

Making Sense of Chinese Reading: Yi and Xing

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Abstract

Research and theory in reading have tended to focus on English and other alphabetic languages. Even if non-alphabetic languages are the focus of reading research, they are primarily studied from a perspective of alphabetic languages. There is little attempt to build research on analysis of the Chinese writing system. This article reports research that is based on a thorough analysis of the Chinese writing system, which has a continuous 2000-year history of use and rivals alphabetic systems in the number of users, world-wide. The research uses miscue analysis in the study of events in oral reading where the observed response to a complete authentic text differs from the expected response. The analysis of the Chinese writing system is provided in the article. This description was the base for a major contribution of the study, the Taxonomy of Chinese Miscues adapted from the Taxonomy of Oral Reading Miscues (Goodman, 1973). The article also places Chinese literacy in its cultural context. The finding that Chinese readers make miscues in similar proportions to readers of alphabetic orthographies is itself important because it shows that Chinese reading is a process of meaning construction and much more than the sequential recognition of characters. Chinese reading employs the same psycholinguistic strategies and use of cues from the text as reading in alphabetic languages. Twelve fourth semester students of Chinese read a complete authentic Chinese text. The resulting data provide a baseline of data for further study of Chinese reading since it avoids the imposition of inappropriate units of alphabetic orthographies such as words, sentences and phonic correspondences. Data from L1 readers are offered for comparison. Goodman's transactional model and theory of reading, writing, and written texts (1994, 1996, 2003), which views reading as primarily the construction of meaning, is thus shown to be applicable to reading Chinese. Chinese readers use the structure of Chinese characters in semantic and syntactic context to make sense of print with little use of phonics. This finding is consistent with the Chinese historical and cultural view that the writing system *yì* (meaning; essence; spirit; interior) is the essential part of the whole semiotic system. In contrast to *yì*, *xíng* (forms; formats; outer) is merely a surface whose form represents what lies within. In Chinese society, reading is not only to construct the *yì* of written texts, but also to construct the *yì* of a culture. By means of

constructing *yì*, the function of reading is fulfilled from the perspectives of both self-cultivation and social transformation.

Keywords

Miscue Analysis, Context, Meaning Construction

1. Introduction

The Chinese writing system has the longest history of continuous use in the world. It played a major role in establishing China as a nation long before European nations emerged. And because it represents meaning rather than oral language, it serves speakers of more than 100 very diverse dialects. The characters are read with the same or related meanings by Japanese and Korean readers as well. Twenty percent of the world's population lives in China which claims 95.1% literacy, so the Chinese orthography rivals all alphabetic writing systems in the extent of its use.

Yet there is little understanding in the Western world even among literacy scholars of the nature of Chinese orthography. It tends to be treated as a quaint, inefficient anachronism compared to alphabetic writing that persists only because of the resistance to change among the inscrutable Asians.

Yet this system works well for its users. It is important to understand how it works and the extent to which making sense of character-based reading is like and unlike making sense of alphabetic writing. In fact our knowledge of how written language works at all is limited if we only study alphabetic writings. And unfortunately what research there is on Chinese reading is strongly based on unexamined imposition of ethnocentric concepts of written language rooted in Indo-European languages.

Chinese culture is extremely rich in literature and other art forms. In exploring the literature in China on literacy the authors became aware of a major cultural concept articulated over centuries. It involves the concepts of literacy involving *yì* and *xíng*. On this view readers make use of the “power of mind/heart” to savor, to think, to appreciate, and to construct the *yì* (concepts; meanings; ideas; functions; inner) of texts beyond *yán* (characters; words; languages). *Xíng* (forms; format; outer) is only the shell which covers *yì*.

Even more than in other languages, Chinese reading must be viewed from a meaning-centered perspective because the culture puts its focus more on the *yì* rather than the *xíng* in reading Chinese texts.

Significance

In this article we will do three things that are significant to advancing knowledge of the nature of written language through the study of Chinese literacy. First we will put Chinese literacy in its historical and cultural context. Second we will present a complete description of Chinese orthography and how it functions in use. And third we will report a study using miscue analysis of the reading of an authentic Chinese text by a group of students in a fourth semester university Chinese class taught by one of the authors. We intend to provide an example of how research on Chinese reading can be contextualized in an understanding of the nature of the writing system and the view of literacy within Chinese culture over the 2000 years history.

We also are testing the applicability and extending a comprehensive transactional model of reading developed through research on English and other alphabetically written language to the major non-alphabetic writing system (Goodman, 1996). The essential focus of this model is that the reader is selective in using cues from the three levels of language simultaneously in constructing a text parallel to the published text. The reader uses the psycholinguistic strategies of sampling, inference and prediction, confirmation or disconfirmation and correction when necessary to construct meaning. We are seeking to understand what is universal about all reading and what is particular to each writing system.

The research we report examines oral reading of the story *JīnFúTóu, A Gold Axe* (Wang, 1978) written in simplified Chinese orthography, by twelve fourth semester students of Chinese as a second language. The choice of simplified orthography is because it is the form in which the subjects have been instructed and it is in general use in mainland China. The study uses miscue analysis to gain insight into how readers use the language cueing systems (graphomorphemic, lexico-grammatical, and semantic-pragmatic) in a character based orthography to

make sense of Chinese texts. For comparison, we contrast data from these L2 readers with data from young L1 readers. The data miscue analysis provides from a single reader of an entire authentic test is voluminous since it examines each miscue in depth. So the data of 12 readers is quite adequate to our purposes. Since there are no other comprehensive miscue studies of Chinese reading, this study makes a major contribution by providing baseline data for use in future studies.

Miscue analysis is based in scientific realism. Unlike experimental research, it examines the structures and processes of actual reading of real texts. The purpose of scientific realism is to establish a theory that can explain the structures and processes it reveals. Unlike experimental research, which tests hypotheses, miscue analysis is hypotheses generating since the data is used to produce a theory which then can be tested in a number of ways including experiments to test the hypotheses the theory generates.

In an appendix we include the Taxonomy of Chinese Miscue Analysis which was modified for the study from the Goodman Taxonomy of Miscue Analysis (1973). In itself the production of this taxonomy is an important product of the study as a research tool and as a resource for teacher education and staff development.

To put the study into proper perspective we consider three questions:

- (1) What is the nature of the Chinese orthography?
- (2) How is reading viewed in Chinese rhetoric and aesthetic tradition?
- (3) How does the Chinese orthography that represents meaning directly influences the reading process?

A key result of the study is to contrast what can be learned about Chinese reading through miscue analysis of the reading of a coherent authentic text with the experimental study of character recognition. Our research is guided by the view that all reading is concerned with constructing meaning from written texts. The Chinese writing system represents meaning more directly than alphabetic systems and that requires readers to have a stronger reliance on context and the construction meaning as a whole with less concern for the relationship of the oral and written forms. Chinese reading is governed to a large extent by considerations of “*idea-joining*,” rather than “*form-agreement*” (Shen, 1992).

2. Current Issues of Research on Chinese Reading

Systematic study of Chinese reading is relatively recent but ideas about reading are found in Chinese classics 2000 years old. Most of this recent reading research uses experimental designs and has been reductionist, focusing on word/character recognition (Tzeng, 2002). The single most widely studied topic in research on Chinese reading is how phonological information of written characters contributes to character identification and meaning activation (Tzeng, Hung, Lee, & Chang 1996; Tan & Perfetti, 1997; Wong & Chen, 1999; Zhou & Marslen-Wilson, 1999; Zhou, Marslen-Wilson, Taft, & Shu, 1999; Kuo & Anderson, 2006, 2010; Anderson et al., 2012; Li, Anderson, Nagy & Zhang, 2002).

Phonological awareness in Chinese has been defined as insight into the structure and function of the phonetic component of semantic-phonetic compound characters (Shu, Anderson, & Wu, 2000). Some also define it as the ability to acquire the information about pronunciation of characters at three levels: syllable, onset and rime, and tone (Chen et al., 2004). In contrast, morphological awareness refers to the insight into the relationship between spoken and written language at the level of the morpheme in Chinese in some studies (Nagy et al., 2002).

Some experimental studies show that phonological awareness does not relate to differences in reading ability among children learning to read Chinese (Huang & Hanley, 1994; Taylor, 2002; Nagy, Kuo-Kealoha, Wu, Li, Anderson, & Chen, 2002). However, some researchers claim that phonological knowledge is important in the process of learning the “Chinese OPC (orthography-phonology correspondence) rule” (Ho & Bryant, 1997). Others even say that when readers encounter an unfamiliar character, they first try to use a phonological cue, and then they use other cues if the pronunciation does not sound right (Wu & Anderson, 2004). For reading instruction, it has been argued that “it is just right” to focus on mappings between scripts and sounds (Ho & Bryant, 1997; Anderson & Li, 2006; He, Wang, & Anderson, 2005; Perfetti, 2003). Clearly those who believe that phonics instruction is essential to all reading are designing experiments to show that it is also necessary in reading Chinese in order to justify their theory.

These studies share certain common characteristics.

First, they view Chinese reading as a linear process of character identification, stroke-by-stroke or character-by-character, and they assume that character recognition is the foundation of the Chinese reading process.

Second, these studies are mainly conducted in language laboratory settings, in order to examine how quickly

and accurately readers can tell nonsense-characters from actual characters or how well readers identify characters in character lists, sentences, or specifically constructed passages. The laboratory experiments do not examine real readers' reading complete and authentic Chinese texts.

Such research is not based in examination of the characteristics of the Chinese writing system. It assumes that words are the accessing units in reading Chinese. Words are identifiable in alphabetic languages relatively easily if only because they are separated by white space. But they are not visible, basic units for ideographic languages like Chinese. In writing Chinese all characters are equally spaced regardless of how they do or do not combine in representing meaning.

Character/word recognition research begins with the unexamined assumption that reading is a linear process of recognizing characters and/or words and that context is one of several aids in character recognition. Our analysis of the Chinese writing system shows that the meaning of a Chinese character is highly context dependent and even the identity of the character itself is highly ambiguous out of context. Partly this is because Chinese has many homophones and homographs. At professional conferences it is common for people to point to their name tags when introducing themselves because there is no reliable way to predict the written form from its oral form.

Research on Chinese writing has been distorted by the belief among the researchers that it is an unsystematic collection of thousands of unique characters which must be memorized. Research should start from the understanding that the Chinese orthography works for its users. There are good reasons why it has been continually and successfully used for approximately 4000 years (Qiu, 2000). There is an unexamined assumption in experimental research on Chinese reading that it must somehow depend on use of phonics even though it is not alphabetic. Few studies have examined how readers transact with authentic Chinese texts to make sense of them.

Miscue analysis makes it possible in this study to see how readers construct meaning from a complete coherent text. In doing so we are examining whether Goodman's transactional socio-psycholinguistic model and theory of reading is applicable to the study of Chinese reading (Goodman, 1994, 1996, 2003).

3. How Is Reading Viewed in Chinese Rhetoric and Aesthetic Tradition?

In design of the study we consider how Chinese reading is shaped by the culture in which it is embedded. All reading is a transaction between the reader, the text, and indirectly the writer, who is the producer of the text. This concept was recognized early in Chinese rhetorical and aesthetic tradition which stress that readers need to sense and savor the transaction by responding to all kinds of text cues, both overt and culturally rooted. Readers become aware of and appreciate the aesthetic as well as the surface, efferent meaning as Louise Rosenblatt puts it (1978).

In this tradition *yì* (concepts; meanings; ideas; functions; inner) is more important than *xíng* (forms; formats; outer) (Shen, 1992). The meaning of a single character or the effect of a specific rhetorical skill can only be realized in the context of the total text (Chen, 2001). The emphasis of *yì* and "whole" represents the ultimate measure of literary value, the ideal of artistic creation, the principle of the Chinese language, and the characteristic of Chinese thinking style (Shen, 1992; He, 2000).

Chinese readers pursue the *yì* (concepts; meaning; ideas) of texts through *wù* (self-realization; enlightenment). Chinese readers use the "power of mind/heart" to sense, to feel, and to imagine under the stimulus of linguistic symbols, and then to bring all their experiences to texts to construct their meaning. *Yì* has at least two levels of meanings in Chinese. It means "concept", "idea," or "meaning" in a common sense, but it also means the "concept as being grasped by a human mind," or the "meaning beyond words." In this sense, readers grasp the meaning beyond characters, because characters are only a surface whose form reveals what lies within.

As the early Taoist philosopher ZhuāngZǐ (367? B.C.E.-286? B.C.E.) explains, meaning cannot be fully expressed in language. The *Classic of Changes* (*Yìjīng*, 1122? B.C.E.-252? B.C.E.) says "what is written does not give the fullness of what is/was said (*yán*); what is/was said does not give the fullness of the concept in the mind (*yì*)" (as translated by Owen, 1992). Some literary critics regard *yì* as the highest aesthetic state of a literary work even comparing the highest level of *yì* to *Tào/Dào*, the way, which is the finest essence and the natural principle of Heaven and Earth (*WénXīnDiāoLóng*¹ by Líu Xíé 465-522).

In short, characters have a limit but meaning has none. If one uses what is limited to pursue what has no limit, one will be in danger (ZhuāngZǐ). The most effective reading goes beyond "comprehending the text" and further "pursuing the *yì* of it."

¹Created by Liu Xie (465-522), *WénXīnDiāoLóng* is the most complex and comprehensive work of literary criticism in ancient China.

Chinese scholars argue that Chinese people tend to perceive things holistically and intuitively while Westerners tend to do it atomically and analytically (Shen, 1992; He, 2000; Cheng, 1973). An eye-movement study on cultural differences in perceptual judgment supports this view (Chua, Boland, & Nisbett, 2005). Chinese subjects focused more on the background (i.e. context) and American subjects fixated more on focal objects when they were asked to view photographs.

Many Western scholars have complained about the vagueness and ambiguity of Chinese texts. Many Chinese terms do not have counterparts that Western readers understand. *Qi/Chì* (air, breath, the force behind all forms of life) and *Dào/Tào* (route, way, the true nature of the world) are two examples. In Chinese tradition “the part is determined by the whole, which again determines the whole” (Cheng, 1973: p. 8). In order to understand a sentence, one must understand a paragraph in which the sentence is embedded. In order to understand a paragraph, one must understand the whole text.

Wù (self-realization) is part of the way that Chinese communicate with each other. Besides *wù*, readers are expected to experience an imaginary journey (*WénXīnDiàoLóng* by LíuXíe 465-522; Cai, 2005). Readers should be capable of seeing and hearing images in texts, but also be capable of wandering off to meet things beyond the text. In this way, they eventually transform and transcend themselves as their minds are “roaming ten thousand yards, up and down” (*WénXīnDiàoLóng* by LíuXíe 465-522). Thus, reading is not only a process of acquiring knowledge, but more an aesthetic and emotional experience to engage with the writer and text.

This view is like that of Rosenblatt (1978) who explains, “the reader, concentrating his attention on the world he has evoked, feels himself freed for the time from his own preoccupations and limitations. Aware that the blueprint of this experience is the author’s text, the reader feels himself in communication with another mind, another world” (p. 86).

4. The Nature of Chinese Writing

A dozen terms (ideographic, logographic, morpheme-syllable, etc.) have been used to characterize the Chinese writing system (DeFrancis, 1989, 2002), though none of them has been accepted without any controversy.

Three aspects of Chinese writing need to be understood:

- a) The structure of characters,
- b) The function of the phonetic symbols in Chinese script,
- c) The function of the semantic symbols in Chinese script.

A widespread misconception is that Chinese characters are each unique and therefore must be memorized individually. In reality there is a system to Chinese characters which makes it possible to construct meaning from unfamiliar characters if they occur in context.

4.1. The Structural System of Chinese Characters

Characters are the basic units in Chinese. A very small number of different strokes are combined to form all characters. Chinese characters are constructed in a two dimensional and square based manner and can be divided into two types: composite and non-composite. Except for a few hundred non-composite characters, all Chinese characters are composite: they are formed of components. The components of composite characters are either non-composite characters or parts of them. For example, 口 (*kǒu*, mouth) is a non-composite character; it has only a single component. But it is also a component in the characters 喝 (*hē*, drink), 唱 (*chàng*, sing), 吹 (*chuī*, blow), and 问 (*wèn*, ask) all of which involve the mouth.

While the total number of characters exceeds 80,000 (Zhou, 1997), the number of components used in Chinese scripts is only 560 (Gong, 2002). Most significantly, 73% of the frequently used components are non-composite characters on their own (Gong, 2002), suggesting that learning to write Chinese characters is not as complicated often claimed.

Characters are usually divided into six categories:

- pictographic (*xiàngxíng*),
- ideographic (*zhǐshì*),
- compound ideographic (*huìyì*),
- semantic-phonetic compound (*xíngshēng*),
- mutually explaining (*zhuǎnzhù*),

phonetic borrowing (*jiǎjiè*) (*ShuōWénJiěZì*, Elucidations of the Signs and Explications of the Graphs)².

While non-composite characters are mostly pictographic and ideographic ones, composite characters are primarily compound ideographic and semantic-phonetic compound ones. The semantic-phonetic compounds have attracted great attention of reading researchers partially because they compose the majority of Chinese characters (81%, Gong, 2002) and partially because they appear on the surface to show an orthography-phonology relationship in Chinese (Qiu, 1985).

4.1.1. Phonetic Symbols in Chinese Script

Phonetic symbols refer to the graphic symbols that suggest how the characters may be read orally (Qiu, 2000). In Chinese scripts, there are two types of phonetic symbols: those in semantic-phonetic compound characters and phonetic borrowing characters (Qiu, 1985; Zhou, 1997). A semantic-phonetic compound character includes a semantic radical component that suggests its meaning and a phonetic component that suggests its sound. For instance, the character 妈 (*mā*, mom) is composed of 女 (*nǚ*, female) and 马 (*mǎ*, horse). The left component 女 suggests that the character is “female”-related while the right component 马 represents the sound of the character. Over 80% of the Chinese characters are semantic-phonetic compound characters.

A phonetic borrowing character is “one used for its phonetic value although originally it represents a different homophonous [or nearly homophonous] character” (Chao, 1968a). For instance, in Chinese classics, 蚤 (*zǎo*, flea) is sometimes used to represent 早 (*zǎo*, morning), although the two characters are not semantically related. When the phonetic borrowing characters were originally created, they were only used to represent the sound of some other characters. There was no consideration of the semantic relationship between the phonetic borrowing character and the homophonous and nearly homophonous character it represents. So they are like a rebus in English, (Eg: Eye Sea Ewe) and a source of many puns in Chinese culture.

Superficially the phonetic symbols in Chinese scripts seem to have a similar function as their counterpart in alphabetic languages so they have been used in some studies as evidence to justify the claim that phonics is an aspect of Chinese reading. In fact, fundamental differences exist between the phonetic symbols in Chinese and phonic systems of alphabetic languages.

First, letter patterns in English have more or less consistent relationship to the sound patterns of English. In contrast, phonetic symbols in Chinese have no components that represent sounds or sound patterns. That contrasts with the Korean syllabary where each symbol represents consistently a consonant and vowel. Rather a Chinese phonetic element suggests that one character sounds like another. But they only represent the relationship in that character and not the sound consistently across characters. Each phonetic symbol in different characters in Chinese scripts has to be learned individually (Hoosain, 1991). That’s why they are called “loaned phonetic symbols” (Qiu, 2000).

These symbols are essentially non-composite characters that have both a sound (a name) and a meaning. There are many Chinese characters that can serve as either phonetic or semantic symbols and even as phonetic and semantic symbols concurrently in semantic-phonetic compound characters (Qiu, 1985; Hoosain, 1991).

The phonetic symbols in Chinese writing are essentially semantic symbols, used for their phonetic value randomly and inconsistently. The phonetic components in semantic-phonetic compound characters were traditionally used to represent the sound of the derived character. However, as in all languages Chinese phonology has shifted over time and varies considerable among the many dialects of Chinese, so many phonetic components of compound characters have lost their function in specifying the pronunciations of the derived characters. Less than 40% of the semantic-phonetic compound characters still maintain the original pronunciation of their phonetic components. If tones are taken into consideration, less than 20% of the semantic-phonetic compound characters have exactly the same pronunciation as their phonetic components (Gong, 2002; Ye, 1965; Zhou, 1978; 2003).

Other factors such as the location of phonetic components also contribute to complexity. In the character 棋 (*qí*, chess), the phonetic component 其 (*qí*, it) is on the right side of the character. But in 问 (*wèn*, to ask), a character with an “inside-outside” structure, the phonetic component 问 (*wèn*, door) is located on the “outside” of the character. Thus the location of a phonetic component is flexible: it could be in any part of a character.

Some phonetic components are homographs that have several pronunciations. Readers cannot predict the

²Created by Xu Shen (58-147), *ShuōWénJiěZì* is the first comprehensive Chinese dictionary and the first systematic study of Chinese scripts. Although a number of “three-principle” theories (Chen, 1956; Tang, 2001; Qiu, 2000) have been proposed, the terms pictographic, ideographic, compound ideographic, and semantic-phonetic compound are still used as technical terms in Chinese grammarology.

sound of these characters solely based on their phonetic components. To sum up, the value of phonetic elements in identifying characters is so limited that they cannot be considered an important aspect of Chinese reading. At best they are a minor aid in oral reading but of little importance in comprehension. Remember that Chinese writing can be understood by speakers of very different dialects of Chinese as well as Japanese and Korean who would not understand each reading orally. Think of Chinese characters like numerals which represent ideas not oral words. $1 + 1 = 2$ means the same thing regardless of the oral language of the reader.

4.1.2. Semantic Symbols in Chinese Script

Much more useful are the semantic symbols, the graphic elements that have a relatively consistent semantic relationship across the characters in which they are found (Qiu, 2000). Semantic symbols in Chinese include pictographic characters, ideographic characters, compound ideographic characters, and the semantic components of semantic-phonetic compound characters (Qiu, 1985; Zhou, 1997). Pictographic characters are those that still, in a highly stylized manner, represent the shape of a concrete physical object. Ideographic characters represent abstract notions or concepts. Compound ideographic characters are composed by two or more semantically related components to represent new meanings.

The semantic component of a semantic-phonetic character was originally used to represent the meaning of the derived character. Due to historical meaning changes, some characters in modern Chinese are no longer related to their semantic components. However, more than 70% of the semantic components still represent the general meaning of the derived characters (Gong, 2002). For this reason, the structures of Chinese characters themselves provide important cues for readers to make sense of them in the context in which they occur. For example, all characters for fruits would contain a common radical. A reader encountering an unfamiliar character with that element would know in addition to any context cues that it was a fruit.

Chinese writing is essentially a system of semantic symbols. Character meanings remain relatively stable as opposed to the dramatic sound change of characters over centuries. Because characters have the same meaning for speakers of all Chinese dialects, written Chinese is a great contributor to the unification and homogeneity of Chinese culture and played a major role in making China a single nation. The relatively unchanged meanings allow modern readers to make sense of ancient Chinese texts beyond the restriction of time.

4.2. The “Highly Semantic” Characteristic of Chinese Characters

If a culture is a set of interrelated semiotic systems, as suggested by Halliday (1985), language, as one among a number of systems, must share ways to express meaning in the culture with the other systems. Chinese language is as highly semantic as the traditional Chinese art forms, literature, architecture, and the like (Shen, 1992). Readers of Chinese must pay more attention to large units of language rather than individual characters, because meaning is carried by the whole sequence. Two aspects of Chinese writing are important in this regard: flexibility and ambiguity.

4.2.1. Flexibility

For communication, all languages allow certain flexibility. As a semantic-oriented language, Chinese is highly flexible in terms of the order of writing, the relationship of morphemes, syllables, and characters, and the lexico-grammatical system of the language. Because of this, some native Chinese linguists argue that Chinese is user-governed in comparison to the rule-governed English (Wang, 1954).

1) The Direction of Writing

The square-based and two-dimensional structures of Chinese characters allow them to be arranged in texts very flexibly. In some texts, characters are placed horizontally within a line, from left to right. In other texts, characters go from top to bottom with the columns going from right to left. Accordingly, readers may read either from left to right and top to bottom, or top to bottom and right to left. Interestingly, some texts can be read in different directions with different meanings presented. For example, the sentence “上海自來水” (*Shàngháiziláishuǐ*) means “Shanghai running water” if read left to right but if read right to left, it means “water is from the sea.” In these cases, how to read the text “correctly” is highly dependent on the whole context.

2) The Relationship of Morphemes, Syllables, and Characters

In modern Chinese, in most instances, one morpheme is one character. However, in some cases, one morpheme is represented by a combination of two or more characters. Characters and syllables seldom have a simple one-to-one correspondence. A character may have different meanings and pronunciations, which produces

many homographs. Conversely, a syllable may be represented by several different characters with different meanings, which produces a large number of homophones as well. Such a flexible relationship between characters, sounds, and meanings results in a great degree of ambiguity in Chinese. As a result even more than English words, the meaning and sound any one character represents is highly dependent on the context in which it is found. Across languages, however, readers tend to be unaware of the ambiguity since redundancy and context disambiguate in most cases (See for example, Al-Fahid, 2000).

3) The Lexico-grammatical System

Unlike words in English, characters are the basic units of Chinese; the Chinese lexicon is an interdependent and inter-generated system (Hoosain, 1992). Characters can be combined to form dozens of “character compounds” or word-like units.

Many individual characters can be used as separate units in texts. They can also be combined with other characters to construct character compounds. Hence the meaning of a Chinese character is highly context-based. Each individual character has its own core meaning, but it can also generate new meanings by compounding with other characters to form new units. In a written text, all characters are equally spaced, so readers must use context to group them.

From the perspective of grammatical function, a character or character compound can have the feature of a noun, a verb, or an adjective in different contexts. For instance, the character 绿 (*lǜ*, green), usually used as an adjective, functions as a verb in the sentence 春风又绿江南岸 (*chūnfēngyòulǜjiāngnánàn*, spring-breeze-again-green-*Jiangnan*-riverside), which means turning something green.

There are open classes in many languages in terms of parts of speech. However, the grammatical function of Chinese characters and character compounds is so flexible that it has evoked a great debate on the applicability of the Indo-European grammatical models in Chinese in terms of parts of speech (Xu, 2001; Shen, 1988, 1992; Lü, 1990).

The Chinese sentence is formed similarly to the way character compounds are formed (Shen, 1988). Some linguists even use the term “bingo” to describe the formation of sentences, meaning character compounds can be combined together to form sentences according to the sequence of time and space (Shen, 1992). Since it is “a bingo game,” the format of an individual component does not change when it is combined together with other components.

As an uninflected language, a Chinese sentence is not burdened with syntactic marks of numbers, persons, cases, tenses, etc. However, this does not mean that the Chinese language is incapable of making such distinctions. They are either represented by semantic considerations within a sentence or they are built through an understanding of the total context in which the sentence occurs (Cheng, 1973).

The order of characters or character compounds is very important and changes the meaning of the larger units in which they are embedded. However, exceptions indeed exist. Take the following three sentences as examples,

江西人不怕辣 (*Jiāngxīrénbùpàlà*) Jiangxi locals aren't afraid of spicy [food].

四川人辣不怕 (*SìChuānrénlābùpà*) Sichuan locals/spicy [food]/is not afraid of

湖南人怕不辣 (*HúNánrénpàbùlà*) Hunan locals are afraid [that the food isn't] spicy.

In the three sentences above, the three characters 不 (*bù*, no), 怕 (*pà*, be afraid of), and 辣 (*là*, spicy) are arranged differently in each sentence. Interestingly, they all mean that some local people are not afraid of spiciness, but the extent of the spicy taste is gradually strengthened.

A “*huiwen* style poem” (a poem in the palindromic style) best reveals the flexibility of the Chinese lexico-grammatical system. The poem was created by the great poet SūDōngPō (1037-1101), appearing with a diamond shape in the text.

烟 冷 村 红 花 蕊
 雨 云 望 吟 残 远
 藏 山 斗 斗 含 香
 远 流 春 老 斗 吟 残 远
 水 注 东 隐 笋 尖 吐 香

To read this text, readers may start from *any* character in the text and keep reading clock-wise or counter-clock-wise until they arrive back at the beginning. In total, the reader may have as many as thirty poems, each of which has four lines with five characters in each line. For the thirteen characters along the two lines of the cross in the middle of the diagram, the reader may read in a normal sequence from left to right, top to bottom, and also backwards from right to left, bottom to top, which will yield a four line poem with seven characters in each line.

In this particular case, the 29 characters can be arranged in various ways to generate different lines that make perfect sense with perfect rhyme. *Huíwén* style requires remarkable skills from the writer. And yet these texts also reveal the uniqueness of the lexico-grammatical system of Chinese.

4.2.2. Ambiguity

Ambiguity is a consequence of the flexibility of language. All languages are pervasively ambiguous. It exists at all levels of language, which demands a “set for ambiguity” from the reader to resolve it (Goodman, 1996).

1) Homophone Ambiguities

Chinese contains an extraordinarily large number of homophones. One character has 20 homophones on average in modern Chinese (Gong, 2002). In an extreme case, one character has 118 homophones. So Chinese involves many ambiguities. For instance, if someone says “qīzhōngkǎoshì” without a context, it could mean either “mid-term examination” (期中考试, qīzhōngkǎoshì) or “final examination” (期末考试, qīzhōngkǎoshì) because 中 (zhōng) and 终 (zhōng) are homophones. In another example, 他很好说话 (tā hěn hǎo shuō huà), the meaning readers construct could be either “he is very nice” or “he likes talking very much,” because 好 (hǎo/hào) has two different pronunciations that result in two different meanings.

2) Dialect Ambiguities

Dialect is another source of ambiguity. The Chinese term for “dialect” is *fāngyán*, which means “regional speech.” There are over one hundred dialects spoken in China at present, from several major dialect groups. Chinese dialects are essentially separate languages, even more different from each other than Norwegian and Swedish (Wang, 1997). For example, 男人 (*nánren*, male-person/man) would be articulated as “*lánrén*” by *Gàn* dialect speakers, since the two syllables “*nan*” and “*lan*” are indistinguishable in the *Gàn* dialect. For Cantonese speakers, they would pronounce 花钱 (*huāqián*, to spend money) as “*fāqián*” (to be paid or to pay someone), due to the lack of the /h/ sound in Cantonese.

3) Word Boundary Ambiguities

The equal spacing of characters or lack of word boundaries produces ambiguities that are have no parallel in English except in confusion over compound or hyphenated words. We use the name “word boundary ambiguities” for this phenomenon though the notion of word has not been well-defined by Chinese linguists (Xu, 2001; Packard, 2000; Li, 1951; Lu, 1957; Li & Thompson, 1989). In an oral sense, a word could be either one syllable or a combination of two or more syllables. However, none of these forms have quite the same scope as the “word” in English (Chao, 1968b, 2002; Xu, 2001). Identifying a one-syllabic word is straightforward, but for a poly-syllabic form, linguists don’t agree on whether it is a word or compound.

Hoosain (1992) asked fourteen undergraduates and seven high school students to segment Chinese sentences into words. They found substantial disagreements on word boundaries in the sentences. So it is problematic to say that reading Chinese is a process of word recognition. As Hoosain (1992) explains, “Given that the purpose of reading a text is to arrive at meanings of larger and larger units of language, up to and beyond the sentence, the boundary of what a subject considers to be one thing or one idea could vary according to whichever chunk of information the subjects is focused on at the time, from that of a morpheme anywhere upwards” (p. 128). In this as in other forms of ambiguity what is working for the reader is the set for ambiguity shared by all people. Chinese readers get *al.ong* without extra spaces around words or characters that combine for meaning by using the other systems of the language such as pattern sequence and semantic context. That’s how readers of English get *al.ong* with homophones and homographs. Context tells us whether *read* is past tense of present and we say it the right way.

4) Sentence Boundary Ambiguities

Similarly, the boundaries of Chinese sentences are also ambiguous. Tsao (1990) conducted a study on Chinese and English sentences by asking eighteen Chinese college students to segment sentences in two Chinese and two English texts, respectively. The Chinese readers had different ideas about how to segment Chinese sentences. However, their segmentation of the English sentences proved to be quite similar to that in the original English texts, even though they were considered to not be proficient in English. This suggests that Chinese syntax

is more likely governed by “meaning” than “form” (Shen, 1992), and hence the segmentation of Chinese sentences varies with individuals.

Most Chinese grammarians seem to agree that the Chinese sentence differs from the English sentence both in its inner structure and at the grammatical level (Li & Thompson, 1989; Tsao, 1990; Chu, 1998). Physically, Chinese sentences have several independent “small sentences” or clauses that are conjoined by commas. When Chinese sentences are translated into English, a large number of commas in the Chinese version have to be represented by periods in the English version.

Shen (1992) examined the sentences in a contemporary Chinese novel 井 (*jǐng*) and concluded that among the sentences he has investigated, 90% of them contain two to eight independent clauses. Native Chinese linguists usually call this type of sentence 流水句 (*liúshuǐjù*) “flowing-water sentence” in which the metaphor 流水 (*liúshuǐ*) “flowing water” vividly describes the physical feature and the logical relationships of the syntactic constructions of the sentence. Again the set for ambiguity helps the Chinese reader. When we learn any language we learn to pay attention to the important features of the language. But we also learn what not to pay attention to. Aspects of a language that create ambiguities for second language learners do not trouble native speakers who learned early what to pay attention to and what to ignore.

Here is a story to show the ambiguity as well as flexibility of the Chinese lexico-grammatical system.

A scholar once made a poster to enroll new students. He decided not to ask for tuition from students who could not afford it. So he wrote: 无米面也可无鸡鸭也可无鱼肉也可无银钱也可 (*wúmìmiànyěkěwújīyāyěkěwúyúròuyěkěwúyínqiányěkě*). However, some trick was embedded in the text. In front of students from wealthy families, he read the text as: 无米, 面也可 (*wúmǐ, miànyěkě*. If no rice, flour is fine.); 无鸡, 鸭也可 (*wújī, yāyěkě*. If no chickens, ducks are fine.); 无鱼, 肉也可 (*wúyú, ròuyěkě*. If no fish, meat is fine.); 无银, 钱也可 (*wúyín, qiányěkě*. If no silver, coin is fine.). In front of students from poor families, he read the text in another way: 无米面, 也可 (*wúmìmiàn, yěkě*. If no rice [and] flour, it is fine.); 无鸡鸭, 也可 (*wújīyā, yěkě*. If no chicken [and] duck, it is fine.); 无鱼肉, 也可 (*wúyúròu, yé kě*. If no fish [and] meat, it is fine.); 无银钱, 也可 (*wúyínqián, yěkě*. If no silver [and] coin, it is fine.).

In this case, the order of the characters stays the same, but the meaning of the sentence is completely changed due to the different segmentations for different purposes. The meanings of the sentence are in both the writer and the reader, rather than in the printed text itself. In Goodman’s reading model the reader is constructing his or her own text which is parallel to the published text. It is this text which the reader is comprehending. No written text in any language fully represents the meaning. Through inference and prediction the reader produces a comprehensible text (Goodman, 1996). In this Chinese example the writer can create two different texts, using intonation to establish the phrasing, from the same written text for his two audiences.

5. What Reading Strategies Do Readers Use to Make Sense of Chinese Texts?

Readers of this article need to understand that the design of our study depended on our analysis of the Chinese written language system. This description of the Chinese writing system should make it clear that research on character recognition is reductionist. It reduces reading to naming characters rather than making sense of written Chinese. Nor can Chinese reading be usefully studied by focusing on the surface meaning of short unnatural sentences. Readers of Chinese are looking for the *yì*, the deep meaning.

In this study, the oral readings of the story *JīnFūTóu*, *A Gold Axe* (Wang, 1978) by 12 fourth semester students of Chinese were analyzed through miscue analysis. The subjects were all students in the same class taught by one of the authors.

5.1. Data Collection

The twelve readers in this study are undergraduate students enrolled in a second year Chinese language course in a major American university. They are all young adult, native English speakers who have studied Chinese as a second language for three and a half semesters. They range in age from 18 to 24. Five of them are of Chinese heritage and seven are of European backgrounds. For all of them Chinese is a second language. All the readers read the same Chinese story *A Gold Axe* (total of 653 characters;) that they had never read before. This reading material was appropriately difficult for the readers.

Following the Reading Miscue Inventory procedures (Goodman, Watson, & Burke, 2005), each tape-recorded data collection session included an interview, an uninterrupted reading of the story, a retelling, and a follow-up discussion. All the reading interviews were conducted in English, with the assumption that the readers were more comfortable in sharing their reading experiences in their native language. The interview questions are adopted from the Burke Interview Modified for Older Readers (BIMOR) (Burke, 1978). The oral reading starts after the interview. Following the reading, the reader retells the story orally in his/her own words. Since L2 readers sometimes comprehend much more of what they read in the L2 than what they can express in the L2, the retelling is done in either English or Chinese, depending on each reader's preference.

5.2. Instrument

The instrument applied in this study is the Chinese Taxonomy of Reading Miscues adapted from Goodman's Taxonomy of Reading Miscues (2006). Wang developed the Chinese Taxonomy building on the Goodman Taxonomy (Goodman, 1973) while coding the Chinese reading miscues produced by both L1 and L2 readers (Wang, 2006, 2008). The results of the coding were checked against data from other studies of Chinese reading and miscue studies in English and other alphabetic languages. The coding of new categories was confirmed by comparing the consistency of coding by two or more coders.

5.2.1. Goodman Taxonomy of Reading Miscues

Goodman's Taxonomy (Goodman, 1973) was originally developed for the analysis of miscues generated by readers in English. As a research tool, it provides researchers with a great amount of information about the structures and processes of reading. Over six decades, the Taxonomy has been successfully applied to the study of reading in many languages other than English, with minor modification (Goodman, 1996). However, the full taxonomy has never been applied to reading in Chinese, a non-alphabetic language that is represented by characters in its written form.

The application of Goodman's Taxonomy to reading in Chinese, while maintaining its transactional psycho-sociolinguistic perspective, required modification to be consistent with Chinese orthography. In that perspective, three language levels are accessed simultaneously: graphophonic, lexico-grammatical and semantic-pragmatic.

The first of these required the most modification since there is no consistent relationship between characters and Chinese phonology. On the other hand in both systems there is a level in which the units are abstract but observable graphic symbols. In Chinese it is the character system.

The lexico-grammatical level modifications are complicated due to the ongoing controversies concerning almost all the major grammatical issues in Chinese linguistics, such as the identifying the features of word, phrase, clause, topic, subject, part of speech, and so forth (Xu, 2001; Shen, 1988, 1992; Tsao, 1990). In English, it is possible to draw a relatively clear line in constituency between the morpheme, word, phrase, and clause, depending on marking the finiteness in the verbal group. However, the definition of these terms is far from clear in relation to the study of the Chinese language. And in any language it has been rare for grammarians to attempt a complete analysis of a long authentic text.

5.2.2. Modifications Made to the Goodman Taxonomy

First, characters, rather than words, are considered as the coding unit for graphic and phonemic proximity because it is the most agreed on unit of the Chinese writing system and because there is much disagreement on the applicability of the word concept to Chinese.

Second, the clause, defined as the theme-rheme structure by Fang et al. (1995), is used as the coding unit for syntactic and semantic acceptability in consideration of the fact that the Chinese sentence differs greatly from the English sentence in both grammatical levels and inner structures (Chu, 1998). Actually, Halliday considers the clause the basic grammatical unit of language.

Third, to accommodate the features of the Chinese writing system, Wang added to, modified, or deleted some miscue categories from the Taxonomy. Specifically, graphic and phonemic proximity had to be greatly modified due to the significant differences in graphs and sounds between English and Chinese. Slight changes are applied for categories such as syntactic acceptability, semantic acceptability, syntactic change, semantic change, and allologs. Except for the code-switched form, modifications to the other four categories (graphic alternative, re-

troflex suffix, tone, segmentation) of the Taxonomy measure the miscues that are uniquely related to the Chinese language. In addition, due to the differences between the morphological and grammatical systems of English and Chinese, as well to reduce the complexity of the analysis, categories such as transformation, intonation, and submorphemic language level have not been applied for the analysis of Chinese miscues.

The full version of the Chinese Taxonomy has 14 major categories to analyze the degree to which miscues change, lose, or enhance the meaning of a written text (**Appendix A**). Under each major category, there are as many as 14 subcategories. A miscue is coded under each category for the purpose of understanding a reader's complex patterns in the use of the linguistic cues and reading strategies in the reading process. Taken together the analysis provides a very detailed profile of the subject's reading. In this study the focus was on the composite profile of Chinese reading across the subjects.

In reporting the findings of the study, which in miscue analysis are both qualitative and quantitative, it has become common not to separate the reporting of data from the interpretation of the data. That's because this research uses scientific realism and treats miscues as actual events to be understood rather than cause effect relationships in experimental research.

5.3. General Information of the Miscues

It may be self-evident, but nevertheless it is important to know that Chinese readers make miscues and at relatively the same frequency as readers of English. That is evidence in itself that Chinese reading is also a constructive process and not the simplistic sequential recognition of characters. Furthermore, regardless of the differences in orthographies which required modification of the Taxonomy, the miscues produced represent the same underlying strategies as alphabetic readers use. That is consistent with our expectation that reading Chinese is not a process of recognizing a string of characters made up of individual components or strokes, nor is it dependent on so-called phonological awareness.

The readers' Miscues Per Hundred Characters (MPHC) ranged from 3.5 to 11 while their comprehension or retelling scores ranged from 31% to 98%. A slight trend emerges: as MPHC increases, there tends to be a decrease in comprehension. However, this does not mean that the reader who had the highest comprehension score had the lowest MPHC, or vice versa, hence the number of miscues alone cannot be used to predict the comprehension of a particular reader.

Of the total miscues coded, 80% are substitutions, 13% are omissions, and 1% are reversals. Insertions and complex miscues are 3% each of the miscues among all the readers. When comprehension scores are taken into consideration, there is no correlation between the miscue types and reading proficiency. The results of this study are consistent with the findings in Goodman's (1973) study of English readers' oral reading behavior. They are also in line with the results of other miscue studies (Devine, 1981) of ESL readers.

Chinese reading is no more nor less accurate than English reading; readers of Chinese make miscues like readers of other languages. These readers showed a predictably stronger reliance on syntactic and semantic context cues than on the graphic and phonemic cues in making sense of Chinese texts.

5.4. The Use of Graphic and Phonemic Cues in Make Sense of Chinese Texts

As suggested above the three language cueing systems function simultaneously and interdependently in the reading process. For the ease of analysis, however, we have to examine the cueing systems separately to understand how they determine the reader's observed responses. As reading begins with the brain's perception of an observable signal, we begin our discussion with the readers' use of graphic and phonemic cues in making sense of Chinese texts.

5.4.1. Low Graphic and Phonemic Proximity

Graphic proximity and phonemic proximity measure the graphic and sound similarity between a substitution and the expected response at the character level. As illustrated in **Table 1**, of the character level substitutions, 48% show no graphic similarity to the expected responses while 70% have no sound similarity. Taking the readers' Chinese proficiency and the difficulty of the story into consideration, their high percentages of "no graphic similarity" and "no sound similarity" are truly noticeable. When the results are compared with the results of research on readers of L1 Chinese and readers of L1 and L2 English, as illustrated in **Table 2**, differences between readers of Chinese and readers of English become apparent.

Table 1. Mean percentage of graphic and phonemic proximity of character level substitution miscues for all readers.

	Graphic proximity				Phonemic proximity			
	No	Some	High	Homograph	No	Some	High	Homophone
No.	111	72	35	12	193	47	17	8
%	48	30	14	8	70	18	6	5

Table 2. Comparison with Goodman's (1973), Devine's (1981) and Tien's (1983) studies.

Category	Goodman (1973)	Devine (1981)	Tien (1983)	Wang (2008)
No graphic Similarity	10.8% for high proficient group	1.3% for high proficient group	62.8%	49%
No phonemic Similarity	18.0% for high proficient group	8% for high proficient group	79.6%	73%

Tien (1983) examined the oral reading miscues of ten highly proficient adult L1 Chinese readers as they read a short Chinese novel. Her study shows that the adult L1 Chinese readers have 62.8% for no graphic similarity and 79.6% for no phonemic similarity. Wang's (2008) study of ten 4th graders enrolled in an elementary school in China shows that the L1 Chinese child readers have 49% for no graphic similarity and 73% for no phonemic similarity. Goodman (1973) investigated the oral reading miscues of ninety-four American children with different language proficiencies. His subjects' percentages of no graphic and no phonemic similarity for the high proficient group are 10.8% and 18.0%, respectively. Devine's (1981) study of fourteen L2 English readers presents a similar pattern to Goodman's: 1.3% for no graphic similarity and 8% for no phonemic similarity (high proficient group).

Chinese readers and English readers in all the studies we compare have similar miscue patterns in their use of the graphic and phonemic cueing systems. The percentage of no graphic similarity is lower than the percentage of no phonemic similarity, and the percentages of no graphic and phonemic similarity for the proficient readers are higher than those for less proficient readers. More importantly, the L1 and L2 Chinese readers have a much lower degree of graphic and phonemic similarity than the L1 and L2 English readers. In general, readers of Chinese make less use of the graphic and phonemic cues than the syntactic and semantic cues, which is a result of differences in the orthographies. There is no reason for a reader of Chinese to produce a miscue that varies in minor details in sounds because there can be no sounding out of unfamiliar characters. On the other hand there is some possibility that a character substitution would be similar graphically to the expected response and the graphic score for no similarity is considerably higher than for no phonemic similarity.

5.4.2. No Notable Relationship between Phonemic Proximity and Proficiency

To understand the effect that level of reader proficiency has on the use of language cueing systems, we divided the readers into two groups of six, according to their comprehension or retelling scores. The retelling means for Groups 1 and 2 are 91% and 44%, respectively. The two groups of readers with different retelling scores in this study produced almost the same proportion of miscues that have no phonemic proximity to the expected responses (74% for Group 1 and 72% for Group 2). Their differences in some similarity and high similarity are also very slight. In Tien's (1983) study, the percentage of "no sound similarity" for adult L1 Chinese readers is 79.6%, and in Wang's (2008) study, the percentage of "no sound similarity" for L1 Chinese child readers is 73%.

Considering their varied language backgrounds, the L1 and L2 groups' slight differences in the use of the phonemic cues is negligible. According to miscue research on readers of alphabetic languages (Goodman, 1973), proficient readers have a lower phonemic mean than less proficient readers because they rely on the phonemic cues less than the latter. However, our findings show that the readers' miscues in this study do not follow this pattern in the same way readers of alphabetic languages do. We believe that the reason lies in the meaning-based characteristic of Chinese characters.

5.4.3. Low Syntactic and Semantic Acceptability of Phonetic-Driven Miscues

To check the influence of the phonetic components of semantic-phonetic compound characters, we examined the

sound similarity of all the phonetic component-related miscues produced by the readers. For example, the miscue 可 (*kě*, but) is the phonetic component of the original text 河 (*hé*, river). Thus it is considered as a phonetic component-related miscue. Of the 35 phonetic component-related miscues, 12% are homophones of the expected responses. If tones are considered as well, only 6% have exactly the same pronunciation as the expected responses. The majority of the phonetic components of characters do not represent the sound of the derived characters. Hence, the reader's reliance on the phonemic cueing system appears to be minor in Chinese reading.

On the other hand, even if a reader articulates a character correctly through its phonetic component, it does not necessarily indicate that the reader has constructed the meaning of the character. 63% of the phonetic-driven miscues are completely syntactically unacceptable, and 69% of the miscues are completely semantically unacceptable within the text. Focusing on the sounds of characters is actually disruptive to reading comprehension, and being able to read a character correctly does not necessarily mean that the reader can successfully construct the meaning of it.

5.4.4. High Syntactic and Semantic Acceptability of Semantic-Driven Miscues

As discussed above the semantic component of a semantic-phonetic compound character conveys its meaning to a great extent. Gong's (2002) study suggests that approximately 87% of the semantic components signify the meaning of the derived characters. To study the utility of semantic radicals in Chinese reading, we examined the syntactic and semantic acceptability of the radical-related miscues produced by the readers in this study. For example, the miscue 湖 (*hu*, lake) shares the same semantic component (氵) of the original text 河 (*he*, river). Thus it is considered to be a radical-related miscue. Of a total of 33 miscues related to the radicals of the expected responses, 52% are syntactically and semantically acceptable within the clause, clause complex, or whole text, and 12% are syntactically and semantically acceptable with the prior or following portion of the clause.

Our data indicates that the Chinese orthography itself provides important cues for readers to make sense. However, this does not say that the readers achieve comprehension solely through the radicals. Actually, without the context, the readers are not able to make sense of unfamiliar characters even if they know the meaning of the radicals. As suggested by Fries (2008), all perception is deeply and inevitably contextualized, and the context is a critical part of the perception.

5.5. The Use of Syntactic and Semantic Context Cues in Making Sense of Chinese Texts

Unlike graphic similarity that measures how much the miscue looks like the expected response, graphic alternative is concerned with the relationship between the miscue and the expected response from the perspectives of the formation of characters and character compound. In alphabetic systems, graphic units are words that are composed of patterns of letters. Chinese characters have graphic components and we can compare miscues that involve these graphic components. The Chinese miscue taxonomy calls character level miscues Graphic Alternative³. We examine a total of 209 character-level substitutions categorized as graphic alternative³.

Specifically, Subcategory 1 of graphic alternative deals with the cases in which both the ER (expected response) and OR (observed response) are non-composite characters. Subcategories 2 to 7 register those involving semantic-phonetic compound characters. For illustration, both 成 (*chéng*, become) and 湖 (*hú*, lake) is coded under these subcategories. The reasons are that (1) 成 (*chéng*, become) is the phonetic component of the character 诚, which is comprised of a semantic part 讠 and a phonetic part 成 (*chéng*, become), and (2) 湖 (*hú*, lake) shares the same semantic component 氵 with the expected response 河 (*hé*, lake).

Subcategories 8 and 9 are set up for the cases involving character compounds. Take the following miscue as an example:

(1) OR 由 (*yóu*)

ER 于是他快乐地唱着歌回家了。(Yúshìtākuàilè de chàngzhegèhuìjiā le. So he went back home, singing a song happily.)

³It should be noted that Subcategories 2, 3, 6, 7, 9, and 10 under Graphic Alternative are similar to the six "error" types (phonetic-derivation, phonetic analogy, radical-related, word-related, and semantic-related errors) listed in the "error-classification system" in Ho and Bryant's (1997) study. The difference is that Subcategories 9 and 10 in Graphic Alternative deal with both non-composite and composite characters, but the "word-related" and "semantic-related" types in the "error-classification system" are only for semantic-phonetic compound characters.

The character 于 (*yú*) was read as 由 (*yóu*). Although the OR 由 (*yóu*) is not syntactically and semantically acceptable within the sentence, it is one constituent of the character compound 由于 (*yóuyú*, because). The ER 于 (*yú*) is the other constituent. In this case, the OR 由 (*yóu*) is neither syntactically nor semantically acceptable within the sentence, but it is related to the ER through the character compound 由于 (*yóuyú*).

Subcategory 10 is also concerned with the case involving character compounds. However, the miscue coded under this subcategory is not only one constituent of a character compound, of which the ER is the other, but is also a synonym of the ER.

(2) OR 音 (*yīn*)

ER 他的哭声... (*Tā de kūshēng*...; His crying...)

In the case of Example (2), the OR 音 (*yīn*, sound) and the ER 声 (*shēng*, sound), which are synonyms, are compounded to form of the character compound 声音 (*shēngyīn*, sound). In other words, the miscue is not only related to the ER through the character compound 声音, but also is syntactically and semantically acceptable within the sentence.

In Subcategories 11, 12, and 13, the ER is read either the OR in a character compound or a structure in which the character (s) preceding, following, or surrounding the ER is/are the constituent character (s) of the compound or structure.

(3) OR 好 (*hǎo*)

ER 最后他的 (*Zuìhòutā de*...; Finally his...)

In Example (3), the OR 好 (*hǎo*, good) is one constituent of the character compound 最好 (*zuìhǎo*, would better) and the character preceding the ER 后 (*hòu* behind) is the other constituent. In this case, the OR is syntactically and semantically acceptable within the sentence.

Table 3 provides the number and percentage of miscues for each subcategory coded under graphic alternative. The results show that among those miscues driven by the phonetic or semantic component of the expected response, 35 are either the phonetic component of the ER or share the same phonetic component with the ER (Subcategories 2, 4, and 6), and 33 are either related to the semantic component of the ER or share the same semantic component with the ER (Subcategories 3, 5, and 7). Of these 68 miscues, the most frequently produced are those sharing the same semantic component with the ER (11%). **Table 3** also shows that 6% of the miscues are related to the ER through character compounds (Subcategories 8 and 9), and 38% are mostly driven by the syntactic and semantic contexts of the sentence (Subcategories 10, 11, 12, and 13). Although the miscues coded under Subcategories 8 and 9 are neither syntactically nor semantically acceptable within the sentence, they definitely reflect the readers' concerns for the meaning of the ER.

A reader usually makes use of the three cueing systems simultaneously during their reading process. So it is problematic to say that a miscue is solely driven by one of the linguistic cues of language. However, readers are likely to focus more on some cues than on others at specific moments during the reading process. Under graphic alternative, the readers produced the highest percentage of miscues that are mainly driven by the syntactic and semantic context cues of the text. The syntactic and semantic contexts are crucial for the perception and interpretation of language. Considering their first language backgrounds, the readers' high reliance on the syntactic and semantic cueing systems is truly remarkable. This demonstrates that Chinese readers do focus on larger

Table 3. Numbers and percentage of miscues involving graphic alternatives.

Subcategory	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No.	26	12	7	7	2	16	24	6	7	1	13	30	37	21
%	12	6	3	3	0	8	11	3	3	0	6	14	18	10

1. The OR and ER share the key unit and configuration (both the ER and OR are non-composite characters). 2. The OR is the phonetic component of the ER. Or the OR is a part of the phonetic component of the ER. 3. The OR is the semantic component of the ER. Or the OR is part of the semantic component of the ER. 4. The ER is the phonetic component of the OR. 5. The ER is the semantic component of the OR. 6. The OR has the identical or a similar phonetic component to the ER. 7. The OR has the identical or a similar semantic component to the ER. 8. The ER is read as the other character in a character-compound in which the ER is the homograph of one of the constituent characters of the compound. 9. The ER is read as the other character in a character-compound in which the ER is one of the constituent characters of the compound. 10. The ER is one constituent of a character-compound in which the OR is the other. Also, the ER is the synonym of the OR. 11. The OR is one constituent of a character-compound in which the character preceding the ER is the other constituent. 12. The OR is one constituent of a character-compound in which the character following the ER is the other constituent. 13. The ER is read as the OR in a structure in which the character(s) preceding, following, or surrounding the ER is/are the constituent character(s) of the structure. 14. Others.

language units than individual characters in the reading process, because “perception and not recognition is the key process involved in making sense in reading” (Goodman, 1996: p. 95).

The results are consistent with the findings in Wang’s (2008, 2012) study of Chinese child readers’ oral reading behavior. Her study shows that of the 165 L1 Chinese miscues coded under graphic alternative, the highest percentage of miscues (34%) are mainly driven by the syntactic and semantic context cues of the text (Subcategories 10, 11, 12, and 13). The results are also in line with Chen (1992) that context plays a more important role than individual characters in reading Chinese.

This point is shown more clearly in a type of miscue involved in code-switched forms. Our L2 readers produced a number of miscues in the form of non-Chinese substitutions. For instance, one reader read the character 神 (*shén*, God) as “kami” (a Japanese pronunciation of the character) when he encountered it the first time. The second time he saw it, he substituted it with “God” in English. When asked why he read the character as “kami,” he explained that he learned the character in Japanese, but he did not know how to say it in Chinese. This case is very similar to different Chinese dialect speakers’ readings of the same Chinese text, in which characters are read as said in the various dialects but the meanings of the characters are shared by the speakers. In Taiwan, for example, monolingual speakers of Taiwanese (*Mǐn* Dialect) easily read newspapers without being able to understand Mandarin.

In this sense, the “unconventional” pronunciation of a character would be considered acceptable by a listener and cannot be considered as an indication of meaning loss without a careful analysis of the influence of the miscues on the comprehension of the text.

5.6. Findings: Character/Word Recognition or Meaning Construction?

As discussed previously, the character/word recognition view has long been the focus of research on readers of Chinese. Like the word recognition view in traditional English reading research, this character/word recognition view defines reading as the act of quickly and accurately identifying characters. The present miscue study examined the reading process of L2 Chinese readers through their oral reading miscues. It differs from research underlying the character/word recognition view in that the data is collected within a natural environment in which the readers read a complete and authentic text. A careful examination of the readers’ oral reading miscues yields some results that contradict the findings in character/word recognition research in two major ways.

The first difference is the understanding of the role of the graphic and phonemic cueing systems in reading Chinese. The character/word recognition view says that morphological and phonological awareness are crucial in reading Chinese because when readers encounter an unfamiliar character, they break characters down to strokes or they first try to use a phonological cue, and then they use other cues if the pronunciation does not sound right. But the information available in Chinese is insufficient to choose between the many homophones and homographs it may represent and it is certainly not sufficient to assign a meaning to the character out of context.

In reading a complete authentic text, our readers use the three cueing systems (graphomorphemic, lexicogrammatical, semantic) simultaneously in the reading process. Of the miscues produced by the readers, 70% do not have sound similarity with the expected responses. There is no notable correlation between the phonemic proximity and proficiency. The readers of Chinese relied less on the phonemic cues than the other linguistic cues, and the use of the phonetic cues in reading Chinese has been greatly exaggerated in character/word recognition studies (which after all are not studies of Chinese reading.)

The second difference derives from the understanding of the role of context in the reading process. Extreme versions of the character/word recognition view hold that readers only use context as an aid to character processing when the phonetic cues are insufficient. Our readers relied heavily on the syntactic and semantic context cues in the reading process. In many cases, the readers could make sense of an unfamiliar character in context without knowing how to pronounce it. They even substituted Chinese characters with English words, which are the exact translations of the expected responses, demonstrating that characters represent meaning directly to the readers. While an L1 reader would not do that they do comfortably substitute homographs without losing meaning.

Under graphic alternative, the most frequently produced miscues are those that are mostly driven by the syntactic and semantic context cues in the text. In a sense, a character has no identity and has no meaning without the context in which it is encountered. Hence, the character-recognition view fails to explain the readers’ beha-

avior in our data.

This miscue study shows that readers of Chinese do not make use of the phonemic cues in the same way that readers of alphabetic languages do because there is no direct correspondence between orthography and phonology in Chinese.

Although our study involved L2 Chinese readers, their miscue patterns are similar to L1 Chinese readers due to the meaning-seeking nature of reading and the nature of Chinese orthography. Moreover, since L1 Chinese readers are generally more proficient than L2 readers, their miscues show even stronger reliance on syntactic and semantic context cues than L2 readers (Wang, 2008).

After all, *any* reader of the Chinese text must make use of similar strategies such as self-realization and imagination to construct the meaning of the text. In Chinese reading, *any* reader must make use of the “power of mind/heart” to savor, to think, to appreciate, and to construct the *yì* (concepts; meanings; ideas; functions; inners) of texts beyond *yán* (characters; words; languages), we have no reason to doubt the universality of the reading process represented by both the L1 and L2 Chinese readers’ oral reading miscues.

In conclusion, we reconfirm that Chinese reading is holistic meaning construction. And we see that readers focus more on the *yì* (meaning; essence; spirit; interior) rather than the *xíng* (forms; format; outer) in reading Chinese texts. The centuries old Chinese rhetorical and aesthetic traditional view of Chinese reading is not only consistent with the transactional model and theory of reading (Goodman, 1994, 1996, 2003) in its claim that the goal of reading is meaning-seeking, it also provides a well-formulated explanation of the process of Chinese reading with regard to its emphasis on meaning and the important roles of context.

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Appendix A

Chinese Taxonomy of Reading Miscues Adapted from the Goodman Taxonomy of Reading Miscues (Short Form)

1. Correction
2. Dialect
3. Graphic proximity
4. Phonemic proximity
5. Graphic alternative
6. Allologs
7. Retroflex suffix (-*er* suffix)
8. Code-switched form
9. Syntactic acceptability
10. Semantic acceptability
11. Syntactic change
12. Semantic change
13. Segmentation
14. Tone