RedWhitepress https://series.gci.or.id

Global Conferences Series:
Social Sciences, Education and Humanities (GCSSSEH), Volume 4, 2020
International Conference on Special Education In South East Asia Region 10th Series 2020
DOI: https://doi.org/10.32698/GCS-04259

Development of Print Awareness of Hearing-Impaired Young Children in China

Jing Song[a], Yuki Ishida[a], Inho Chung[b]

[a]Graduate School of Comprehensive Human Sciences, University of Tsukuba, Japan
[b]Faculty of Human Sciences, University of Tsukuba, Japan
1-1-1 Tennodai, Tsukuba, Ibaraki, Japan
E-mail: s1821372@s.tsukuba.ac.jp

Abstract: The purpose of this study was to examine experimentally the developmental changes and characteristics on print awareness of hearing-impaired young children in China through comparison with hearing young children of the same age. It was conducted a character consciousness measurement task on judging whether the presented stimulus was a character or not for 67 hearing-impaired young children and 45 hearing young children aged 3 to 5 years in China. As a result, hearing young children showed an increase in the score of the print awareness task among all ages, and that print awareness improved with development. Hearing-impaired young children were suggested to have significantly improved print awareness between the ages of 4 and 5 due to the increased score of the print awareness task between the ages of 3 and 5 and between the ages of 4 and 5. From this result, it was clarified that even hearing-impaired young children at the age of three years before receiving formal literacy education can recognize characters to some extent, and that the print awareness develops up to the age of five. From this study, it is suggested that hearing-impaired young children have a slight delay in the development of print awareness compared to hearing young children of the same age. There is a significant difference from hearing young children as the age increased, indicating that print awareness of hearing-impaired young children develops more slowly than hearing young children.

Keywords; development of print awareness, hearing-impaired children, China

INTRODUCTION

In language acquisition, early childhood is the time to learn spoken language, and it is also the time when emerges emergent literacy. Emergent Literacy refers to the cognitive ability that occurs prior to full-scale read and writing, and that development is said to occur embedded in social relationships in everyday life（McLane & McNamee, 1990）. Emergent literacy include speech language skills (vocabulary, syntax), phonological processing (phonological awareness, phonological memory, phonological encoding), and print awareness (letter knowledge, alphabet knowledge, concept of print)（Whitehurst & Lonigan, 1998）. According to Scarborough（2001）, phonological processing and print awareness cooperate to support word decoding and spelling, while oral language skills cooperate to support understanding and conception. Meta-analysis study also suggests that these skills (spoken language, phonological processing, print awareness) are moderately to strongly correlated with elementary school children's reading, and spelling skills（National Early Literacy Panel, 2008）. Thus, it is clear that the development of emergent literacy has a great influence on elementary school student's literacy, and research is being conducted focusing on the sub-regions of the required ability for read and writing.

Hearing-impairment not only makes it difficult to hear sounds and voices, but also affects overall language development. In studies on reading and writing in hearing-impaired children, various findings have been obtained at the word, sentence, and reading comprehension. However, there is not much research on emergent literacy, which is the stage before full-scale read and writing. In particular, despite being one of the key factors

in early reading and writing skills, compared to spoken language ability and phonological awareness, few experimental studies have focused on print awareness.

Print awareness is a comprehensive term, such as knowledge of characters, the structure of text, the understanding of the interaction between spoken and written language, and is defined as awareness of the concept of written language and the form and function of written language（Justice & Ezell, 2001）. Studies of print awareness in hearing-impaired children suggest that print awareness develops in the same way as hearing children（Ambrose & Eisenberg, 2012; Easterbrooks, Lederberg, Miller, Bergeron, & Connor, 2008; Werfel, 2017; Werfel, Lund, & Schuele, 2015）. Such studies are considered to be effective knowledges in examining measures aimed at improving read and writing ability in children with hearing impairments.

However, all the knowledges so far are based on previous studies for English-speaking countries. Due to differences in linguistic features and cultural background, children's preparations for early language learning also depend on the language environment. English is a phonogram, and phonological awareness is the most important predictor of a children's literacy development, whereas Chinese does not have a strict correspondence between letters and sounds and the emphasis is on visual ability over spoken language ability. Given the great differences between English and Chinese, it is necessary to be cautious in adapting these studies as they are, but study of children's print awareness in a Chinese cultural background is relatively few.

Studying the print awareness of hearing-impaired young children is considered of great significance in providing foundation data on literacy acquisition and development. Therefore, this study examines the print awareness of hearing-impaired young children in China. When assessing Chinese print awareness, three important areas are identified: understanding of character functions, attention to characters, and understanding of character forms（Liu, Hong, Feng, Li, & Pan, 2019）. The purpose of this study was to focus on understanding of character forms in print awareness, and to examine the developmental changes in understanding of character forms of hearing-impaired young children through comparison with hearing children of the same age.

METHOD

1. Participants：67 hearing-impaired young children aged 3 to 5（3 years old: 21 people, 4 years old: 22 people, 5 years old: 24 people）who are enrolled in a hearing-impaired rehabilitation center providing inclusive education in Gansu, China, and 45 hearing young children aged 3 to 5（3 years old: 15 people, 4 years old: 15 people, 5 years old: 15 people）who are enrolled in the same center.

2. Task：This study was use a modified version of "Preschool Children's Print Awareness measurement material"（Lai, 2013）. This material can measure the level of development of print awareness, including young children's awareness of the basic morphological features and the internal structure of Kanji. Using this material, a character determination task was performed to determine whether the presented stimulus was a character. In order to measure the development level of print awareness, based on previous studies stimuli were classified into five components（Table 1）.

3. Procedure：The implementer randomly presented one card (8 x 8 cm) in which a Chinese character or a non-character was written, and children were asked to determine whether the task presented to was a letter. The experiment was conducted from early June to early July 2019.

4. Analysis：The average value and standard deviation of the total score of the character determination task and the scores of the lower items for each of the five categories were calculated. These scores were used to comparison of hearing-impaired young children with different ages and comparison with hearing young children of the same age.

5. Research ethics：The purpose and content of the experiment and the handling of personal information were explained to the director of the rehabilitation center and guardians, and the consent was obtained by signing the written form.

FINDING AND DISCUSSION

1 . Development of print awareness in hearing-impaired young children

The purpose of this study is to elucidate the development of print awareness in hearing-impaired young children and the characteristics of print awareness of hearing-impaired young children through comparison with hearing young children. The total score of the character determination task for each age in hearing-impaired and hearing young children was calculated, and a Two-way ANOVA was performed. As a result was observed significant main effect of factor of disability（$F(1, 106)=20.27$, $p<.01$）and age（$F(2, 106)=37.24$, $p<.01$）, and the interaction was observed marginally significant differences（$F(2, 106)=2.51$, $p<.10$）.

Table 1 Sub-components of The Character Determination Task

Component	Measurement content	Stimulation
Word shape（12 tasks）	Measure awareness of basic morphological features of Kanji	
Spatial formats（12 tasks）	Measure awareness that Kanji are closely connected blocks	
Radical knowledge（18 tasks）	Measure identification to whether parts used in Kanji combination actually exist	
Orthography（24 tasks）	Measure of whether parts can be composed of Kanji according to specific rules	
Kanji（30 tasks）	Measure whether the correct Kanji can be recognized（Kanji used in Chinese language teaching materials for first and second graders in elementary school）	

Because marginally significant differences were observed in the interactions, a simple main effects analysis was performed. With respect to the disability factor, the main effect was observed in both hearing-impaired and hearing young children. Hearing-impaired young children showed significant differences between 3-year-olds and 5-year-olds（$p<.01$）, 4-year-olds and 5-year-olds（$p<.01$）, and the hearing young children showed significant differences between all ages of 3-year-olds and 4-year-olds（$p<.05$）, 3-year-olds and 5-year-olds（$p<.01$）, 4-year-olds and 5-year-olds（$p<.01$）. From this, it was elucidated that print awareness of hearing young children develops with increasing age. On the other hand, it was suggested that hearing-impaired young children develop the character consciousness mainly from 4 to 5 years of age, and that they develop more slowly than hearing young children. Regarding the age factor, the main effect was observed in 4-year-olds and 5-year-olds, and in both cases, hearing young children scored higher than hearing-impaired young children（$p<.01$）. This suggests that, from the age of four, hearing-impaired young children have lower print awareness than hearing young children. Although it has been reported that hearing-impaired children have the same results as those of hearing children in terms of the knowledge of letter or correspondence between letters and sounds, but conceptual part of character consciousness performed lower and development tended to be delayed than hearing children.

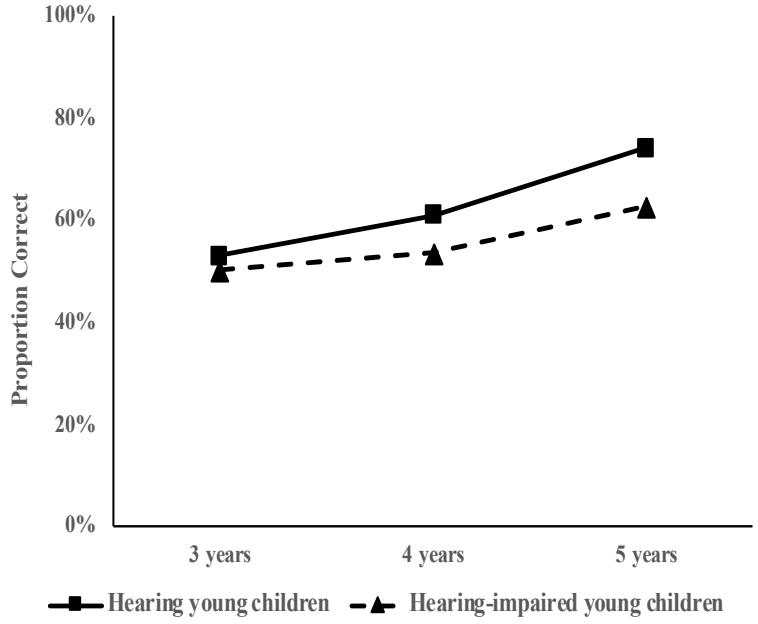

Figure 1 Total Score of Character Determination Task

The development of print awareness has already been observed in 3-year-olds and has been reported to develop from younger to older children（Hiebert, 1981; Imai, 1982; Imai & Morita, 2001）. This study suggests that hearing-impaired children, as well as hearing children, can recognize letters to some extent from the age of 3 and develop their print awareness up to the age of 5, regardless of formal literacy education.

This study showed a difference from hearing young children after 4-years-olds of age, suggesting that hearing-impaired young children's print awarenesss develop lowly compared to hearing young children. This result differs from previous studies in English-speaking countries that reported that hearing-impaired children develop print awareness as well as hearing children（Ambrose & Eisenberg, 2012; Easterbrooks, et al., 2008）. Although it has been reported that hearing-impaired children have the same results as those of hearing children in terms of the knowledge of letter and correspondence between letters and sounds, but conceptual part of character consciousness performed lower and development tended to be delayed than hearing children（Werfel, 2017; Werfel, et. al., 2015）. These knowledges suggest that it is possible that Kanji with high abstraction require conceptual of characters from the stage of print awareness.

２. Characteristic of developing print awareness

It considers about development of sub-component such as "shape rules", "spatial arrangement", "elementary knowledge", "orthography" and "kanji".

(1) Word shape

The word shape scores of the character determination task for each age in hearing-impaired children and hearing children was calculated, and a Two-way ANOVA was performed. As a result was observed significant the main effect of age（$F(2, 106)=12.50$, $p<.01$）, but disability（$F(1, 106)=1.20$, *n.s.*）and interaction（$F(2, 106)=0.13$, *n.s.*）did not significant difference. Because a significant difference was observed in the main effect of age, multiple comparisons were performed by Bonferroni's method. As a result the showed significant differences between 3-year-olds and 4-year-olds, 3-year-olds and 5-year-olds（$p<.01$）.

(2) Spatial formats

The spatial formats scores of the character determination task for each age in hearing-impaired children and hearing children was calculated, and a Two-way ANOVA was performed. As a result were observed significant the main effect of disability（$F(1, 106)=9.11$, $p<.01$）and age（$F(2, 106)=19.97$,

p＜.01）, but interaction did not significant difference（F(2, 106)＝1.83, n.s.）. Because a significant difference was observed in the main effect of age, multiple comparisons were performed by Bonferroni's method. As a result the showed significant differences between 3-year-olds and 5-year-olds, 4-year-olds and 5-year-olds（p＜.01）. In the comparison between the groups, showed significant for hearing children higher than hearing-impaired children（p＜.01）

(3) Radical knowledge

The radical knowledge scores of the character determination task for each age in hearing-impaired children and hearing children was calculated, and a Two-way ANOVA was performed. As a result was observed significant main effect of factor of disability（F(1, 106)＝11.60, p＜.01）and age（F(2, 106)＝21.12, p＜.01）, and the interaction was also observed significant differences（F(2, 106)＝4.07, p＜.05）.

Because significant differences were observed in the interactions, a simple main effects analysis was performed. With respect to the disability factor, the main effect was observed in both hearing-impaired children and hearing children. Hearing-impaired children showed significant differences between 3-year-olds and 5-year-olds（p＜.05）, and the hearing children showed significant differences between 3-year-olds and 5-year-olds, 4-year-olds and 5-year-olds（p＜.01）. Regarding the age factor, the main effect was observed in 5-year-olds, and, hearing children scored higher than hearing-impaired children（p＜.01）.

(4) Orthography

The orthography scores of the character determination task for each age in hearing-impaired children and hearing children was calculated, and a Two-way ANOVA was performed. As a result were observed significant the main effect of disability（F(1, 106)＝8.87, p＜.01）and age（F(2, 106)＝13.68, p＜.01）, but interaction did not significant difference（F(2, 106)＝0.67, n.s.）. Because a significant difference was observed in the main effect of age, multiple comparisons were performed by Bonferroni's method. As a result the showed significant differences between 3-year-olds and 5-year-olds, 4-year-olds and 5-year-olds（p＜.01）. In the comparison between the groups, showed significant for hearing children higher than hearing-impaired children（p＜.01）.

(5) Kanji

The Kanji scores of the character determination task for each age in hearing-impaired children and hearing children was calculated, and a Two-way ANOVA was performed. As a result were observed significant the main effect of disability（F(1, 106)＝11.60, p＜.01）and age（F(2, 106)＝7.51, p＜.01）, but interaction did not significant difference（F(2, 106)＝0.76, n.s.）. Because a significant difference was observed in the main effect of age, multiple comparisons were performed by Bonferroni's method. As a result the showed significant differences between 3-year-olds and 5-year-olds（p＜.01）. In the comparison between the groups, showed significant for hearing children higher than hearing-impaired children（p＜.01）.

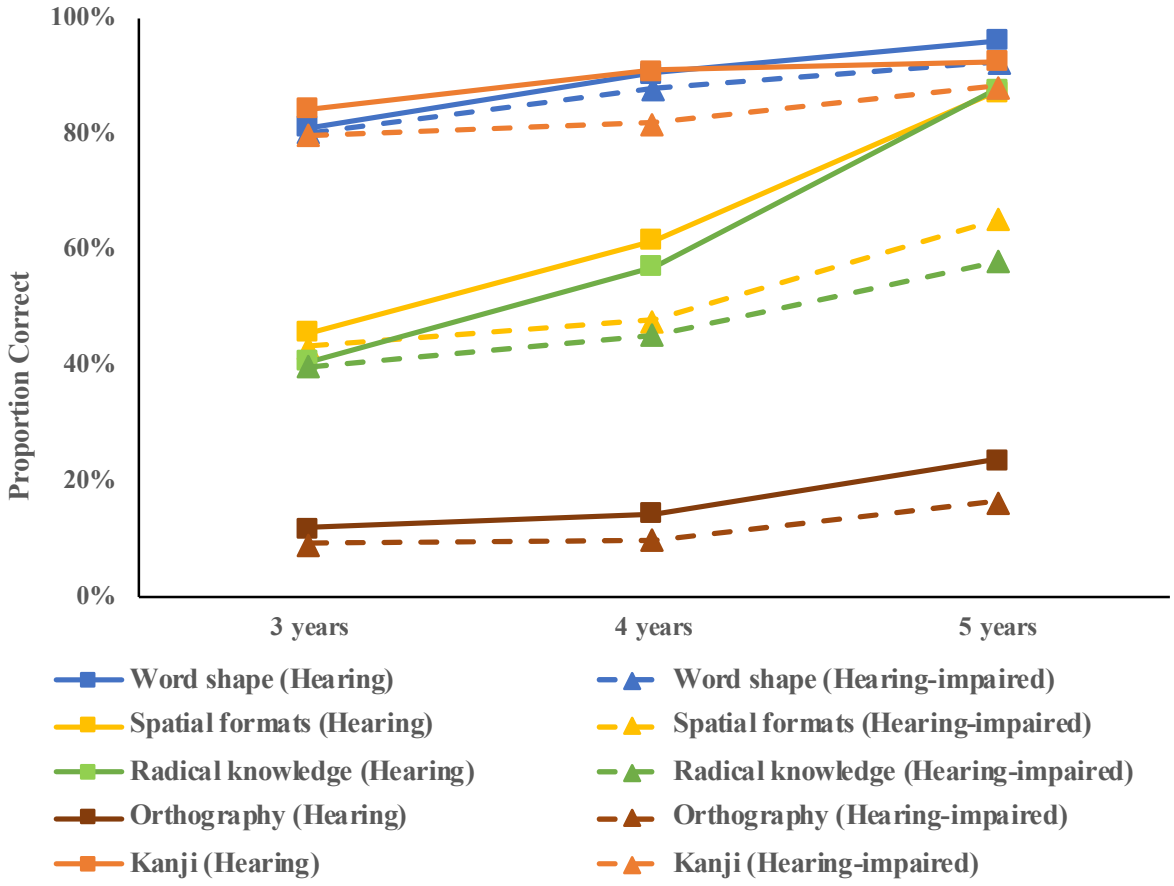

Figure 2 Sub-component Score of Character Determination Task

From subcomponent results, showed no difference in "word shape" scores, suggesting that hearing-impaired children develop at the same level as hearing children between 3 and 4 years of age. On the other hand, in "spatial format", "radical knowledge", and "orthography", both hearing-impaired and hearing-impaired children develop between 4 and 5 years of age, but the hearing-impaired children suggested to grow slower than the hearing children. In recognition of "Kanji", development was observed from 3 years of age, as with hearing children, suggesting that hearing-impaired children tend to be delayed compared to hearing children.

It has been suggested that infants develop in steps in the process of acquiring print awareness. For Chinese character's print awareness, it has been suggested that children develop their print awareness in stages（Liu, 2012）: Stage 1 "the whole shape processing stage" that the overall shape of the Chinese character can be understood, Stage 2 "the partial construction processing stage" that Chinese character can be understood as closely connected blocks, and whether parts can be used in Chinese characters, Stage 3 "orthographic rules processing stages" that it is possible orthographic rules such as correct combinations can be understood.

The results of this study suggest that hearing-impaired children also have a developmental process in which print awareness deepens from "whole" to "parts", similar to suggestions in previous studies. However, the analysis of sub-component, it is suggested that the development of "spatial formats" and "radical knowledge" tends to be delayed as compared with hearing children, which is considered to be a one factor of the reason for the slow development of print awareness. "Spatial formats" and "radical knowledge" are considered to be the partial construction processing stage, and for their development is seemed that understanding the concept of characters is indispensable.

As pointed out in previous studies（Werfel, 2017; Werfel, et. al., 2015）, since the conceptual part of print awareness in hearing-impaired children tend to develop slowly, it is possible that the weakness in the

concept part and the functional of the character had an effect. In the future, in addition to a comprehensive discussion of print awareness, it is also necessary to consider the relationship between print awareness and individual cognitive ability, and how print awareness affects the development of literacy.

DAFTAR RUJUKAN

Ambrose S., Fey M., & Eisenberg L.（2012）Phonological awareness and print knowledge of preschool children with cochlear implants. *Journal of Speech, Language, and Hearing Research*, 55, 811–823.

Easterbrooks S., Lederberg A., Miller E., Bergeron J., & Connor C. M.（2008）Emergent literacy skills during early childhood in children with hearing loss: Strengths and weaknesses. *The Volta Review*, 108, 91–114.

Hiebert，E．H．（1981）Deve1opmental patterns and inter-relationships of preschool children's print awareness. *Reading Research Quarterly*，16，236-260．

Imai, Y.（1982）Development of print awareness in preschool children．*Departmental Bulletin Paper of Education Research Institute of Nara Education University*，18，109-116．

Imai, Y. & Morita, T.（2001）Comparative research on the print awareness of young japanese and south korean children. *The Science of Reading*, 45(2)，52-59.

Justice, L.M. & Ezell, H.K.（2001）Word and print awareness in 4-year-old children. *Child Language Teaching and Therapy*, 17, 207-225.

Lai, K.（2013）*The effect of different book reading sharing methods on the development of print knowledge in young children - Evidence from eye movements in -4-5-year-olds* -. Master dissertation, Tianjin Normal University.

Liu, N.（2012）*A study on the development of preschool children's writing awareness*. Master dissertation, Tianjin Normal University.

Liu, X., Hong, X., Feng, W., Li, X., Wang, X., & Pan, Y.（2019）*Research on the Development and Education of 0-3-Year-Old Children in China*. Springer-Verlag Berlin Heidelberg.

McLane, J. & McNamee, G.（1990）*Early literacy*. Cambridge: Harvard University Press.

National Early Literacy Panel.（2008）*Developing early literacy: Report of the National Early Literacy Panel*. Washington, DC: National Institute for Literacy.

Scarborough, H.（2001）Connecting early language and literacy to later reading (dis) abilities: Evidence, theory, and practice. In Neuman S. & Dickinson D.（Eds.）, *Handbook for research in early literacy.* New York, NY: Guilford Press.

Werfel K.（2017）Emergent literacy skills in preschool children with hearing loss who use spoken language: Initial findings from the early language and literacy acquisition (ELLA) study. *Language, Speech, and Hearing Services in Schools*, 48, 249-259.

Werfel K., Lund E., & Schuele C. M.（2015） Print knowledge of preschool children with hearing loss. *Communication Disorders Quarterly*, 36, 107–111.

Whitehurst, G. J. & Lonigan, C. J.（1998） Child development and emergent literacy. *Child Development*, 69, 848–872.