionally a manner of regression, but also even relied on a totally different orthographic structure of the script, English. For example, he first wrote the word '夫' for '失' ('to lose'), which belongs to pattern 6, writing with few absent /added or wrong strokes, in one data collection session. Then in the next session, he wrote '**矢**' for '失' ('to lose'), which belongs to pattern 5, invented writing with distinguishable qualities. Later he simply wrote the English word 'lose' instead of Chinese in the following session. In another following session, he wrote '夫' for '失' ('to lose'), which again belongs to pattern 6. Then in the next session, he finally wrote this word correctly. This example clearly indicates that the character '失' ('to lose') Jason wrote progressed from a higher level of invented spelling, to a lower level of invented spelling, to reference to English, to a higher level of invented spelling, and then finally to the correcting writing. The way Jason saw his mother tongue above may affect his development of cognitive processes and strategies for dealing with Chinese. Due to the fact that Jason's cognitive processes

and strategies to achieve writing proficiency in an orthographic system like Chinese may have somehow lost or gradually yielded its way toward English, all he could do about learning Chinese now is to resort to his fading memory. It is no wonder that a sign of stagnation or even regression could be observed.

As suggested earlier, to help Jason improve his Chinese, his Chinese exposure may at least meet some requirements. First of all, the word lists his parents usually imposed on him must directly come from the reading materials which he has learned In addition, he had better be exposed to a learning environment in which he can play an active role to formulate, test, and evaluate his own theory about the orthography, and this learning context can provide him with many opportunities that enhance natural language use through comprehensive speaking, reading, and writing practices as means of communication and expression. Then he also needs opportunities to compare words on different levels, like sound, syntax, and semantics, so that he might extend both his spelling and vocabulary growth by means of discovery and utilization of the underlying and systematic patterns of spelling and word meaning. When offering Jason an appropriate learning context, we should also pay close attention to examining the writing and reading process as an indication of his own theory making and growth. This way he can "invent" (in Piaget's terms) the structures which enable him to assimilate reality, thereby tacitly constructing the transformational rules which govern the structure of spoken and written language, and finally becoming a successful learner (Zutell, 1980).

The discussion thus far basically examined the observed child's Chinese invented spelling in terms of developmental patterns. We can see that this aspect of discussion is of valuable help to our better understanding of this child's literacy development. To further explore the greatness and complexity of how human beings learn different languages at the same time and how they develop this innate gift to the fullest potential, it has been suggested that we also need to take into account perspectives from the contextual nature and the political/interpretive functions (Daiute, 1993; Neuman & Roskos, 1997). That is to say, in addition to developmental patterns, children's everyday experiences with literacy are highly correlated to and influenced by sociocultural and sociopolitical diversity. After presenting some possible explanations for the observed child's spelling and writing product from the developmental point of view, the present paper will now go one step further to analyze his written behavior from the aspect of sociocultural and sociopolitical theory of literacy. We, therefore, can gain a deeper understanding of or shed new light on the observed child's literacy development. Indeed it is a well recognized fact that language learners need to interact with different contexts so as to formulate their own theory about written texts. It is hoped that this further discussion will be conducive to an interest of further research for the potential application of literacy theories.

Where sociocultural aspects of literacy are concerned, the sociocultural factor has been suggested to exert a great influence on children' oral and written language production (e.g., Daiute, 1993). This aspect of literacy development not only can shed light on the role of children's backgrounds in their language learning processes, but also may inform us how they, when collaborating with adults or more knowledgeable peers who can convey important cultural essence and practices, may extend their linguistic abilities by engaging in higher-order aspects of literacy, such as mastery over encoding sounds into their written forms.

Take for example the focus of the present study, spelling. It is an important aspect of language learning that must be orchestrated with other areas of leaning tasks in order for language users to be able to read and write. From a social constructionist

point of view, children's spelling development is highly related to the social context on which this specific development is based. Learners may regard a reflective teacher or more skilled peer as a valuable resource for solving their spelling problems. This can be considered a sign of their showing active participation in the code of written language. Through social interactions within the texts, such as involvement with text, conversation around text, and internalization of important concepts in the specific context, children will become more and more familiar with and capable of coping with the text form and its underlying systems (Neuman & Roskos, 1997). Hence, we can see how spelling fits in a picture of developmentally sensitive sociocultural perspectives in many respects. In other words, spelling cannot be regarded only as a separate or low-level skill that has to be learned before writing (Reddy & Daiute, 1993; Hall & Moats, 1999).

For 9-year-old Jason, his approaches to Chinese and English learning reflect, to a large extent, his experiences in family and school. As far as the relationship between family culture and literacy development is concerned, family discourse patterns have been shown to closely relate to children's literacy development (e.g., Snow, 1993; Weinberger, 1996). The parents in effect play a very important role in providing their children with the appropriate types of conversational challenges when children are ready to address and integrate these challenges into their day-to-day discourse. With different types of conversation, such as expressing feelings, affirming affection, exchanging information, and imbuing discipline and socialization, children are given ample opportunities for talk exchanges that require various linguistic tasks. In addition to helping children develop their oral language abilities, these opportunities eventually greatly conduce to their literacy development. It is the children with parents who engage them in many different kinds of talk, that is, who socialize them into literary ways of conversation, that succeed with literacy because the discourse enhanced by family interactions can directly support children's successful learning to read and write (Snow, 1993; McMahon, 1996; Weinberger, 1996).

However, the effect of the effort made by Jason's parents on his Chinese learning turns out to be of limited help. Because he has no siblings, his parents are the only persons at home who can speak Chinese to him. Although they have such a strong motivation to improve his Chinese as to set up a policy that they would talk to him in Chinese as much as possible, his Chinese still shows no obvious sign of progress. After spending much time working with Jason, the investigator found that family interactions were not really helpful for his Chinese development, but in a way might be helpful for his English learning. For instance, the focus of this nine-year-old boy's everyday life can be said to have much to do with his school events. Whenever talking to his parents about what happened in school, he almost always tried to start in English even if he knew that they wanted him to employ Chinese the best he could. The investigator asked him why he did not follow his parents' 'rule.' He said that most of the time he really did not know how to express himself in Chinese, and that this made him feel that English was much easier to speak his mind. For example, when he wants to have more fish at dinner, he can talk to his mother either 'Fish, please' in English, the phrase he picks up and has many opportunities to practice at school or '請挾魚給我 *qǐng jiá yú gěi wǒ*' in Chinese, the phrase he learns and has only few chances to use at home. Obviously it is easier for him to employ the English expression. It seems that similar situations also happen when he learns to read and write.

His response made perfect sense to the investigator. Just imagine that in school

he is imbued with some ideas about ecological and environmental protection that are so brand-new to his developing mind. Since he learns these ideas only in English, how was he supposed to use Chinese to tell his parents? If his parents insisted that he use Chinese, lots of Chinese-English code-switching and code-mixing sentences naturally emerged. The way he talked then seemed unnatural, his talking speed would slow down, and he finally even did not want to go on talking about this topic or would try to finish it as quickly as possible. Whenever Jason employed any English, his parents would try to teach him how to say its Chinese counterparts. However, due to the complexity of Chinese characters and the lack of appropriate learning contexts, it was very difficult for him to pick up what his parents taught him. In other words, his parents' insistence in fact dampened his spirit and discouraged him a lot from time to time. He thus developed a positive feeling toward English and a negative feeling toward Chinese. With a view to avoiding parental correction and instruction, sometimes he would even confine himself to a certain topics in which he was able to easily employ simple Chinese to express himself, or might speak less and less to his parents.

This was really sad, wasn't it? Jason's parents did not notice that in the first place. After knowing language choice would greatly affect their son's willingness to talk to them, they now become flexible so as not to stick to their Chinese-only-at-home policy all the time. In the past, only when knowing that Jason understood something better in English might his parents respond to him in English, but now his parents would take the initiative in speaking English to him if they know he understands something only by English. They do not have a heart to discourage Jason with Chinese when he talks about something in English in high spirits. Jason always thinks that English is a better language for many reasons. For example, he thinks that English vocabulary is much easier to remember than Chinese, and that Chinese is a very difficult and unpopular language which is used only by his parents and few friends and relatives. His parents' losing their ground might strengthen Jason's thought that English had an advantage over Chinese. That is the reason why the investigator believes that family interactions, such as discourse patterns, may be helpful for his English learning in some way. In fact, in his family culture, the investigator found ample evidence in favor of his English learning over Chinese, which supports the argument that family interactions can enhance various linguistic skills such as a large and sophisticated vocabulary, production of connected discourse, and use of specific linguistic genres, thereby providing a direct support to young children's learning to read and write (Snow, 1993).

With regard to school culture, as mentioned above, in order to improve his Chinese, it is of great importance for Jason to have both interactions with teachers from whom he can model expert literacy strategies, and interactions among his peers from whom he can be provided with effective spontaneous strategies as learning supports (Johnston, 2001). In other words, what he needs is not only teachers' or experts' instructions on culturally privileged characteristics of literacy, but also enough opportunities to combine these characteristics with his own diverse, specific oral and written genres. Comparatively speaking, the Chinese tutoring he receives is much inferior to his formal schooling in English in terms of offering the meaningful exposure he needs to improve literacy. For example, he almost got no Chinese interactions from his peers because they talked to one another almost exclusively in English.

According to Daiute et al. (1993), although teachers' or experts' literacy expertise plays an important role in children's development, the interaction around

literacy is much more important. By specific peer collaboration, such as extensive exploration, play, and reliance on social and affective supports, it is children's mutual engagement with each other, learning tasks, and ideas that are most conducive to their literacy progress. Thus, we can see how this kind of social interaction positively influences the essence and context of the reading and writing. In addition, the teachers' dominant attitude toward ideas and processes has been shown to be negatively associated with learners' ability to benefit from interacting with them (Daiute, 1993). This can offer another account for Jason's current Chinese and English ability. Where Chinese is concerned, Jason interacts mainly with his parents, who extremely control the way by which Jason learns his mother tongue. As regards English, he not only has relatively more 'democratic,' meaningful, and joyful interactions with his teachers, but also can actively engage with peers around written text. It hence comes as no surprise that the learning outcome of his Chinese cannot meet his parents' expectation.

Furthermore, the political and interpretive functions can offer another angle for researchers to gain a better understanding of the observed child's literacy development. Based on Jason's definition of literacy, his views on the politics of literacy, and his choices in the process of language learning, the investigator also found that a sociopolitical paradigm emerged. Friere and Macedo (1987) argue that literacy is a political project in which not only people's own experiences can be read, understood, and transformed, but also their relationships with the wider society can be reconstituted. That is to say, literacy is fundamental to aggressively constructing one's own voice as part of a wider project of possibility and empowerment. Jason's theory of literacy can be said to correspond to Friere and Macedo's point of view on a sociopolitical perspective. To this observed child, literacy is a stepping stone to make sure that the construction of his own voice can be heard and appreciated.

In reality, it is English, not his mother tongue Chinese, that can serve Jason's purpose in everyday life. In an interview to find out how he felt about Chinese and English, he said that he could not understand why his parents had to make him learn Chinese so incessantly. He even said, "I see no point for me to learn Chinese. It cannot help me perform better in school or get along well with my teachers or friends." In other words, he regarded English as a de facto working language, functioning as a unifying working language in his daily life. Jason even considered English a decidedly language of participation and mobilization involved in the community, and political and economic process at the national and international level. He felt that people's access to the society and the world will be much limited if they remain incompetent in English.

It is somewhat amazing that a 9-year-old child holds such a viewpoint. The reason why he would see things this way is based on the different experiences he had with Chinese and English. He said that because English played a critical role in his daily life, he would feel helpless and incompetent when his English was limited. In other words, with a good command of English, he thinks that he can at least get an equal chance to compete with his peer. However, he would not feel this way when he could not make himself understood in Chinese because to him Chinese is a language employed almost exclusively at home. So even if it was often difficult for him to converse with others to freely express what he would like to do in his mother tongue, he does not care at all. Simply put, since his native language can hardly get him anywhere, it seems reasonable that he really does not have a strong urge to learn this language. When his parents did not stick to their Chinese-only-at-home rule little by little, it was even more difficult for him to keep motivated to learn Chinese and to

have a positive affect toward it.

In fact, what Jason experienced can serve as a good example to illustrate the phenomenon of so-called subtractive bilingualism (Brown, 2000), which generally refers to the situation in which learning a second language interferes with the learning of a first language and thus the second language gradually replaces the first language. This phenomenon is commonly found in young children who emigrate to a foreign country where the official language is the second language children need to learn. These children would play down their mother tongue learning because they think it is the second language, not the first, that can help them not only survive, but also compete on an equal status in the society they live in. Interestingly, even though Jason is not an immigrant in Taiwan and English is not the official language here, he still sees things the way children experiencing the phenomenon of subtractive bilingualism do.

In brief, where Jason's unbalanced language development is concerned, after conducting an in-depth discussion for this child's performance from the perspectives of the developmental patterns, contextual nature, and the political/interpretive functions, we can achieve a fuller understanding of why the development of his Chinese literacy skills did not improve much despite his parents constant efforts or of why this development has sometimes been stagnant or even regressive.

CONCLUSION

The present study was designed to focus on a bilingual child's early literacy development by examining invented spelling in his mother tongue. The main purpose was to find out what his developmental patterns were and to further explore whether his native language development might be affected by learning of a second language, especially in the cases of young learners who spend so much time and effort learning English under the current craze in Taiwan. The results suggest that the limited L1 performance of the observed child indeed seems to relate to his English learning.

Many research findings have shown that literacy development is a very complex process which involves many factors such as social, affective, cognitive, and cultural issues. Through examining different aspects of literacy theory, we can be more confident of accounting for children's written work as the result of their different backgrounds, not just as incorrect forms of the language. When exploring Jason's literacy development, the investigator has found that the developmental, sociocultural, and political perspectives all contributed a specific understanding of his literacy development. These three aspects provide us with a clearer idea about children's construction of their own linguistic theory of literacy. The sociocultural point of view can help us pay particular attention to how children perceive and integrate varied voices that influence their oral and written language. Furthermore, taking into consideration the cognitive-developmental and sociopolitical perspectives could greatly complement our understandings of the sociocultural perspective on literacy. We, thus, can obtain much more information about how children perceive different genres and even present new genres (Daiute, 1993). This kind of information is very conducive for researchers to interpret the texts written and said by children and understand children's literacy development. Accordingly, to gain a better knowledge of children's literacy development and to offer them necessary assistance, we need to refer to different theoretical domains and its constructs, especially those including children's own theory of literacy.

One major contribution of this line of study is that by examining literacy development from different perspectives, we are able to analyze developmental

patterns of literacy behavior in a fuller picture. This provides insight into the complexity of language development and the importance of sociocultural interaction. This insight can be of great help to language learners because they need to be aware of the possible factors that are related to their acquisition or non-acquisition. The present paper contributes to the cross-linguistic evidence for examining the literacy development through an in-depth analysis of a Chinese-English bilingual child's invented spelling. Studies focusing on this aspect of language development can yield interesting information of considerable value for cross-linguistic influence on bilingual children.

Last, it should be noted that this study, which focuses only on one bilingual child's invented spelling, is but an initial investigation of the literacy development of Chinese-English bilingual children. To understand this development better, this line of study may need to include more participants or to be carried out in an experimental design. Only through this way is it possible for us to bring new vitality and strength to present as full a picture as possible for young children's literacy development.

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TABLES

TABLE 1
Total frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes for the two years.

Level of Developmental Patterns	Dictated Writing N=720		Uninterrupted Writing N=1385		Subtotal N=2105	
	F	%	F	%	F	%
1. Scribbling	3	0.0*	0	0.0	3	0.0
2. Iconic Pictographic Writing	25	3.5	18	1.3	43	2.0
3. Pictographic Invented Writing	45	6.3	38	2.7	83	3.9
4. Invented Writing with Mildly Distinguishable Qualities	40	5.6	46	3.3	86	4.1
5. Invented Writing with Distinguishable Qualities	38	5.3	40	2.9	78	3.7
6. Writing with Few Absent/ Added or Wrong Strokes	18	2.5	33	2.4	51	2.4
7. Writing by Homonym Character	18	2.5	30	2.2	48	2.3
8. Writing by Phonemic Symbol	8	1.1	14	1.0	22	1.0
9. Correct Writing	451	62.6	994	71.8	1445	68.7
Totals**	646	89.7	1213	87.6	1859	88.3

*Most numbers were rounded to three decimals with the result that the total for a given task might exceed or be less than 1.00.
**The totals here are the total Chinese characters the child actually produced. They were less than the totals we were supposed to find because of the following two reasons: (a) sometimes the child did not write anything because he did not know how to write the specific words in the Dictated Writing task; (b) even though the child was asked to write things down in Chinese, he would sometimes resort to English word.

TABLE 2
Total frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes from February, 2003 to July, 2003.

Level of Developmental Patterns	Dictated Writing N=180		Uninterrupted Writing N=442		Subtotal N=622	
	F	%	F	%	F	%
1. Scribbling	0	0.0*	0	0.0	0	0.0
2. Iconic Pictographic Writing	3	1.7	5	1.1	8	1.3
3. Pictographic Invented Writing	4	2.2	7	1.6	11	1.8
4. Invented Writing with Mildly Distinguishable Qualities	6	3.3	10	2.3	16	2.6
5. Invented Writing with Distinguishable Qualities	9	5.0	12	2.7	21	3.4
6. Writing with Few Absent/ Added or Wrong Strokes	8	4.4	14	3.2	22	3.5
7. Writing by Homonym Character	8	4.4	13	2.9	21	3.4
8. Writing by Phonemic Symbol	2	1.1	5	1.1	7	1.1
9. Correct Writing	135	75.0	367	83.0	502	80.7
Totals**	175	97.2	433	98.0	608	97.7

*Most numbers were rounded to three decimals with the result that the total for a given task might exceed or be less than 1.00.

**The totals here are the total Chinese characters the child actually produced. They were less than the totals we were supposed to find because of the following two reasons: (a) sometimes the child did not write anything because he did not know how to write the specific words in the Dictated Writing task; (b) even though the child was asked to write things down in Chinese, he would sometimes resort to English word.

TABLE 3

Total frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes from August, 2003 to January, 2004.

Level of Developmental Patterns	Dictated Writing N=180		Uninterrupted Writing N=410		Subtotal N=590	
	F	%	F	%	F	%
1. Scribbling	0	0.0*	0	0.0	0	0.0
2. Iconic Pictographic Writing	5	2.8	6	1.5	11	1.9
3. Pictographic Invented Writing	8	4.4	10	2.4	18	3.1
4. Invented Writing with Mildly Distinguishable Qualities	9	5.0	19	4.6	28	4.7
5. Invented Writing with Distinguishable Qualities	11	6.1	14	3.4	25	4.2
6. Writing with Few Absent/ Added or Wrong Strokes	5	2.8	9	2.2	14	2.4
7. Writing by Homonym Character	4	2.2	8	2.0	12	2.0
8. Writing by Phonemic Symbol	3	1.7	4	1.0	7	1.2
9. Correct Writing	124	68.9	320	78.0	444	75.3
Totals**	169	93.9	390	95.1	559	94.7

*Most numbers were rounded to three decimals with the result that the total for a given task might exceed or be less than 1.00.
**The totals here are the total Chinese characters the child actually produced. They were less than the totals we were supposed to find because of the following two reasons: (a) sometimes the child did not write anything because he did not know how to write the specific words in the Dictated Writing task; (b) even though the child was asked to write things down in Chinese, he would sometimes resort to English word.

TABLE 4
Total frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes from February, 2004 to July, 2004.

Level of Developmental Patterns	Dictated Writing N=180		Uninterrupted Writing N=321		Subtotal N=501	
	F	%	F	%	F	%
1. Scribbling	3	1.7*	0	0.0	3	1.0
2. Iconic Pictographic Writing	8	4.4	5	1.6	13	2.6
3. Pictographic Invented Writing	12	6.7	13	4.0	25	5.0
4. Invented Writing with Mildly Distinguishable Qualities	13	7.2	10	3.1	23	4.6
5. Invented Writing with Distinguishable Qualities	8	4.4	8	2.5	16	3.2
6. Writing with Few Absent/ Added or Wrong Strokes	2	1.1	7	2.2	9	1.8
7. Writing by Homonym Character	4	2.2	5	1.6	9	1.8
8. Writing by Phonemic Symbol	2	1.1	3	1.0	5	1.0
9. Correct Writing	108	60.0	228	71.0	441	88.0
Totals**	160	88.9	279	86.9	439	87.6

*Most numbers were rounded to three decimals with the result that the total for a given task might exceed or be less than 1.00.
**The totals here are the total Chinese characters the child actually produced. They were less than the totals we were supposed to find because of the following two reasons: (a) sometimes the child did not write anything because he did not know how to write the specific words in the Dictated Writing task; (b) even though the child was asked to write things down in Chinese, he would sometimes resort to English word.

TABLE 5
Total frequency and percentage of the child's developmental patterns in his early writing in lexicon across writing modes from August, 2004 to January, 2005.

Level of Developmental Patterns	Dictated Writing N=180		Uninterrupted Writing N=212		Subtotal N=392	
	F	%	F	%	F	%
1. Scribbling	4	2.2*	0	0.0	4	1.0

2. Iconic Pictographic Writing	9	5.0	2	1.0	11	2.8
3. Pictographic Invented Writing	21	11.7	8	3.8	29	7.4
4. Invented Writing with Mildly Distinguishable Qualities	12	6.7	7	3.3	19	4.8
5. Invented Writing with Distinguishable Qualities	10	5.6	6	2.8	16	4.1
6. Writing with Few Absent/ Added or Wrong Strokes	3	1.7	3	1.4	6	1.5
7. Writing by Homonym Character	2	1.1	4	1.9	6	1.5
8. Writing by Phonemic Symbol	1	1.0	2	1.0	3	1.0
9. Correct Writing	84	46.7	129	60.8	213	54.3
Totals**	146	81.1	161	75.9	307	78.3

*Most numbers were rounded to three decimals with the result that the total for a given task might exceed or be less than 1.00.

**The totals here are the total Chinese characters the child actually produced. They were less than the totals we were supposed to find because of the following two reasons: (a) sometimes the child did not write anything because he did not know how to write the specific words in the Dictated Writing task; (b) even though the child was asked to write things down in Chinese, he would sometimes resort to English word.