

Studies on Global and Partial Processing for Chinese Children with Dictation Difficulties

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Abstract

Dictation difficulty refers to people who possess normal reading ability but poor dictation ability. Orthographic representation deficit of Chinese children with dictation difficulties might stem from backward in global processing, preferential effect in partial process or deficit in paired associative learning. However, there is a vacancy in this research field. Therefore, the current study aimed to examine features and preferences in both global and partial processing as well as their relationships. Participants are selected according to their scores on reading, dictation and intelligence text. By calculating discrepancies on reading and dictation scores, 22 dictation difficulties and 24 controls were chosen. Two 2 by 2 factor-designed experiments were conducted respectively. In experiment 1, a "+" was presented on screen for 500ms, followed by a target stimuli with a specific shape composited from small shapes last for 1000ms, then a probe stimuli, a global- or partial-changed version of the target was presented. Subjects were asked to judge which version was the probe stimulus. In Experiment 2, a "+" was presented on screen for 500ms, followed by a stimuli with a specific shape composited from small shapes last for 1000ms. Subjects were asked to whether the stimuli has a round as well as triangle shape. Both experiments recorded accuracy and reaction time. Both experiments reveal that Chinese dictation difficulties were significantly deficient in global processing, but excellent in partial processing. One possible explanation is that it is the preferential effect in partial processing that influences global processing. Further studies were expected to investigate this assumption

Keywords: dictation difficulties, Chinese, visual process, global and partial

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Introduction

As a main type of learning disability, specific spelling difficulties has the main feature of specific and significant impairment in the development spelling skills in the absence of a history of specific reading disorder, which is not solely accounted for by low mental age, visual acuity problems, or inadequate schooling(ICD-10, version; 2015). In China, such kind is called dictation difficulties.

According to the feature of normal reading and poor dictation performance, it might be that children with dictation difficulty has deficit in orthographic representation. But relevant studies have shown conflicting results in dictation difficulties' global representation of Chinese character. Also, relationship between global and partial process remains unknown. Finally, previous studies focus mostly in Chinese characters and ignore common graphs. Thus, this research aims at resolve these problems.

Methods

Participants were selected according to their scores on reading, dictation and intelligence test. The selecting procedures were as followings: (1) dictation test, the contents were read by teachers and students wrote on designated paper; (2) reading test after two days, students wrote phonetic notations or homophones on designated paper. (3) Progressive raven standard reasoning test, whose scores were under 75% were eliminated. By calculating discrepancies on reading and dictation scores, 22 dictation difficulties and 24 controls were chosen.

Both experiment 1 and 2 were designed as two-factor mixed experimental design, groups of participants were between-subject factors.

Experiment 1 explored features of global and partial process respectively as well as their relationship. Experiment 1 used shape-change-detect paradigm. Materials were global and partial shapes including triangle, roundness, square and rhombus (See table 1). The experiment process were as follows: a "+" was presented on screen for 500ms, followed by a target stimuli with a specific shape composited from small shapes last for 1000ms, then a probe stimuli, a global- or partial-changed version of the target was presented. Subjects were asked to judge which version was the probe stimulus.

Table1 Examples of Materials in Experimental 1

Probe stimuli	Target stimuli	
	Global-changed	Partial-changed
		

Experiment 2 also explored features of global and partial process respectively as well as their relationship. Materials were global and partial shapes including triangle, roundness, square and rhombus (See table 2). The experiment process were as follows: In Experiment 2, a "+" was presented on screen for 500ms, followed by a stimuli with a specific shape composited from small shapes last for 1000ms. Subjects were asked to whether the stimuli has a round as well as triangle shape.

Table2 Examples of Experiment 2

Target stimuli	Distractible stimuli		
			

Results

Both experiments recorded accuracy and reaction time.

In experimental 1, results were: (1) in accuracy, main effect of group were significant, $F(1, 44)=19.23$, $p<0.01$, $\eta^2=0.32$; main effect of type of change were not significant, $F(1, 44)=2.80$, $p>0.01$; interaction effect were significant, $F(1, 44)=9.59$, $p<0.01$, $\eta^2=0.18$. (2) in reaction time, main effect of group were not significant, $F(1, 44)=3.36$, $p>0.01$; main effect of type of change were significant, $F(1,44)=119.82$, $p<0.01$, $\eta^2=0.73$; interaction effect were significant, $F(1,44)=5.20$, $p<0.05$, $\eta^2=0.11$.

In experiment 2, results were: (1) in accuracy, main effect of group were significant, $F(1,43)=18.84$, $p<0.01$, $\eta^2=0.29$; main effect of type of judgment were not significant, $F(1, 43)=0.61$, $p>0.05$; interaction effect were significant, $F(1,43)=133.45$, $p<0.05$, $\eta^2=0.74$. (2) in reaction time, main effect of group were significant, $F(1,43)=21.21$, $p<0.05$, $\eta^2=0.33$; main effect of type of judgment were significant, $F(1,43)=78.94$, $p<0.001$, $\eta^2=0.65$; interaction effect were significant, $F(1,43)=49.42$, $p<0.05$, $\eta^2=0.53$.

Conclusion

In conclusion, both experiments revealed that Chinese dictation difficulties were significantly deficient in global processing, but excellent in partial processing. One possible explanation is that it is the preferential effect in partial processing that influences global processing. Further studies were expected to investigate this assumption.

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