Open Access Library Journal
2023, Volume 10, e10022
ISSN Online: 2333-9721
ISSN Print: 2333-9705

Examining the Relative Contributions of Morphological Awareness to Chinese Reading Comprehension

Yitian Ye

Department of College of Foreign Languages, East China University of Science and Technology, Shanghai, China
Email: 18979345002@163.com

How to cite this paper: Ye, Y.T. (2023) Examining the Relative Contributions of Morphological Awareness to Chinese Reading Comprehension. *Open Access Library Journal*, **10**: e10022.
https://doi.org/10.4236/oalib.1110022

Received: March 3, 2023
Accepted: April 20, 2023
Published: April 23, 2023

Abstract

The relationships between two aspects of morphological awareness, vocabulary knowledge, and reading comprehension were examined among 63 Chinese fourth graders. Correlation analysis results showed that both morphological tasks including homophone awareness and homograph awareness were significantly correlated with vocabulary knowledge and Chinese reading comprehension. Multiple regression analysis results further revealed that homophone awareness, instead of homograph awareness, contributed unique variance to reading comprehension after general reasoning ability was controlled. These findings underscore the robust predictive power of morphological awareness in early reading acquisition among Chinese children.

Subject Areas

Linguistics

Keywords

Morphological Awareness, Vocabulary Knowledge, Reading Comprehension

1. Introduction

Reading is a complicated mental process that requires the corporation of various cognitive skills. Research on reading acquisition has generated many impressive findings in the past decades that inform us about what skills may be universally important for reading, including phonological awareness (Nithart *et al.* 2011) [1], rapid naming (Blachman 1984 [2]; Liu *et al.* 2017 [3]), etc. Besides, some skills may be specifically more important for learning individual languages, like morphological awareness for Chinese (Shu *et al.* 2006) [4].

In the literature on alphabetic writing systems, evidence shows that reading and vocabulary development are bi-directionally associated with one another with development (Cunningham & Stanovich 1997) [5], which is also associated with morphological skills (Wysocki & Jenkins 1987) [6]. A study by McBride-Chang *et al.* (2003) [7] went further and found that morphological skills, vocabulary, and reading were also strongly correlated among Chinese children learning to read Chinese. However, only kindergarten and second-grade children were examined in their study, and it is not known if their study results can be generalized to students in more advanced elementary grades. In the present study, we aimed to address this gap in the literature.

1.1. Morphological Awareness

A series of theoretical and empirical studies have confirmed that children's morphological awareness and reading development are highly correlated (Carlisle 2000 [8]; Li *et al.* 2012 [9]). Emma *et al.* (2021) [10] reported that morphological awareness accounted for uniquely important variance in reading comprehension for groups aged 6 - 8 and 12 - 13 beyond other factors including age, nonverbal reasoning, vocabulary, phonological awareness, and word reading. Their results showed that morphological awareness was a fundamental predictor across the reading comprehension ability spectrum and remained even after controlling for other reading-related skills.

According to Carlisle (2000) [8], morphological awareness can be defined as "children's conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure". Chinese is an important language in which to explore morphological awareness because of its unique morphology. In the Chinese language, each morpheme is generally represented as a single syllable. Likewise, Chinese script is sometimes described as morpho-syllabic, because each character represents both a syllable and a morpheme, thus the unit of the interface between the written word and the spoken language is a syllable, instead of the phoneme, which corresponds to a morpheme (Liu *et al.* 2017) [3].

Common assessments of children's morphological awareness take the forms of homophone awareness, homograph awareness, and compounding word construction. Children's ability to distinguish homophones and their morpheme construction skills are believed to explain a significant amount of variance in Chinese word reading, word spelling, and reading comprehension (McBride-Chang *et al.* 2006) [11]. The fact that there are a large number of homophones in Chinese means that those learning to read Chinese must distinguish characters that have very different written forms but which sound identical.

1.2. Vocabulary Knowledge and Reading

Reading is strongly associated with vocabulary development (Stanovich 1986) [12]. Empirical evidence shows that learners with the sparsest vocabulary levels are often those with the poorest reading skills as well.

The classic theory of the lexical quality hypothesis states that the knowledge and connection of words' components constitute the basis of reading comprehension (Richter *et al.* 2013) [13]. Thus, metalinguistic awareness like morphological awareness has been thought to be a good indicator of lexical quality. From this perspective, high precision of the morphology of words would indicate a high quality of lexical representation, which would contribute to a larger vocabulary and in turn enhance reading comprehension (Cheng *et al.* 2016) [14].

2. The Present Study

The primary aim of the present study was to examine the interrelationships between morphological awareness, vocabulary knowledge, and reading comprehension in Chinese based on previous findings and models of reading comprehension. Correlation analysis and hierarchical multiple regression analysis were conducted to examine the unique contribution of morphological awareness and vocabulary knowledge to Chinese reading comprehension. Only kindergarten and second-grade children were examined in the previous study, and this paper took the study further by examining if the results can be generalized to students in more advanced elementary grades.

3. Methodology

3.1. Participants

A total of 76 students (40 boys and 36 girls) participated in the study (mean age = 9.45 years old; SD = 0.50). 13 students were excluded from the study because of incomplete data. The participants were recruited from a representative primary school in terms of the socio-economic background of the parents, teaching methods, and children's Chinese language performance. All participants were native Chinese speakers. Consent forms were obtained from parents and were tested in their schools by trained experimenters.

3.2. Measures and Procedure

3.2.1. Raven's Standard Progressive Matrice

To measure the reasoning ability and nonverbal intellectual ability of participants, the Revised Raven Standard Reasoning Test China City Edition chaired by Zhang and Wang (1987) [15] of Beijing Normal University was administered to assess the participants' reasoning ability and control for its potential influence on reading performance. 60 multiple choices were divided into five groups and are listed in order of difficulty. The participants were asked to identify the missing element and select a picture that perfectly completes the pattern from six to eight alternatives. Participants would get one point for one correct answer and the maximum score for this task was 60.

3.2.2. Morphological Awareness

Two aspects of morphological awareness were tested, including homophone awareness and homograph awareness.

In the homophone awareness task, three two-syllable Chinese words were orally presented to the children and the words had an identical syllable. The children were then asked to identify the two words that had a syllable sharing the same meaning and to circle the letters (A, B, or C) assigned to the words according to the presentation order. The position of the target syllables in the words and the order of correct answers were counterbalanced across items. Participants would get one point for one correct answer and the maximum score for this task was 15.

In the homograph awareness task, 20 pairs of two-syllable Chinese words were presented in print. Each pair of words had an identical syllable that may or may not share the same meaning. The children were instructed to tick or cross for each pair (tick for those who share the same meaning and cross for those who do not). Participants would get one point for one correct answer and the maximum score for this task was 20.

3.2.3. Vocabulary Knowledge

20 two-syllable Chinese words were presented in order of difficulty. The children were asked to choose the correct meaning for the words from four alternatives. Participants would get one point for one correct answer and the maximum score for this task was 20.

3.2.4. Reading Comprehension

A narrative passage was used to test children's reading comprehension ability. The narrative passage is the most common type of genre found in the Chinese language textbook for grade four students.

In the reading task, there were four types of questions for reading comprehension: 1) focus on and retrieve explicitly stated information and ideas, 2) make straightforward inferences, 3) interpret and integrate ideas and information; and 4) examine and evaluate the content, language, and textual elements. Type 1, 2, and 3 questions were asked in the form of multiple-choice questions. Type 4 questions were asked in an open-ended format since they solicit students' judgment and personal knowledge of the text topic and related issues. There were 20 questions for Type 1, 2, 3, and 4 and 2 questions for Type 4. Only Type 4 required written responses. Students were allowed to write Pinyin for unfamiliar characters and incorrect writing of characters was not penalized.

3.2.5. Procedure

The tasks were given to the children in a number of sessions and after each session participants had a short break before the next one came. All measures were administered to the children by trained testers who were familiar with testing children in these age groups.

4. Results and Discussion

4.1. Descriptive Statistics

Table 1 presents the general performance of 63 participants, covering means,

Table 1. Means, standard deviations, ranges skewness, and kurtosis for measures.

Variable	Mean	SD	Range	Skewness	Kurtosis
General reasoning ability	38.27	7.52	19 - 56	−0.21	−0.42
Homograph awareness	12.40	2.54	6 - 17	−0.09	−0.25
Homophone awareness	10.33	3.23	0 - 15	−1.07	1.08
Vocabulary knowledge	6.46	2.49	1 - 15	0.39	1.43
Reading comprehension	15.03	4.54	5 - 22	−0.69	−0.73

General reasoning ability was assessed by Raven's progressive matrices. N = 63.

standard deviations, range of scores, skewness, and kurtosis computed for the various measures in the current study. As the coefficients showed, the mean value of homograph awareness (M = 12.40) was higher than that of homophone awareness (M = 10.33), suggesting that homograph knowledge may be more difficult for fourth graders in acquiring morphological awareness.

4.2. Correlation Analysis

Correlations among all measures included in the study are represented in **Table 2**. First, as indicated in the table, both morphological tasks, *i.e.*, homophone awareness and homograph awareness task, were significantly correlated with reading comprehension scores among fourth-graders. Specifically, the magnitudes of correlations of the homophone awareness task with reading comprehension ($r = 0.536$, $p < 0.01$) were higher than that with homograph awareness, which, however, was also remarkable ($r = 0.284$, $p < 0.05$). Second, the correlations between the two dimensions of morphological awareness and vocabulary knowledge were also significant. Similarly, homophone awareness had a higher correlation ($r = 0.340$, $p < 0.01$) with vocabulary knowledge than homograph awareness ($r = 0.269$, $p < 0.05$).

However, the two aspects of morphological awareness measures were not significantly associated with one another, suggesting a low degree of commonality in the current study. And it is not surprising that vocabulary knowledge is saliently correlated with reading comprehension ($r = 0.385$, $p < 0.01$), underscoring a positive association between vocabulary knowledge and reading ability.

4.3. Regression Analysis

A series of hierarchical multiple regression analyses were conducted to examine the unique contribution of the three reading-related measures to reading comprehension in the present study. In this equation, we entered all measured variables in the order of hypothesized contribution to reading. General reasoning ability was entered first.

In Step 2, vocabulary knowledge was included. Previous studies with alphabetic languages showed children's vocabulary knowledge is a fundamental predictor of reading comprehension (Stanovich 1986) [12]. Finally, in step 3, both

Table 2. Correlations among all measures in this study.

	1	2	3	4	5
1) General reasoning ability	-				
2) Homograph awareness	0.111	-			
3) Homophone awareness	0.135	0.235	-		
4) Vocabulary knowledge	0.248*	0.269*	0.340**	-	
5) Reading comprehension	0.453**	0.284*	0.536**	0.385**	-

General reasoning ability was assessed by Raven's progressive matrices. For all variables, N = 63, *p < 0.05; **p < 0.01.

morphological awareness skills were included to test our hypothesis whether these abilities would predict unique variance in Chinese reading.

Hierarchical regression equations showing each step separately are displayed in Table 3. The table demonstrates that general reasoning ability was strongly predictive of reading comprehension. At the next step, vocabulary knowledge was surprisingly not a significant predictor of reading. In Step 3, both morphological awareness tasks were included but, interestingly, only homophone awareness was found to be significantly predictive of unique variance in reading comprehension.

Results of this study have demonstrated that the homophone awareness task designed to measure one aspect of children's morphological awareness was strongly associated with Chinese reading comprehension among fourth-graders while vocabulary knowledge was not as significant as a predictor after the effect of general reasoning ability was statistically controlled.

These results are solid evidence of the unique role of morphological awareness in early reading development among Chinese children, especially homophone awareness, in line with previous studies that have supported that sensitivity to spellings of homophones is associated with reading (Sprenger-Charolles *et al.* 1998) [16].

The great number of homophones in Chinese forces young Chinese readers to learn to distinguish among characters that have very different meanings but sound identical in speech from the very beginning. As Mcbride-Chang *et al.* (2003) [7] proposed in their study, the task of distinguishing homophones in Chinese requires effortful processing and may relate more strongly to the task of reading itself than in languages with few homophones such as Spanish or English.

However, contrary to the conclusions of other studies (Stanovich 1986) [12], vocabulary knowledge was not as significant as a predictor of reading after the effect of general reasoning ability was statistically controlled in the current study. This is possible because the evidence supporting the close relationship between vocabulary knowledge and reading comprehension mainly comes from studies where vocabulary knowledge was examined in the contexts of other reading-related cognitive skills (Cheng *et al.* 2016) [14].

Table 3. Hierarchical regression equations predicting reading comprehension.

Variable	β	t
General reasoning ability	0.35	3.55**
Vocabulary knowledge	0.12	1.16
Homophone awareness	0.42	4.05**
Homograph awareness	0.11	1.12

General reasoning ability was assessed by Raven's progressive matrices. For all variables, $N = 63$, $p < 0.05$; **$p < 0.01$.

5. Conclusions

This study is interested in finding out the interrelationships between morphological awareness, vocabulary knowledge, and reading comprehension among Chinese fourth graders. Results from correlation analysis and hierarchical multiple regression analyses showed that the two aspects of morphological awareness, *i.e.*, homophone awareness and homograph awareness, are closely associated with vocabulary knowledge and reading comprehension. Besides, homophone awareness was found to contribute unique variance to Children's reading comprehension.

The present study is, of course, limited in the questions it can answer about children's reading development. The primary limitation of the present study is that we constructed tasks of only two types of morphological awareness that we thought might be related to the reading of Chinese. It is possible that there are other aspects of morphological awareness that are also strong predictors of Chinese reading that have yet to be tested.

Despite the limitation, the present study has highlighted the importance of morphological awareness as a cognitive component of reading skills, independent of general reasoning ability, in young children. Preliminary results from the current study may facilitate among researchers and practitioners more ideas or tools for understanding interactions between morphological awareness skills and children's reading ability. For example, activities intended to foster homophone awareness could easily be incorporated into school curricula if they ultimately appear to have predictive value for reading development.

Conflicts of Interest

The author declares no conflicts of interest.

References

[1] Nithart, C., Demont, E., Metz-Lutz, M.N., *et al.* (2011) Early Contribution of Phonological Awareness and Later Influence of Phonological Memory throughout Reading Acquisition. *Journal of Research in Reading*, **34**, 346-363. https://doi.org/10.1111/j.1467-9817.2009.01427.x

[2] Blachman, B.A. (1984) Relationship of Rapid Naming Ability and Language Analysis Skills to Kindergarten and First-Grade Reading Achievement. *Journal of Educa-*

tional Psychology, **76**, 610-622. https://doi.org/10.1037/0022-0663.76.4.610

[3] Liu, Y., Georgiou, G.K., Zhang, Y., *et al.* (2017) Contribution of Cognitive and Linguistic Skills to Word-Reading Accuracy and Fluency in Chinese. *International Journal of Educational Research*, **82**, 75-90. https://doi.org/10.1016/j.ijer.2016.12.005

[4] Shu, H., McBride-Chang, C., Wu, S., *et al.* (2006) Understanding Chinese Developmental Dyslexia: Morphological Awareness as a Core Cognitive Construct. *Journal of Educational Psychology*, **98**, 122-133. https://doi.org/10.1037/0022-0663.98.1.122

[5] Cunningham, A.E. and Stanovich, K.E. (1997) Early Reading Acquisition and Its Relation to Reading Experience and Ability 10 Years Later. *Developmental Psychology*, **33**, 934-945. https://doi.org/10.1037/0012-1649.33.6.934

[6] Wysocki, K. and Jenkins, J.R. (1987) Deriving Word Meanings through Morphological Generalization. *Reading Research Quarterly*, **22**, 66-81. https://doi.org/10.2307/747721

[7] McBride-Chang, C., Wat, C.P., Shu, H., *et al.* (2003) Morphological Awareness Uniquely Predicts Young Children's Chinese Character Recognition. *Journal of Educational Psychology*, **95**, 743-751. https://doi.org/10.1037/0022-0663.95.4.743

[8] Carlisle, J.F. (2000) Awareness of the Structure and Meaning of Morphologically Complex Words: Impact on Reading. *Reading and Writing*, **12**, 169-190. https://doi.org/10.1023/A:1008131926604

[9] Li, H., Shu, H., McBride-Chang, C., *et al.* (2012) Chinese Children's Character Recognition: Visuo-Orthographic, Phonological Processing and Morphological Skills. *Journal of Research in Reading*, **35**, 287-307. https://doi.org/10.1111/j.1467-9817.2010.01460.x

[10] Emma, J., Currie, N.K., Tong, S.X., *et al.* (2021) The Relations between Morphological Awareness and Reading Comprehension in Beginner Readers to Young Adolescents. *Journal of Research in Reading*, **44**, 110-130. https://doi.org/10.1111/1467-9817.12316

[11] McBride-Chang, C., Cheung, H., Chow, B.W.Y., *et al.* (2006) Metalinguistic Skills and Vocabulary Knowledge in Chinese (L1) and English (L2). *Reading and Writing*, **19**, 695-716. https://doi.org/10.1007/s11145-005-5742-x

[12] Stanovich, K.E. (1986) Matthew Effects in Reading: Some Consequences of Individual Differences in the Acquisition of Literacy. *Reading Research Quarterly*, **21**, 360-407. https://doi.org/10.1177/0022057409189001-204

[13] Richter, T., Isberner, M., Naumann, J., *et al.* (2013) Lexical Quality and Reading Comprehension in Primary School Children. *Scientific Studies of Reading*, **17**, 415-434. https://doi.org/10.1093/deafed/ent024

[14] Cheng, Y., Zhang, J., Wu, X., *et al.* (2016) Cross-Lagged Relationships between Morphological Awareness and Reading Comprehension among Chinese Children. *Frontiers in Psychology*, **7**, Article 1379. https://doi.org/10.3389/fpsyg.2016.01379

[15] Zhang, H.C. and Wang, X.P. (1985) Revised Raven Standard Reasoning Test (China City Edition). Beijing Normal University, Beijing.

[16] Sprenger-Charolles, L., Siegel, L.S. and Bechennec, D. (1998) Phonological Mediation and Semantic and Orthographic Factors in Silent Reading in French. *Scientific Studies of Reading*, **2**, 3-29.