Bilingual Chinese/English first-graders developing metacognition about writing

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Abstract

This study investigates metacognitive development of 16 bilingual Chinese/English first-graders. The researcher analysed the metacognitive utterances produced by the children while they were engaged in the writing task of composing dictated stories. The results suggest that the young bilinguals demonstrated metacognitive abilities and were able to employ metacognitive knowledge during their writing attempts. There is also indication that metacognition is closely connected to these children's ability to compose stories and the qualities of their stories.

Key words: bilingual, Chinese, metalinguistic, cognition, writing, first graders

Background

Metacognition is the capacity to reflect, monitor and regulate one's thinking processes. Metacognitive abilities are considered crucial and closely related to one's learning performance (Baker, 2002; Baker and Brown, 1984; Flavell, 1978). Students with more sophisticated metacognitive abilities tend to be more successful readers and writers (Baker, 2002; Raphael, Englert and Kirschner, 1989).

Declarative and procedural knowledge are two important types of metacognitive knowledge (Jacobs and Paris, 1987; Paris, Lipson and Wixson, 1983). Declarative knowledge concerns one's awareness of oneself as a learner, of task characteristics and of strategies to be used. An important indicator of children's declarative knowledge is their ability to know the demand of a cognitive task and to understand the structure and goal of the task (Raphael, Englert and Kirschner, 1989). Another critical indicator of children's declarative knowledge is metalinguistic awareness, the ability to talk about language as an object of study (Goodman, 1986; Sulzby and Otto, 1982). Children's overt metalinguistic statements provide evidence of their analysis of the written language (Goodman, 1986). Metalinguistic awareness can be observed when children use language to express concepts of story, word, phonemes or alphabet (Cox, 1994).

Procedural metacognitive knowledge is about using resources strategically and taking various actions or strategies to complete a difficult task (Baker and Brown, 1984; Raphael et al., 1989). It includes planning, monitoring, checking, evaluating and revising (Baker and Brown, 1984). For example, in writing, addressing the needs of readers, self-regulating, other-regulating and self-correcting are examples of procedural metacognition (Cox, 1994). Procedural metacognition is found to be critical to older students' development of writing expertise (Raphael et al., 1989).

Some earlier research suggests that metacognitive abilities, the abilities to reflect, monitor and regulate one's own cognitive processes are complex and generally not developed until one reaches adolescence (Baker and Brown, 1984; Gombert, 1987). Young children were considered incapable of such higher-level mental functions. In recent years, this assumption has been challenged. Some researchers have found that metacognitive comments are evident when young children are engaged in reading or writing activities (e.g. Cox, 1994; Rowe, 1994).

Rowe (1994) examined three- and four-year-old children's writing behaviours in a pre-school setting. The children made metacognitive utterances and demonstrated several behavioural indicators of metacognition. She also recorded several types of evidence of self-monitoring while the children were engaged in literacy activities at their writing tables. She suggested that these young children were strategic problem-solvers who used strategies gleaned from their interactions with more knowledgeable others or peers in their social environment during their writing attempts. Sulzby (1986) observed that the children in her study demonstrated metacognitive awareness about writing tasks and the conventions of writing and reading by commenting on or inquiring about their conventional and non-conventional performances. The results from these two studies provide evidence that young children engage in metacognition. However, this was not the focus of either study, and they did not investigate young children's development of specific types of metacognition.

The studies conducted by Cox and her associates (Cox, 1994; Cox and Sulzby, 1982; Cox, Fang and Otto, 1997) examined the relationship between young children's emergent writing development and their use of emergent metalinguistic and procedural metacognition. Using a method of asking children to dictate texts for others to read, Cox and her colleagues were able

to observe that children as young as four or five demonstrate metacognitive knowledge through their metalinguistic and self- and other-regulatory comments made during dictation. The results from those studies are limited in scope because they did not consider other possible forms of declarative and procedural knowledge.

The body of knowledge on the relationship between metacognition and reading has been well established (Baker, 2002; Baker and Brown, 1984; Pressley, 2002). However, we do not have enough knowledge about how metacognition manifests itself in writing, especially the writing of young children (Cox, 1994). A similar situation exists in research on bilingual children's literacy development. Research on bilingual children's writing development is hard to find in the first place, and virtually unexplored is the influence of biliteracy learning on young bilingual children's metacognition in relation to their English writing. Because of the importance that metacognition bears on language and literacy learning, exploring bilingual children's metacognitive development in writing could enhance our understanding of how bilingual children write and how we can support their writing development.

The purpose of this study is to investigate metacognition development of a group of bilingual Chinese/English first-graders as they were involved in the writing task of producing a dictated story for others to read. Two questions were asked:

- How have bilingual Chinese/English children changed in their development of metacognitive knowledge and control of the composing process in English across the first grade year?
- What are the effects of learning two different languages on these children's composition-related metacognitive development?

In recent years, an increased number of bilingual Chinese/English children have been entering American schools. It is hoped that answers to these questions will expand the current body of knowledge about how metacognition is played out in young Chinese/English bilingual children's writing and thus help us understand the probable influence of receiving first language instruction on bilingual children's metacognition development.

Theoretical framework

Vygotsky's theories (1962, 1978), especially his views on children's internalisation of knowledgeable others' mediating comments, provide the theoretical basis for this study's design, analytical procedures and interpretation of the data. Research suggests that children are able to develop new knowledge and strategies by working through engaging problems and unfamiliar concepts under the verbal mediation of knowledgeable others (Wertsch, 1985). Such verbal mediation is internalised as 'inner speech' and later employed by the child to solve similar problems or tasks independently (Vygotsky, 1962). Furthermore, before such mediational language is internalised or even after it is internalised, if the problem is sufficiently challenging or unfamiliar, it may also be adopted by the child to guide audibly his/her thinking.

Cox and her associates (Cox, 1994; Cox, Fang and Otto, 1997) lamented the lack of studies on young children's metacognition development. This lack, to a great extent, lies in the difficulties of identifying indicators for such metacognitive behaviours or processes. Metacognition cannot be easily assessed among young children through think-alouds and survey methods used in research with adults and older children (e.g. Raphael et al., 1989). Rather, observing young children in the process of doing their own writing or drawing (e.g. Rowe, 1994) or using a dictation task to elicit metacognitive utterances (e.g. Cox, 1994) are more effective.

The first-graders in this study were asked to dictate stories for others to read (i.e. literate register texts) because written monologues in the form of dictation are considered a legitimate form of written text (e.g. Cox, Fang and Otto, 1997; Sulzby, 1986). Dictation can provide a valid reflection of young children's knowledge of written language because it requires written conventions (Hall, 1999; Sulzby, 1986).

While dictation is not likely to be an unfamiliar task, requesting that the text be for others to read does present a challenge to those children who have just begun to learn the patterns and linguistic choices of books (i.e. literate register text). Consequently, planning, monitoring and editing of the composing process and linguistic choices may likely be externalised. In addition, in the context of dictation, the child's only means of controlling his/her text is through externalised speech to monitor and direct both the scribe and the text. Controlling or regulatory metacognitive speech would be most likely to emerge if the child is sufficiently and/or intuitively knowledgeable about the need to plan and make appropriate language choices and to monitor both his/her text and the scribe in order to produce the requested text.

Method

The study's participants were 16 bilingual first-graders who learned Mandarin Chinese and English simultaneously in a mid-western region in the United States. Thirteen of the 16 bilingual Chinese children were born in China and came to the United States with their parents. The remaining three were born in the United States. Their parents were graduate students or other professionals. The children went to public school

during the week for formal education and attended Chinese school once a week during the weekend to receive two hours of reading and writing instruction in Chinese. All the bilingual children had attended American kindergarten the previous year and were fluent in at least playground English. They spoke Chinese mixed with a varied amount of English at home and in their Chinese school.

The first-grade Chinese instruction that the children received had a heavy focus on learning Chinese phonetic systems and Chinese characters. The text-books were literature-based basal readers with controlled vocabulary. Each lesson introduced certain key words that students needed to learn to recognise and write. It is important to note that in Chinese instruction, the instructional focus for writing in first grade was on precise copying and memorisation of Chinese characters. The teachers expected and encouraged their students to write each character correctly. Several times throughout the school year, the students were tested on how well they wrote the newly learned characters. As to the free writing activities, the students were allowed to choose their own topics, but the parents were encouraged to help their children with words. There was a general lack of opportunity for the use of language experience or shared writing in the Chinese programme. Writing for an audience or other purposes was not the focus of writing instruction in the Chinese first-grade curriculum.

The data are children's dictated texts and the interview conversations taped during the data-collection sessions. Two data-collection sessions (at the beginning and end of first grade) were conducted with each individual child in a separate classroom at the Chinese school. The researcher, a Chinese/English bilingual, had spent a considerable amount of time making observations, supporting the Chinese teacher, and working with the children before the commencement of data collection. Good rapport had been established between the researcher and the children who participated in the study.

During each data-collection session, the researcher worked with each child one on one. The child was requested to produce a dictated literate-register story (the dictation task). The first step in the dictation task was to engage the child in informal conversation. Considerable research (e.g. Cox and Sulzby, 1984; Cox, Fang and Otto, 1997) suggests that engaging young children in oral conversation can assist them in producing an oral monologue (at least two sentences on the same topic without the correspondent's assistance), which served as an important precursor for the dictated story. During the conversation, the child was encouraged to share a personal experience as a continuous text (i.e. oral monologue).

After the child shared a personal experience oral monologue, he or she was encouraged to dictate that same recount as a text for others to read (i.e. a written-attempt or literate register monologue). Following the dictation, the child was told that the researcher (also a scribe) would read the text aloud to be sure it was "just the way you want it for the other children to read". This allowed and encouraged edits by the child, if any.

The entire interview session, from conversation and oral monologue to dictated text, was audio tape recorded and transcribed for analysis. Spontaneous comments related to the text and/or the scribe were identified from the tape and considered within the context in which they occurred, in order to evaluate their potential as metacognitive utterances.

Analyses of metacognitive comments

The children's talk before, during and after their attempts at composing literate register texts (through dictation) was examined for evidence of metacognitive knowledge. The researcher followed the general procedures for analysing young children's metalinguistic and procedural knowledge described by Cox (1994) but also revised and expanded her analytical scheme to include two categories of procedural knowledge and two categories of declarative knowledge. These were 'externalised speech implying inner thinking and general planning' and 'audible self- or other-regulatory speech' for procedural knowledge, and 'comments about text structure and writing goal' and 'meta-linguistic comments' for declarative knowledge.

The researcher and another trained scorer, working independently, analysed the dictated stories and the surrounding discourses containing metacognitive utterances. The texts were first parsed into T-units. T-unit analysis was first developed by Hunt (1965) and was later modified and employed by other researchers for text analysis (e.g. Cox, 1986; Cox, Shanahan and Sulzby, 1990; Fang, 1997; King and Rental, 1981; Pappas, 1981). A T-unit, also known as the smallest terminal unit in a sentence, is an independent clause with all dependent clauses or non-clausal structure attached. Consistent with Halliday's functional grammar (1994), a T-unit realises a function-based experience or event. For T-unit parsing, the general procedures described by Cox were followed. (See Cox, 1987 for more in-depth discussion and description).

The following steps were used to analyse further the metacognitive comments produced by the children during the whole process of dictating a text for others to read. First, a frequency count was made for:

- each of the two subcategories of declarative metacognitive comments (i.e. metalinguistic comments and comments about the structure and the goal of the writing task); and
- each of the two subcategories of procedural metacognitive comments (i.e. externalised speech

implying inner thinking and general planning, and audible self- or other-regulatory speech).

Then an index was calculated of metacognitive utterances for each category. The declarative metacognition index (DMI) was obtained by dividing the total number of declarative metacognitive comments by the total number of T-units. The procedural metacognition index (PMI) was obtained by dividing the total number of procedural metacognitive comments by the total number of T-units. Thus the DMI indicates the incidence of declarative metacognitive comments, and the PMI the incidence of procedural metacognitive comments.

Following the independent parsing and scoring, the researcher and the other scorer met and compared results. Initial agreement between scorers was 95% on parsing and 87% on identified metacognitive utterances. In all instances, differences were discussed and resolved with 100% agreement.

Results

Statistical findings

The results from *t*-tests indicated that, as a group, the bilingual children made statistically significant gains over the school year on the procedural metacognition measure (PMI), $t(15) = 3.83$, $p < 0.01$. The children produced fewer procedural metacognitive utterances at the beginning of the school year, $M = 0.20$, and more procedural metacognitive utterances at the end of the school year, $M = 0.29$. However, no statistically significant difference was found in their declarative metacognitive measure (DMI), with an equal mean of 0.05 at the beginning and end of the school year.

Descriptive findings

Descriptive analyses of children's dictated texts and interview transcripts provide a rich array of metacognitive comments implying both declarative and procedural metacognitive processes. The comments show that the children employed metacognitive utterances that ranged from simple forms (e.g. utterances – ums, repetitions – implying inner thinking) to very sophisticated self-monitoring and regulating (both self-regulating and other-regulating) behaviours. Examples of different types of metacognitive comments produced by the children are provided in Table 1.

Qualitative analyses of the texts support the statistical result that the children made good progress in employing procedural metacognitive utterances to control the writing process and product. The metacognitive comments made by Mei (M), a representative case of the group, are analysed and discussed below to illuminate the qualitative aspect of this growth. The researcher (scribe) is indicated by R. The italicised texts represent metacognitive utterances.

> *Fall*
> M: *Can I do it in English?*
> R: Yes.
> M: *Um . . .* I went to a water park, *I mean a water slide,* and there was like a swimming pool and under it was sand. And there was, *um . . . ,* a wooden, a wooden, a wooden-like deck, *and um . . .* I *. . . um . . .* jumped down there. And it was really fun. And they are also had a water

Table 1: Modified metacognition analytical scheme and examples of children's metacognitive comments

Procedural metacognitive comments		Declarative metacognitive comments	
Externalised speech implying inner thinking and general planning	Audible self- or other-regulatory speech	Comments about text structure and writing goal	Metalinguistic comments
"Can I do it in English?"	"Ok, I am mixed up again."	"You mean to put them in order?"	"The end."
"I think it was . . . "	"I wasn't ready."	"An actual one?"	"I wrote four pages!"
"But . . . um . . . "	"I'll wait."	"You want me to write what really happened?"	"That's five REALLY!"
"Because . . . um . . . "	"I mean ate." (for correction purpose)	"Is it going to be printed out on computer?"	"E-V-A-N, that's how you spell his name."
	"Let's start now."		
	"You don't have to write all that."		
	"I am ready. You'll start to write."		
	"You can go ahead and write."		
	"Cross that out."		

slide. They had this place in it under us. And then we can sit on it. *And then . . . and then . . .* when we got on it, it went really really fast. *OK.*

Spring
M: I went to my friend's house, and, and we made sand picture. And it was really fun. Her sister Katie *um . . .* did a Barbie Play. And it was funny. While, while, we were watching her sister's show, *um . . .* me and my friend we eat ice cream. *I want to do "ate"* (pointing to the word "eat"). When it was time to go, when it was time to go, we, *"we", cross that out* (pointing to the word "we"), her mom dropped us off, dropped us off. *And um . . .* then we gave something for them to *to to* eat.

The comparison of the two transcripts clearly demonstrated that Mei had made significant growth in terms of her use of procedural metacognitive comments to control the writing process and product. For example, in the Fall transcript, Mei was found to make more externalised utterances implying inner thinking and general planning (e.g. um . . ., and then . . . etc.). There was only one instance of self-regulatory speech (i.e. I mean water slide). As the year went by, Mei used more sophisticated procedural metacognitive comments, especially to regulate the scribe's transcription. For example, she made comments such as "I want to do 'ate'" when she realised that the previously dictated word "eat" was in the wrong tense and therefore should be corrected. She also asked the scribe to cross out the word "we" when she changed her mind about starting the sentence with "we". In addition, there was an increased amount of repetition and self-correction occurring throughout her dictation. Clearly Mei had taken greater metacognitive control of the writing process and product, and she was constantly monitoring her own thinking during her dictation by the end of the school year.

In this study, those who produced much shorter dictated texts than the average writers were considered poor writers. The text produced by the poor writers generally lacked cohesion, a very important indicator for good writing (Cox, Shanahan and Sulzby, 1990; Hasan, 1984). The results show that poor young writers tended to make fewer metacognitive utterances about the writing task and they seldom tried to regulate their thinking during the dictation, nor did they try to regulate the scribe who helped to transcribe their stories. In contrast, more-advanced writers tended to comment more often on the task before, during and after they dictated the story. They also tended to monitor their composition through regulating their own and the scribe's behaviours.

The following data clip taken in Spring reflects Han's developing metacognition when engaged in the writing task. It also provides a good example of an emergent writer who monitored and regulated his own and the scribe's writing process.

H: There are more than one type of tag. Freeze Tag is like somebody is It. And if the Iter Iter (Han was looking at me and trying to clarify for the researcher), *that's what the person's called*, tags you, you're, you're frozen. But you have to yell for help because if you're It, *no, just erase It there* (*Han was pointing to the word It*), if you're frozen for 10 seconds, you are automatically It. Jail tag is when the Iter tags you, you have to go to jail. And if you are tagged 3 times, you are It. TV tag is like regular tag but only one difference. If you get down and say your favorite TV show, the Iter can't get you. *That's all.*

Throughout the dictation task, Han closely monitored the scribe's reaction and the way the scribe took dictation. He tried to clarify the word 'Iter' for the scribe when she showed a sign of puzzlement. He told the scribe to erase the word 'It' when he changed his mind about what he was going to say in the middle of his sentence. He also paused for the scribe to make sure that the scribe wrote down every word he said and the story was written down exactly how he wanted. His story employed many cohesive devices and literate wording choices. The way that he started and ended his dictation also reveals his developing understanding of writing conventions and the writing task.

Discussion

Both questions of the study were answered. In addition, this study has provided several important observations in relation to metacognition development in the bilingual Chinese/English first-graders.

With regard to the first question, the results indicate that the bilingual children have made significant progress in their development of procedural metacognition across the school year. Two factors could have contributed to these children's greater use of procedural metacognitive utterances to take control of their own composing processes and products and to regulate the scribe during the story dictation activity. The experience of American culture and classroom expectations could be a likely source for this growth in procedural knowledge. Additional cognitive demands posed by learning two languages and having to monitor and resolve the differences between the two languages could be another explanation for this increase.

It is puzzling that the bilingual children's use of declarative metacognitive utterances remained at a similar level when compared to their performance at the beginning of the school year. It is reasonable to expect that the bilingual children would also have made good gains in metalinguistic awareness and

knowledge of task structure and task demands by the end of their first-grade year. The lack of significant progress in first-graders' declarative metacognitive knowledge and the role of declarative knowledge in early writing composition need to be further explored.

With regard to the second question, the results suggest that learning two languages does not have a negative effect on the bilingual children's composition-related metacognitive development. On the contrary, a significant growth in their metacognitive procedural knowledge and control was found. There is reason to believe that the interaction between the simultaneous learning of Chinese and English contributes to young bilingual children's metacognitive development. The results support the argument made by Kessler and Quinn (1987) that having regular exposure to two languages and their competing linguistic codes can lead to higher-level cognitive systems.

The bilingual young children in this study were learning to read and write in two languages and therefore forced to sort out the semantic, syntactic, graphophonic and orthographic differences that exist between the two languages on a regular basis. Moving in and out of the two languages requires a great amount of linguistic flexibility and the ability to monitor their language production appropriate in different contexts. Although it is difficult to pinpoint whether their English instruction or Chinese instruction contributes more to their metacognitive development, the interaction of the regular instruction they received in both languages seems to have produced a positive effect on their metacognitive growth.

The results also clearly support the assertions made by some emergent literacy researchers (e.g. Cox, 1994; Rowe, 1994) that metacognition is not a late developing skill. Although less sophisticated than adults' or older children's metacognition, young children can employ metacognitive knowledge when engaging themselves in cognitively challenging tasks such as composing messages for others to read. This research has shown that there is no exception with these bilingual first-graders.

The results also indicate that metacognition is closely connected to young children's ability to compose texts and the qualities of their stories. More advanced young writers have a better understanding of task demands, and they actively monitor the writing process through self- and/or other-regulation. The behaviours of poor writers indicate otherwise. This finding has particular implication for writing instruction. To support young children's writing development, it is desirable that teachers encourage young writers to reflect on the task demands and to monitor and regulate their own writing behaviours.

The results also suggest that asking young children to compose through dictation could provide teachers with precious insights into young children's emerging metacognitive knowledge, procedural knowledge in particular. Due to developmental factors, with young children, dictation appears to be a productive approach to eliciting externalised metacognitive comments on the writing process and product for analysis.

However, the lack of statistically significant progress in declarative knowledge could also be attributed to the data-collection method used in this study. Although this lack could be real, the results also suggest a need for research tools that are more sensitive to measuring the changes in young children's declarative metacognition. Because no other tools existed at the time of the study, the researcher would like to call for such tools to be developed by other researchers in the future.

It is a folk belief in the USA that simultaneous attention to learning two languages may hinder bilingual children's development of the dominant or school language, and therefore the current climate in American education does not encourage schools and teachers to provide bilingual education to its English-as-Second-Language students. The results from this study do not support such a belief or practice. On the contrary, they provide evidence that receiving first-language education (Chinese) does not prevent students from making progress in developing metacognitive abilities, especially procedural knowledge, in relation to composing in their second, dominant school language (English). More studies investigating how bilingual children develop metacognitive control over writing processes and products are needed so that more informed decisions can be made in relation to supporting bilingual children's literacy development.

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