

USING COLOR AND SHAPE CODING TO TEACH SENTENCE STRUCTURE IN CHINESE¹

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Introduction

It is common for foreign language instructors of adolescents and young adults to find a few students in their classes who, despite being of average or above average intelligence, are not able to comprehend the language as well as their peers, even though appropriate time has been invested in explanations, memorization, practice, and repetition. These students may have great difficulties achieving correct pronunciation, following oral instructions, answering questions and completing assignments. They may not understand basic grammatical structures. What is it about foreign language learning that creates such difficulties for these otherwise successful students? How can a foreign language teacher help such students learn the language successfully? According to some research, using multisensory instruction may be an important tool for reaching these to at-risk foreign language students. Because learning disabilities are often due to certain kinds of processing deficiencies, it is often necessary to use multisensory instruction when working with students with learning disabilities (LD), so that they can learn through other cognitive pathways than those of conventional instruction which they cannot access effectively. The purpose of this study is to apply such principles to activities for helping LD students learn grammatical features, such as sentence structure in Mandarin Chinese, and to provide a detailed example of one such activity.

Review of the Literature

Processing Difficulties in Learning Disabled Individuals

As Schneider (1999) points out, students with learning disabilities often show strengths in the areas of right-brain tasks, that is, tasks which involve using multiple senses, music and artistic, athletic, rhythmic or kinesthetic-tactile pathways of cognition. The areas of weakness that LD students often experience are frequently left-brain tasks, that is, visual

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and auditory skills, recognition of grammatical patterns, and handling letter and sound correspondences.

Syntactic Processing Difficulties

In order to better show the role that multisensory instruction can play in helping LD learners succeed, it is useful to consider the kinds of problems that LD learners frequently have when acquiring grammatical structures. Many students with learning disabilities have great difficulty comprehending grammatical structures of a language. As Schneider (1999) points out, in addition to a certain level of awareness about the phonological/orthographic rule system of language thought necessary to be successful in reading, writing, and spelling, a certain level of implicit and explicit grammatical awareness is also necessary in order to read, write and spell appropriately. Grammatical awareness involves primarily comprehending and retrieving grammatically correct structures. Schneider (1999) suggests that the grammatical awareness of individuals with language learning disabilities is typically weaker than that of normally achieving peers, in that individuals with learning disabilities can have difficulty comprehending and retaining complex or abstract sentences in a foreign language. Gajar (1987) points out that testing of university students with learning disabilities presented the poorest performance on measures of sensitivity to grammatical structure and memory for language. Gajar's (1987) work was reviewed by Sparks, who states, "A direct instruction model emphasizes the explicit teaching of the structure of a language" (Sparks, 2002, p. 64). In a multisensory approach, students are explicitly taught not only the vocabulary, and phonology/orthography of the new language, but also its grammatical structure (Sparks, 2002).

Multisensory Instruction

Thus, the question becomes how we can utilize LD students' strengths to help them acquire the information which is traditionally presented via the cognitive pathways in which they are weak. As Birsh (1999) suggests, multisensory instruction may be one way of helping students who have a wide range of learning disabilities. According to Birsh (1999), the term "multisensory" refers to "any learning activity that includes the use of two or more sensory modalities simultaneously to take in or express information" and, "in education parlance, the term refers to generic hands-on activities in the classroom that engage tactile (touch) or kinesthetic (movement) senses" (p. 1). In explaining multisensory instruction, Birsh (1999) states, "teaching is done using all learning pathways in the brain (visual, auditory, and kinesthetic-tactile) simultaneously in order to enhance memory and learning" (p. xxii).

Research provides a strong theoretical support for multisensory instruction. From a neuropsychological perspective, based on her research findings, Schneider (1999) concludes that there are distinct differences in the brain anatomy, brain activity, and genetic constitution of dyslexics, compared to non-dyslexic individuals. Schneider (1999) also reminds us that Samuel T. Orton's work in the 1920's-1940's revealed that the brain of a dyslexic typically lacks the asymmetry of the right and left hemisphere

normally found in right-handed non-dyslexic persons. Based on research by Flower (1993), Schneider (1999) writes that “the left temporal planum is generally larger than the right” and that “brains of dyslexics displayed significantly more misplaced and unusually organized nerve cells in the left than in the right hemisphere” (p. 20). Therefore students with dyslexia, which affects 80% of those identified with learning disabilities (Birsh, 1999) need to learn to use one type of memory process to compensate for a weakness in the other. Responding to this neurophysiological evidence, specific teaching approaches were developed to adapt to these conditions, among them, multisensory instruction (Schneider, 1999).

In addition to this neurophysiological perspective, Birsh (1999) notes that existing knowledge about the nature of attention, memory, verbal learning, and brain organization and function helps provide a basis for explaining why multisensory instruction results in more rapid, effective, and enjoyable learning for students with learning disabilities than other traditional teaching strategies. For example, as regards the nature of memory, memory of phonological units is typically deficient in children with learning disabilities. As a result,

listening, speaking, reading and writing, along with other related tactile and kinesthetic activities, could produce multiple representations of linguistic units in working memory that would improve the explicitness, completeness, and durability of what is stored in long-term memory (Birsh, 1999, p. 11).

Thus, while current neuropsychological research supports multisensory instruction, it would be wrong to think that multisensory instruction is a recent development. As Birsh (1999) states, the idea that learning experienced through all senses is helpful in reinforcing memory has long existed in pedagogical history. For example, educational psychologists of the late 19th century promoted the theory that all senses, including the kinesthetic sense, are involved in learning. James (1890) concludes in The Principles of Psychology, that all perceptions, particularly, those of sight and touch, involve movements of the eyes and limbs because such movement is essential in seeing an object, it must be equally essential in forming a visual image of the object. Hinshewood (1917) believes that all sensory pathways need to be used to reinforce weak memory patterns. Orton (1928) proposed that education methods should be based on simultaneous association of visual, auditory, and kinesthetic fields. Brant (1979) indicates that teachers' textbooks on the treatment of learning disabilities typically recommended the use of multisensory techniques in word-recognition instruction and for other domains of symbolic and conceptual learning.

Thus we can see that there is a well-established body of research to provide the theoretical support for multisensory instruction, and that this instructional approach is particularly well suited for addressing weaknesses in the phonological/orthographic, grammatical and morphological/semantic rules of the foreign language, and is therefore a beneficial response to at-risk foreign language learners (Schneider, 1999; Sparks, 2002). Multisensory strategies in foreign language teaching to LD students, as Smith (1995) maintains, allow LD students to use every available channel to gain knowledge and retain

it. By using their entire bodies to reinforce what they have learned through experiences of seeing, hearing, touching, and doing, LD students can better organize and integrate information in their brains.

The Project

Based on my knowledge of the foregoing principles of a multisensory approach to teaching foreign language students with learning disabilities, I decided to design an activity for teaching word order in Mandarin Chinese, incorporating both these principles and my experience as a teacher of Chinese to American students of different ages. This activity included the use of color and shape to add visual and kinesthetic elements to the teaching of basic sentence structure in Mandarin Chinese.

This activity is intended to be used as a means of helping the students review and memorize basic sentence structure when they talk about their daily schedules. It should provide the students with experience of seeing, touching, and doing in order to review and retain the vocabulary words for time expressions and daily activities, and to enhance their ability to organize the different parts of speech in correct order while expressing their daily schedules. This activity should target visual, kinesthetic, and tactile processing channels.

Given the benefits of using this multisensory approach to help foreign language students with learning disabilities learn grammatical structures, I focused on the following aspects when designing this activity:

1. It is important for teachers to help the students succeed by reviewing a procedure or concept before they are asked to apply it. Thus this activity starts with a review of the concepts of subject, verb, adverb with time expression and object using colored and shaped cards with different parts of speech in constructing sentences in Mandarin Chinese.
2. Colored and shaped cards of words and word parts are used throughout the activity. These cards are distributed to small groups of students who are instructed to place word parts and words in the correct positions in sentences while verbalizing the thinking process. This stage is characterized by combination of kinesthetic and metacognitive reinforcement as the students use their hands, placing grammatical morphemes such as subject, verb, adverb/time expression, verb and object in order. The students verbalize why they are placing cards in certain positions.
3. Learning grammatical structure requires memory of sequences. Students with learning disabilities are typically not able to follow specific patterns or remember the order of the words in sentences. Therefore, in order to help the students enhance their visual sequentialization, using non-symbolic activities is vital. For example, in the second phase of the activity, the students are asked to line up in front of the writing board according to the target sentence structure.

4. A kinesthetic approach to learning in groups is emphasized in this activity. The kinesthetic component involves muscle memory, which can assist students with learning disabilities to retain information, especially those whose deficiencies might be auditory or/and visual in nature. In this activity, the students learn to express their daily schedules by not only using colored and shaped cards, but also using their whole bodies, and moving around the classroom. They learn and reinforce what they have learned through experiences of seeing, hearing, touching and doing so that they can better digest the information.

5. Group learning is also emphasized throughout this activity. How do we teach students in ways to motivate and help students learn? Cooperative learning has proven to be an effective way to assist students with learning disabilities. In this activity, group learning should provide the students with an opportunity to practice specific cooperative skills such as decision-making, trust-building, communication, and conflict-management skills.

Activity Goal

The basic sentence structure I will be teaching in this activity is *Subject + Adverb + Verb + Object*. In this basic sentence structure, a subject is the leader of a sentence, an adverb always precedes a verb, and an object ends a sentence.

The Multisensory language learning concept is color and shape coding. This multisensory activity is designed for students with learning disabilities who have a low intermediate proficiency level of Mandarin Chinese. This activity is intended to be used after the students have learned and understood the concepts of subject, object, verb, and adverb, as well as time expressions using the technique of the color and shape coding. They have already learned the vocabulary words for time expressions and phrases used for daily activities. The students have also been introduced to the rule that Chinese modifiers always precede what they modify, so adverbs (including time expressions), always precede verbs.

This activity can be completed over two or three class hours depending on how quickly the students can absorb the content and carry out the activity. I believe that frequent and short instructional segments are much more effective than less frequent segments lasting a longer period of time.





The language skills addressed in this activity are listening, speaking, and reading. This particular lesson uses basic sentence structure in expressing elements of daily schedules. This activity can be used with different age groups, from elementary learners to adult learners. Group size is flexible.

Activity Materials

The required materials are as follows:

- Colored cards of parts of speech with different shapes
- Colored/white vocabulary cards

The following color and shape codes are used in this activity. Since a subject leads a sentence, it plays a role like a tour guide in China, who usually holds a green flag when leading the tour. Since an adverb always precedes the verb, a blue arrow is used to point to the verb. The common mistake that my students make is to place the adverb at the end of a sentence. I teach the students that an arrow cannot be placed at the end because it points to nothing if it is placed at the end of a sentence. A yellow “V” is used to symbolize the verb because it matches the letter “V” in the word “verb” so it is easy for the students to memorize by providing a visual cue. A pink period is then used to represent an object because it looks like the letter “O” in the word “object” and it also indicates the end of a sentence. That is to say, nothing can be placed after the object in this basic sentence pattern. The chart representing these cues follows:

| Parts of Speech | Color | Shape | Meaning |
|------------------------|--------|---|--|
| Subject | Green |  | “Subject” is the leader of a sentence. |
| Adverb/Time Expression | Blue |  | “Adverb” is to modify the verb that follows it. |
| Verb | Yellow |  | “V” is consistent with the letter “v” in the word “verb”. |
| Object | Pink |  | It looks like the letter “o” in the word “object” and a period indicating the end of a sentence. |

Carrying Out the Activity

This activity has two phases. In Phase One the students review the parts of speech using colored and shaped cards. In Phase Two the students engage in a number of activities in which they learn to talk about their daily activities using colored and shaped vocabulary cards. These two phases are described in detail below:

Phase One

- The teacher starts the activity with a review of different parts of speech for basic sentence structure (subject + adverb/time expression + verb + object) using colored and shaped cards, which were introduced to the students earlier in the course when they learned different parts of speech.
- The teacher distributes to each student the four colored cards corresponding to the parts of speech and asks the students to place the parts of speech in the correct order. The colors and shapes of the cards correspond with the sentence pattern and provide the students with cues.

- While the students are working on the assignment, the teacher monitors the students' progress by walking close to each student, observing what he/she is doing, and answering any questions he/she has.
- After the students have finished the task, the teacher calls on various students to place the colored cards on the board in the correct order.

Phase Two

- Before the class starts, the teacher prepares sets of colored cards corresponding to the parts of speech with different shapes and puts them inside a box (the number of the cards corresponds to the number of the students). The teacher asks each student to draw one card from the box.
- The teacher asks the students to look at the cards they have selected and then stand in front of the writing board according to the order of the colored cards earlier placed on the board. The students who are standing in front of the particular part of speech (e.g. "subject") will form a group to complete the next phase of the activity. Teacher needs to make sure that the students stand in the correct place (based on the cards they have selected).
- Prior to class, the teacher prepares five sets of vocabulary words/phrases. Each set forms a complete sentence, which includes a subject (i.e. *wo* in Chinese; *I* in English) adverb/time expression (i.e. *wanshang jiu dian* in Chinese; *9:00PM* in English), verb (i.e. *kan* in Chinese; *watch* in English), and object (i.e. *dianshi* in Chinese; *television* in English). Each of the vocabulary words/phrases is written in English on one side of a card and in Chinese on the other side of the colored cards with different shapes corresponding to the colors and shapes of parts of speech.
- The teacher asks each group to select one set of vocabulary cards from a box. There is one set left in the box.
- The teacher models an example by putting the set of vocabulary cards which is left in the box in correct order, or alternatively, the teacher could also ask a stronger student to model the task.
- The teacher asks each group to work together to place these vocabulary words/phrases in the correct order.
- While the students are working in groups, the teacher walks close to each group, observes the students' responses, answers any questions the students have, and works with the weaker students, to make sure that each student is on the right track.
- The teacher asks the stronger students, who have finished the task earlier, to help those struggling students.
- After the students have completed this task, the teacher then asks each group to read its sentence aloud based on its organization of the words/phrases. The teacher needs to make sure that each group gets its sentence in the correct order.
- The teacher gives positive reinforcement to the students for having successfully completed the task.
- The teacher randomly distributes a set of colored cards indicating parts of speech on the floor.

- The teacher divides the students into four groups, each of which includes at least one stronger student.
- Prior to class, the teacher prepares four white cards (representing subject, adverb/time expression, verb and object respectively), on which four words/phrases relating to daily schedule are written in both English and Chinese. These words/phrases form a complete sentence corresponding to the sentence structure used for expressing daily schedule (i.e. *Wo shiyi dian chi zhong fan* in Chinese; *I eat lunch at 11:00* in English). For example, for the weaker students, teacher has also prepared four colored cards, on which the same words/phrases are provided as the ones on the white card. The shapes of the colored and white cards are consistent with the shapes used for parts of speech.
- The teacher then explains the directions while modeling an example for the students to ensure that all the students understand the task. Teacher then asks each group to select a white card, read the card aloud and then stand next to the corresponding colored card.
- After each group finds its position, the teacher asks the rest of the class to judge whether the group made a correct choice. If the group is judged to be incorrect, the group is asked to repeat the process again with the colored card. If the group has made a correct decision the first time, it gets 100 points. If the group answers correctly the second time, it gets 50 points. If the group does not get the correct answer after the second time, it receives 20 points and teacher then asks the rest of the class to correct the mistake.
- The teacher then asks the students to complete the sentence. The students take turns reading aloud the cards they have selected. The group that stands next to “subject” will start by reading aloud their card, and the groups of adverb, verb and object will follow.

Informal Assessment of the Activity

Informal assessment is defined as the process of collecting data in an informal manner. It can play a critical role in the LD teacher’s decision making in the instructional process. Throughout the activity, the teacher should serve as a facilitator, continuously assessing the students’ level of knowledge, monitoring their progress and revising the lesson as needed. Teachers’ observations about students’ learning process are a source of information of what is important for maximizing students’ interactions in the learning process. The teacher assesses the students’ progress by walking close to each student or each group, informally observing the students’ behavior in completing the task and the interactions that occur between students, answering any questions they might have about the instructions, and working with the weaker students at their desks. For example, the teacher pays close attention to the students who have difficulty completing the following tasks throughout this activity:

1. in the first phase of the activity, students who are not able to place the parts of speech in the correct order

2. in the second phase of the activity, students who are not able to find their position based on the colored card of parts of speech they selected, or students who fail to place the cards for words/phrases in the correct order
3. in the third phase of the activity, students who cannot match the vocabulary card that they have selected with the colored card representing the parts of speech placed on the floor
4. in the final step, students who are not able to tell when they are supposed to read aloud their card according to correct sentence structure
5. throughout the activity, students who are not able to understand the instructions given by the teacher, or students who are much slower in understanding the task than other students

These informal assessments are carried out for instructional planning and for monitoring, and for evaluating student progress and instructional process. If students fail to accomplish the tasks mentioned above, this should cause the teacher to adjust his/her teaching plan to enhance the students' comprehension and effectiveness of learning.

Transfer Activity

The teacher can continue the same procedure described in the two phases described earlier using the white cards of different shapes to reinforce the structured multisensory and metacognitive learning process. Students then participate in the activity using white cards instead of colored ones. This can gradually prepare students for the next phase in which they continue to work in black and white. Therefore, this activity serves as a transition to conventional texts.

Homework Extension

Students learn to apply their knowledge in the homework exercise worksheet after they master the grammatical task using the visual, auditory, tactile and kinesthetic cues. The teacher could ask the students to complete the exercise worksheet (see "Appendix") in order to reinforce their memory of sentence structure and then ask them to talk about their daily schedule in the correct sentence order. For example, students could talk about the time at which they get up, eat breakfast, have Chinese class, eat lunch, eat dinner and go to bed.

Adaptation of Multisensory Approach to Teaching of Other Language Components

This multisensory activity is re-usable and can be applied to multiple skill lessons. For example, the technique of color and shape coding can be adapted to teaching Chinese tones and eight kinds of basic strokes of Chinese characters.

1. Teaching Chinese Tones

Chinese syllables can have one or several meanings. By themselves or in groups of two, (or three, or more), they correspond to what one calls a “word” in western language. Each syllable is composed of three components – initials, finals and tones. The actual meaning of the syllable changes with differing tones. Therefore, tones are a vital part of spoken Chinese.

There are four tones in Mandarin Chinese. These are:

First Tone (—) Second Tone (/) Third Tone (∨) Fourth Tone (\)

In order to help the students memorize the tones, one might construct a story in which each tone is linked with a different sentence in the story:

First tone: An airplane is sitting on the ground and getting ready to take off.

Second tone: The airplane is taking off.

Third tone: The airplane is flying through turbulence.

Fourth tone: The airplane is landing.

Color Code

COLOR: Each of four colors is arbitrarily paired with a tone used in pronouncing the paired color.

First tone: BLACK (hei)

Second tone: ORANGE (cheng)

Third tone: PURPLE (zi)

Fourth tone: GREEN (lu)

SHAPE: Each shape is arbitrarily paired with a shape.

First tone: —

Second tone: /

Third tone: ∨

Fourth tone: \

2. Teaching eight kinds of basic strokes of Chinese characters

Each Chinese syllable has a written form called “character”. Chinese characters are composed of various strokes, and their structures may seem very complicated to learners. In actuality, the various strokes one encounters in written Chinese fall into eight forms. For any student learning Chinese, it is important to memorize the eight kinds of basic strokes in writing Chinese characters. These strokes are the key to the organization of each character and hence to writing each character.

These strokes can be represented by different colors and the shapes should be consistent with the shapes of the strokes.

Dot: GRAY

Dash: BROWN

Vertical Line: RED

Left-falling stroke: SILVER

Right-falling stroke: BURGUNDY

Hook stroke: GOLD

Upwards to the right: BEIGE

Bend: WHITE

Conclusion

As proposed earlier in this paper, multisensory instruction is an effective way to help students with learning disabilities organize and integrate information in the brain, because it involves the simultaneous use of all learning channels to overcome the students' processing deficiencies. The multisensory activities described here provide examples of how multisensory instruction can be applied to teaching a non-alphabetic language such as Mandarin Chinese. These activities are intended to serve as a pilot upon which I can further incorporate multisensory instruction into my teaching, and as a model to others who might wish to incorporate this approach to teaching into their own lessons.

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Appendix:

Homework Exercise Sheet

1. Draw a shape below each word/phrase with a color pen/pencil indicating the appropriate parts of speech.
2. Place these words/phrases into the correct order.

Example: wo

I



kan

read



zaoshang qidian

7:00am



shu

book



Completed sentence: Wo zaoshang qidian kan shu.

1.

chi

eat

wanfan

dinner

wode meimei

my sister

wanshang liudian

6:00pm

Completed sentence:

2.

shangwu shidian

10:00am

ta

he/she

xue

study

zhongwen

Chinese

Completed sentence:

- | | | | | |
|----|--------------|---------------|---------------|----------------------------|
| 3. | kan watch | dianshi TV | tamen they | wanshang in the evening |
|----|--------------|---------------|---------------|----------------------------|

Completed sentence:

- | | | | | |
|----|----------------------|-------------------|------------|--------------------|
| 4. | xuesheng Students | zhongfan lunch | chi eat | zhongwu at noon |
|----|----------------------|-------------------|------------|--------------------|

Completed sentence:

- | | | | | |
|----|------------------|---------|----------------|---------------------|
| 5. | hen very much | wo I | xihuan like | zhongwen Chinese |
|----|------------------|---------|----------------|---------------------|

Completed sentence:

