

Opening remarks: “For Whom the Bell Tolls”

Initially, ICPEAL2012 was planned to be ICPEAL2011. Unfortunately, ICPEAL2011 had to be postponed due to the greatest earthquake within recorded history that occurred at 2:46 p.m. on the 11th of March, 2011. This once in a millennium earthquake has been named “The Great Eastern Japan Earthquake”.

The sequence of odd numbers making up 3.11.2011 are remembered as a burden of great sorrow, while the sequence of even numbers in 2:46 record a moment of devastating disruption that propelled a country of peace and tranquility to the edge of chaos. Continuing to live through odd and even days, we are constantly compelled to bridge the discrepancies between memory and record.

It was in the depths of this heavy tragedy that we started to design a symbol for ICPEAL2012. As the abbreviation for Processing on East Asian Languages, PEAL, brings to mind the peal of the temple bell, we had no hesitation in selecting the shape of a bell as the main motif for ICPEAL2012. Moreover, the bell shape is filled mainly with kanji related to “language, words” (語) and “speech” (話). Accordingly, most of these *word*-related kanji consist of the radical (言) meaning “to say” on the left side. One exception is “belief” (信), where the reversed configuration of the radicals may distinguish it from other forms of verbal behavior.

“Every thing reminds you of something” is the title of an unpublished novel by Ernest Hemingway. The finished poster for ICPEAL2012 reminded me of the words “For whom the bell tolls”. This is also a title of a novel by Hemingway. He took these words from MEDITATION XVII written by the British poet, John Donne, who was active from the sixteenth to the seventeenth centuries.

John Donne started Meditation XVII with the following words:

*Now this bell tolling softly for another,
says to me, Thou must die.*

PERCHANCE he for whom this bell tolls may be so ill as that he knows not it tolls for him. And perchance I may think myself so much better than I am, as that they who are about me, and see my state, may have caused it to toll for me, and I know not that.

And, finally, he closes with these well-known words.

No man is an island. entire of itself; every man is a piece of the continent, a part of the main; if a clod be washed away by the sea, Europe is the less, as well as if a promontory were, as well as if a manor of thy friend's or of thine own were; any man's death diminishes me, because I am involved in mankind, and therefore never send to know for whom the bell tolls; it tolls for thee.

Citing from John Donne's Meditation XVII may seem somewhat inappropriate as the opening remarks to the glorious international conference that is hopefully to come. However, as we meditate on the path leading to the present conference, we must pause to reflect on why his words have been passed down to the present day. Certainly we cannot simply replace his reference to Europe with one to Asia, still his words undoubtedly extend beyond a specific religion or communion and they convey to us a universal message that may have become forgotten. In our everyday lives, we stand shoulder to shoulder with others in happiness and unhappiness.

Fortunately, at this time, approximately 90 individuals have already registered for ICPEAL2012, and, we are still expecting in excess of 100 people to attend the conference. Accordingly, our current intention is to host ICPEAL 2012 with the planned program, because this is a purely academic and scientific endeavor that is separate from natural disasters and political shifts. Having barely entered into the new millennium, wisdom tells us to proceed with holding the ICPEAL 2012 conference in Nagoya. Perhaps the world will still recall how the Japanese people continued with their lives in the aftermath of last year's earthquake and tsunami disasters. Some people remarked that disasters such as that tsunami only occur once per millennium. We know that the true value of the individual is only revealed in their behavior during times of hardship.

The present difficulties represent a kind of test of whether we are really worthy to pursue lives within academia. We truly hope that everyone can respond positively by committing to attend ICPEAL 2012. We believe the ICPEAL 2012 will be fruitful all of you who can attend and also for those who cannot for various reasons.

Yours sincerely

Chair of the ICPEAL 2012

Hirofumi Saito

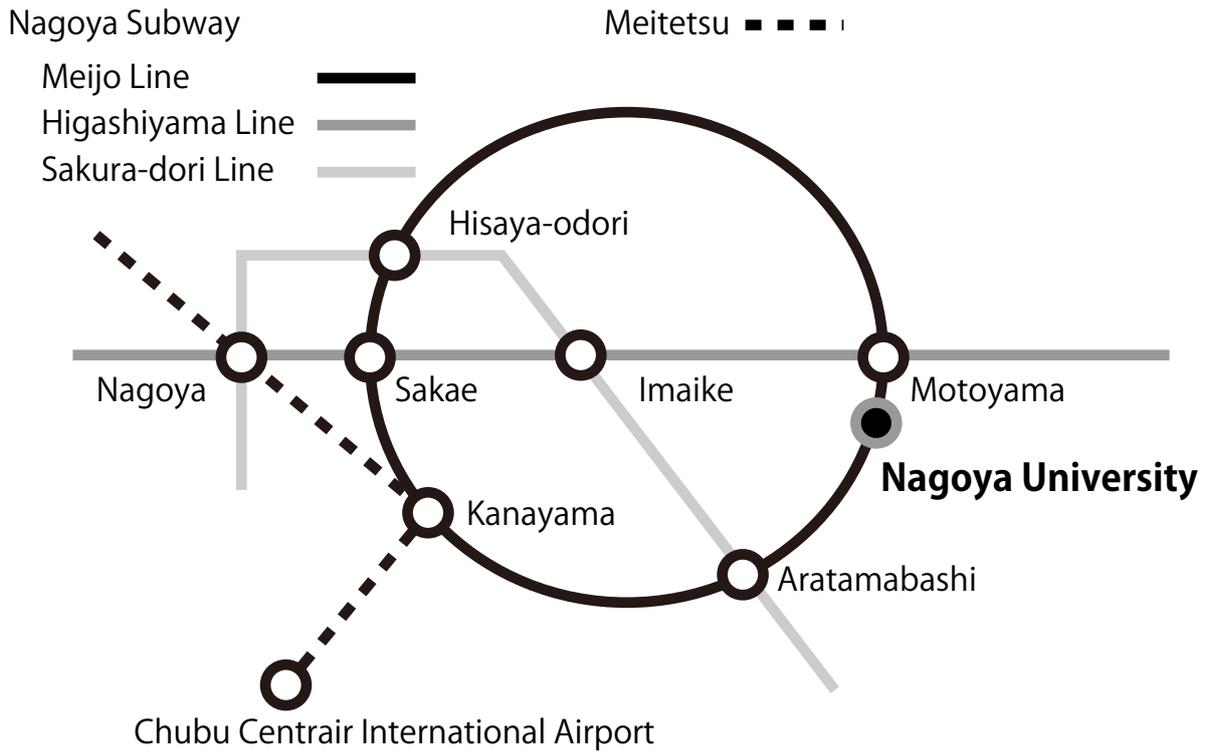
Introduction

The International Conference on the Processing of East Asian Languages (ICPEAL), which has been held every two years since 1978, provides opportunities for researchers to disseminate new research findings, to exchange new ideas, to develop new paradigms, and, consequently, to advance the cognitive study of East Asian languages.

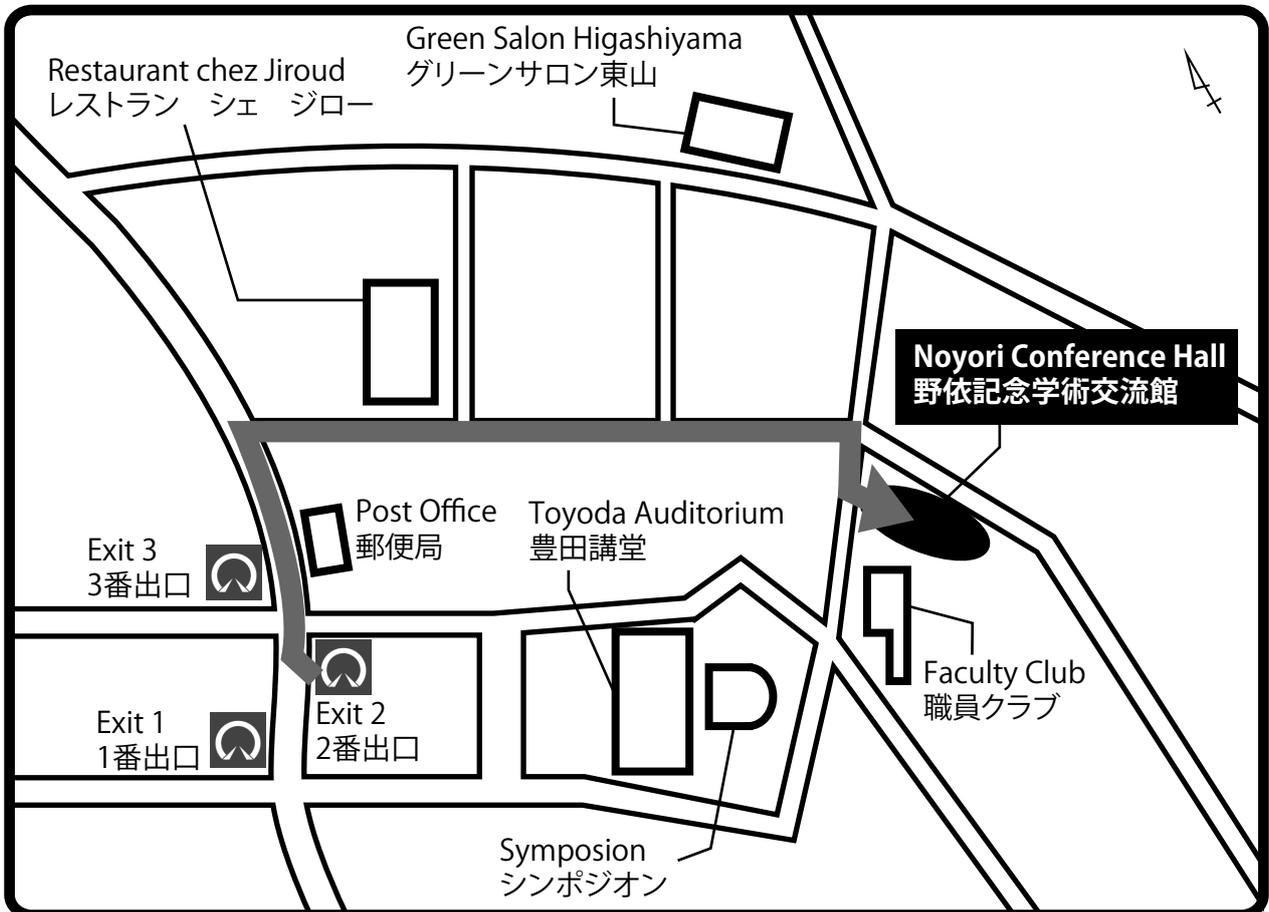
The 14th ICPEAL will take place on the 26th-28th, October, 2012 at Nagoya University. The conference will include keynote addresses, invited symposiums, panel symposiums, and poster sessions. The conference is being organized by the Department of Cognitive Informatics, Graduate School of Information Science at Nagoya University.

The 14th ICPEAL seeks to bring together a wide range of researchers who are interested in language and human information processing systems. Consistent with the goal of broadening the perspectives on language processing, the 2012 ICPEAL will also host a symposium on Brain and Communication, which has a two-fold significance. In addition to acknowledging the rapid expansion of this research area, it reflects a desire to bring together a diverse range of excellent researchers (brains) interested in communicative behavior to actively interact with researchers of East Asian languages.

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Abstracts

Imagoro as a counterpart identifier of the utterance time

Yukinori TAKUBO

Kyoto University

This presentation is an attempt to give a discourse management account of a deictic time noun *imagoro* ('now'+time identifier'). It is claimed that *imagoro* serves to identify the counterpart of *ima* (now) in a parallel mental space. We first examine the uses of *imagoro* in cases where it combines with periodic deictic time nouns such as *asita* (tomorrow), *rainen* (next year), e.g. *asita no imagoro* (tomorrow about this time), *rainen no imagoro* (next year about this time). We argue that the use of *imagoro* in these cases are licensed by the presence of a parallel temporal structure definable on a periodic time scale. For *imagoro* to get the value corresponding to the utterance time in the counterpart space. The counterpart space must contain a temporal structure parallel to the base space, accounting for the restriction of *imagoro* to periodic time nouns. It will further be demonstrated that the licensing conditions based on the parallel structure can be extended to the cases of *imagoro* in modal structure and conditionals, suggesting the possibility that they also involve a parallel temporal structure.

Short bio of Professor Yukinori Takubo

Yukinori Takubo is Professor of Linguistics at Kyoto University, Japan. He received Doctor of Litt. in linguistics from Kyoto University. His research interests include generative syntax, pragmatics, discourse management theory, Mental Spaces, formal semantics, and the description and documentation of Ryukyuan languages, sister languages of Japanese.

His academic publications appeared, among others, in *Gengo Kenkyu*, *Journal of the Linguistic Society of Japan*, *Journal of Japanese Linguistics*, *Journal of Pragmatics* and *Ene*, *Journal of the Linguistic Society of Korea*. He has (co-)authored and (co-)edited fifteen books/book series/special issues of journals, including *Nihongo no Kozo: Suiron to Chisikikanri* (Structure of Japanese: Inference and Knowledge Management), *Nihongo Bunpou* (Basic Grammar of Japanese), *Shijishi* (Demonstratives), *Iwanami Series of Language Sciences*, *Gengo Kenkyu*, and *Journal of Semantics*.

He was editor-in-chief of *Gengo Kenkyu*, *Journal of the Linguistic Society of Japan*, the vice president of *Japan Cognitive Science Society* and is currently an executive board member of the *Society of Japanese Linguistics* and the *Society of Japanese Grammar*.

Prior to his current appointment he was an full-time visiting lecturer of *Dongguk University*, Korea, an Associate Professor of *Kobe University*, a Professor of *Kyushu University*. He has also taught at the *LSA institute* at the *University of California, Santa Barbara*, and was a *Fulbright Scholar in Residence* at *Carleton College*.

Modeling lexical processing with naive discrimination learning

R. Harald BAAYEN

University of Tübingen and University of Alberta

Introductory courses to linguistics describe the internal structure of words with the help of the theoretical notion of the morpheme, supposedly the minimal meaning bearing unit. However, this conception of the morpheme works well for only a small minority of languages, and most modern theories of morphology (e.g., realizational morphology, word and paradigm morphology) reject the notion of morpheme as a theoretical unit. However, the morpheme enjoys undiminished popularity in experimental research on lexical processing in psychology.

I will present a computational model for lexical processing, the naïve discriminative reader, that accounts for a wide range of experimental effects reported in the lexical processing literature for Indo-European languages such as English, Dutch, and Serbian. This model is "amorphous", in that it does not make use of morphemic representations. Instead, it maps orthographic units (letter unigrams and bigrams) directly onto meanings. The model's connection strengths are estimated from word trigrams observed in large corpora, using the equilibrium equations of the Rescorla-Wagner equations.

A phenomenon that challenges traditional accounts of morphological processing, but that emerges naturally in the naive discriminative reader model, is a paradigmatic prototypicality effect: Words that make atypical use of case endings (Serbian) or prepositions (English) take longer to read, even when presented in isolation. This effect fits well with the theory of word and paradigm morphology.

In my presentation, I will discuss experimental results indicating that a similar paradigmatic effect is also present in Chinese, providing further support for the importance of paradigmatic relations in lexical processing. In addition, experimental results on the reading of Vietnamese compounds will be presented. I will show, using modeling with naive discrimination learning, that, at least in visual comprehension of two-syllable compounds, Vietnamese is indeed a truly isolating language.

Baayen, R. H., Milin, P., Filipovic Durdevic, D., Hendrix, P. and Marelli, M. (2011), An amorphous model for morphological processing in visual comprehension based on naive discriminative learning. *Psychological Review*, 118, 438-482.

Short bio of Professor R. Harald Baayen

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July 1980 Teaching Assistant, Summer Institute of Linguistics, U.K.

1985 – 1988 Teaching Fellow, Free University, Amsterdam, The Netherlands

1989 – 1990 Postdoctoral Fellow, Free University, Amsterdam, The Netherlands

1990 – 1998 Member of Scientific Staff, Max-Planck-Institut für Psycholinguistik, The Netherlands

1998 – 2005 Postdoctoral Fellow, Radboud University Nijmegen, The Netherlands

2006 – 2007 Professor of Quantitative Linguistics, Radboud University Nijmegen, The Netherlands

July 2007 – August 2011 Professor of Quantitative Linguistics, University of Alberta, Edmonton, Canada

September 2011 – Professor of Quantitative Linguistics, Eberhard Karls Universität, Tübingen, Germany

Awards:

(1998) PIONIER career advancement award from the Netherlands Organization for Scientific Research (NWO)

(2004) Erskine Fellowship awarded by the University of Canterbury, Christchurch, New Zealand

(2005) KNAW Muller chair awarded by the Royal Netherlands Academy of Arts and Sciences

(2011) Alexander von Humboldt research award

(2012) Member of the Academia Europaea

Top three publications:

Baayen, R. H., Milin, P., Filipovic Durdevic, D., Hendrix, P. and Marelli, M. (2011). An amorphous model for morphological processing in visual comprehension based on naive discriminative learning. *Psychological Review*, 118, 438–482.

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Human communication:

A deeply interactive social action

Bruno GALANTUCCI

Yeshiva University, Haskins Laboratory

In this talk I will claim that, in order to properly understand human communication, one must study it within the context of rich social interactions. I will describe two lines of evidence supporting the claim.

At a behavioral level, I will summarize a few recent studies on the emergence of novel forms of non-verbal communication. These studies provide new insights into human communication, exposing its deeply interactive origins. Intriguingly, the findings of these studies can be connected to classic behavioral findings concerning verbal communication.

At a neural level, I will summarize two fMRI studies. These studies use different methods and focus on different forms of communication—verbal in one case and non-verbal in the other. However, they reach the same conclusion: The investigation of the neural underpinnings of human communication assumes a whole new meaning when it is done within the context of realistic interactions.

Short bio of Professor Bruno Galantucci

Bruno Galantucci received a PhD in Cognitive Science from the University of Padua and a PhD in Experimental Psychology from the University of Connecticut. He is currently Associate Professor in the Department of Psychology of Yeshiva University, where he directs the Laboratory of Experimental Semiotics. He is also a Research Affiliate at the Haskins Laboratories, where he has conducted research on the psychology of language, including speech perception, word recognition, and sentence processing, and has been a Research Fellow at ZIF (University of Bielefeld), where he was involved in research on embodied communication. In the last few years, he has focused on studying experimentally how humans establish and develop novel forms of communication, contributing to the foundation of the field of Experimental Semiotics.

Bruno Galantucci has published in a number of peer-reviewed journals including *Cognitive Science*, *Journal of Experimental Psychology*, *Plos ONE*, *Psychonomic Bulletin and Review*, and *Trends in Cognitive Sciences*.

He has served as associate editor of *Topics in Cognitive Science*, as guest editor of *Interaction Studies* (co-editing a special issue on

Experimental Semiotics), and he is currently on the editorial board of *Cognitive Semiotics*.

His current research interests include: Experimental Semiotics, Human Communication, Joint Action, Distributed Cognition, Social Cognition, Language, Speech Science.

Selected publications

- Galantucci, B. (2005). An experimental study of the emergence of human communication systems. *Cognitive Science*, 29(5), 737-767.
- Galantucci, B., Fowler, C. A., & Turvey, M. T. (2006). The motor theory of speech perception reviewed. *Psychonomic Bulletin & Review*, 13(3), 361-377.
- Galantucci, B. (2009). Experimental Semiotics: A new approach for studying communication as a form of joint action. *Topics in Cognitive Science*, 1(2), 393-410.
- Galantucci, B., & Garrod, S. (2011). Experimental semiotics: a review. *Frontiers in Human Neuroscience*, 5(11).
- Hasson, U. Ghazanfar, A. A., Galantucci, B., Garrod, S. & Keysers, C. (2012). Brain-to-brain coupling: A mechanism for creating and sharing a social world. *Trends in Cognitive Sciences*, 16(2), 114-121.

Perception-Action Systems Underlying Communication

Nobuhiro FURUYAMA

National Institute of Informatics

In this talk, I will review recent development in empirical and theoretical studies on motor coordination both at the intra- and inter-personal planes (including our own stuff) to draw implications to understanding embodied nature of human communication. In particular, I will discuss the possibilities and limits of the HKB model for communication studies, while discussing the contributions of the "social brains" to communication.

Short bio of Professor Nobuhiro Furuyama

Dr. Nobuhiro Furuyama is an associate professor at National Institute of Informatics, Research Organization of Information and Systems. He holds joint appointments with Department of Informatics, School of Multidisciplinary Sciences, the Graduate University for Advanced Studies, and Department of Computational Intelligence and Systems Science, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology as associate professor. He received his Ph.D. in psychology from the University of Chicago in 2001. His research interests include inter-personal and human-machine interaction from the viewpoint of ecological psychology. He is a director of International Society of Ecological Psychology, and Japanese Cognitive Science Society.

Language processing in Chinese:

Insights from behavioral and brain studies

Hsuan-Chih CHEN

The Chinese University of Hong Kong

Most research on language and cognition has been carried out using materials in English or other European languages, and only a small amount has been done in non-European languages. Because there are striking between-language differences, it is not self-evident that the same cognitive processes underlie the different languages. Thus, to build a genuinely comprehensive theory of language processing, it is important and useful to carry out cross-language research. The Chinese language, due to its distinctive structures, provides challenging opportunities to explore both language-specific processes and the universality of theories developed from the study of European languages. This lecture will review selected recent studies on processing Chinese and discuss their implications for the general understanding of human language processing.

Short bio of Professor Hsuan-Chih Chen

Hsuan-Chih Chen is Chair Professor of Psychology and Director of the Centre for Cognition and Brain Studies at the Chinese University of Hong Kong. He obtained his Ph.D. in cognitive psychology from the University of Kansas in 1982 and has since held visiting and honorary positions at several universities and academic institutions around the world. He has been serving as associate/consulting editor of several journals and is a regular reviewer for many international journals and national/regional funding agencies. His research interests include language processing in Chinese, bilingualism, and human cognition. Having published extensively on these topics in prominent psychology and neuroscience journals, he has also edited 15 related books.

http://cmsdev.itsc.cuhk.edu.hk/~joomla_psy/index.php/en/people/teaching-staff/11-people/137-chen-hsuan-chih

The Effect of Chinese Character Background on the Formation of Illusory Contour in Depth

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Illusory contour (IC) is derived as an emergent property from the appropriately aligned inducing elements, mostly through the effective arrangement of geometrical figures. The present study first demonstrates the formation of IC by taking Chinese character as inducing element and observes the behavior of IC under stereopsis. A set of stereo pairs were prepared in the following manners: (1) IC carved in the left and right images with positive or negative disparity on the same recognizable Chinese character in complete or reduced form (Version 1), (2) IC carved on two non-overlapping but complementary Chinese character halves in the left and right images respectively (Version 2). Control conditions were also designed to compare with the performance of IC under stereopsis. Some of the major findings are discussed as follows. Firstly, the effect of monocular interposition cue is the determining factor for the rising and sinking of IC in depth. For the two versions of preparation, it is easy to observe the rising of IC in depth. Contrastingly, it is very difficult to see the sinking of IC even the unambiguous disparity information was given. Secondly, the degree and direction of monocular occlusion may show significant impact on sinking in depth by manipulating randomization or transparency into the preparation of stereo pair. Putting a real, instead of illusory, and visible contour on the randomized and thus hidden Chinese character will result in a rise and sink in depth of the real contour, due to a significant reduction of monocular occlusion in the stereo pair. Similar observations of sinking were also found if the transparent contour is perceived as being put under the Chinese character or if the occlusion relationship is made ambiguous between the contour and the reduced-form Chinese character. Thirdly, a non-word substitution on Version 2 will prevent even the rising of IC in depth. Two non-overlapping but complementary Chinese character halves were each prepared in the left and right images of a stereo pair. The rising of IC is possible after a successful cognitive matching of the background character through the fusion of two non-overlapping but complementary halves. A rotation of 180 degrees for each segment in Version 2 was manipulated so that fusion for a meaningful character cannot be achieved by putting these two non-word halves together. Under this case, no such rising of IC may occur. A summary of these results may show a high-level modulatory effect on the low-level disparity computation. How specific can this effect be attributed to the properties of Chinese character remains to be seen.

ERP evidence for radical processing in Chinese character recognition

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Two event-related potential (ERP) experiments were conducted to investigate radical processing in Chinese character recognition. We adopted two different experimental tasks (i.e., lexical decision and delayed character naming) in these experiments. Several early ERP components (e.g., N100, P150, and/or P200) were found to be associated with radical frequency. These results suggest that radicals are processed at a relatively early stage in recognizing Chinese characters.

ERP correlates of orthographic decomposition in Chinese character recognition

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The majority of Chinese characters are compounds composed of two to more radical components (94%) with a handful of them composed by one radical component (6%). To the extent that the radical is an orthographic processing unit in the visual recognition of Chinese characters, the cost of character inversion or rotation on recognition performance should be the function of the number of radicals. In the current experiment, participants made lexical decisions as their ERPs were recorded. Character inversion resulted in larger increase in RTs and error rates for compound than simple characters. Simple and compound characters also varied in the rotation related negativity at 300-700ms (Heil, 2002; Wijers et al., 1989) recorded from parietal electrodes. For compound characters, inversion resulted in more negative going amplitudes at P3, but not P4. For simple characters, the inversion related negativity was significant at P4, but not at P3. Inversion did not bring forth negativity at 300-700 ms for pseudo compound characters or for faces. While simple characters could be processed as a whole by the RH (Wang, Kuo & Cheng, 2011), radicals were identified by the linguistically more adept LH as they were decomposed from a compound character to serve as an orthographic processing unit in Chinese character recognition.

Morpho-orthographic decomposition of radicals in Chinese character recognition

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We examined the nature of radical representations in Chinese character recognition using the repetition blindness (RB) paradigm. RB is the failure to report the second occurrence of a repeated item in rapid serial visual presentation. Yeh and Li (2004, *Brain and Language*) first reported the radical-RB effect for two Chinese characters that had a common radical; for example, 誠 and 諸, which were reported as 誠 and 者, with the repeated left radical 言 omitted. Here we further demonstrated robust radical-RB effects for both high- and low-frequency characters (Experiment 1), for both high- and low-combinability radicals (i.e., the number of characters containing a given radical, Experiment 2), and for both semantic and phonetic radicals (Experiments 1 and 2). These results suggest that radicals embedded in a character were decomposed and served as the lower-level orthographic input to access Chinese character representations. We went on to examine the position (left or right) and function (semantic or phonetic) representations of radicals in Chinese character recognition. The radical-RB effect was observed for repeated radicals in the same position and with the same function, while the RB magnitude was reduced when the repeated radicals were either in different positions or had different functions (Experiments 3 and 4). Further manipulations of transparency of semantic radicals and consistency of phonetic radicals revealed that neither factors influenced the RB magnitude. Nevertheless, semantically-related characters elicited a facilitatory priming effect, whereas homophones elicited an inhibitory effect (Experiments 5 and 6). Radical function is therefore likely to be represented in the connection network between orthographically-similar characters rather than in radical itself. We conclude that the decomposition of radicals in Chinese character processing is represented with its identity and position, which is comparable to the morpho-orthographic – rather than the morpho-semantic – decomposition in recent studies on English words (Davis & Rastle, 2010, *Psychonomic Bulletin & Review*).

A comparison of static versus dynamic input for the mental representation of event in Mandarin-speaking children

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An important fact about human language is that different forms can be used to refer to the same thing and different expressions can be formulated to describe the same event when they are situated in different contexts. The general principle is that speakers have to infer what the hearers know and based on this assumption they choose an appropriate form to refer to a particular object for hearers to identify the intended referent (Gundel, Hedberg, & Zacharski, 1993). The development of such capacity in children of course is an important question. The present study examined how children made use of different expressions when they were situated in different communication contexts. Two story retelling tasks, one with static input (Frog) and one with dynamic input (Pear) were administered to age 6 children who are native speakers of Chinese. In the Pear task, child participants were required to retell the story immediately after watching the Pear film (Chafe, 1975), with dynamic input available in child's mind. By contrast, in the Frog task, child participants, after listening to the Frog story (Mayer, 1969) along with looking at the story slideshow, retrieved the story with static input available in their mind. By comparing language samples elicited in these two tasks, we probed into how children introduce and refer to previously mentioned figures, a window for us to see how these events were represented mentally in children.

Our results showed that children used more relative clauses in Pear task in which dynamic information had been inputted before the retelling discourse. Subsequent analyses of the use of relative clauses in these two tasks revealed that grounding and humanness were two major factors affecting their syntactic choices of referring expressions, as proposed by Fox & Thompson (1990). We suggest that referring expressions are resultants of discourse participants' attention to information flow, even when the conversation is carried on in a controlled situation. Children chose specific linguistic forms to serve particular function in discourse, in alignment with the information they get from differing inputs.

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What is the Unit of Reading in Chinese?

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In many studies of word recognition in Chinese children, children are administered a reading task in which they have to read words or characters aloud. While words and characters are often one in the same, it is also the case that not all characters are words and the majority of Chinese words consist of two or more Chinese characters. In the present study, we asked a very simple question: Does the unit of reading matter in Chinese? This is a practically important question given differences across studies that treat character and word reading tests as tapping the same ability. The importance of morphological awareness in the form of lexical compounding for reading in some studies of Chinese children suggests that children make use of lexical compounding in word recognition. At the same time, in single character reading, such compounding skills are not necessary. Rather, good memorization or orthographic skills are required to have these characters memorized.

We will report here on a study of children’s performance on character reading when the character appears as a component within a word as compared to when the character appears alone. Participants were 69 Hong Kong Chinese children (35 girls) from three kindergartens of an average age of 67 months, 62 3rd grade children (30 girls) of an average age of 107.67 months, and 50 5th grade children (25 girls) of an average age of 134.18 months. Among other tasks, the children were asked to read both characters and 2-character words (60 characters and 41 2-character words for kindergartners; 98 single characters and 49 2-character words for the older children). Paired sample t-tests showed that across all three levels of children, their reading accuracy on the target characters was consistently significantly higher when these were embedded within whole words than when they were presented alone as single characters. For the third and fifth graders, we also found that children’s word-reading errors consisted of those that were unrelated (i.e., seemingly random), semantic (related to the meaning of the character, i.e., sharing the same radical with the original character), phonological (sounding similar to the correct character), and word-related (i.e., pronounced in a way that could make use of context with another character to form a sensible word). Across both character- and word-reading conditions, children consistently also made more phonological and word-related errors in the character, as compared to the word reading, conditions.

Taken together, these results indicate that character and word reading reinforce one another in the reading process in Chinese children. A model of character and word reading and their interaction will be presented.

Table 1 Paired sample t-tests of two reading tasks for children of three groups

| | character reading tasks | | t value |
|--------------|-------------------------|----------------------|---------|
| | in words | as single characters | |
| | <i>Mean (SE)</i> | <i>Mean (SE)</i> | |
| kindergarten | 31.68 (2.23) | 27.68 (2.12) | 7.77*** |
| 3rd grade | 87.58 (1.36) | 83.18 (1.46) | 6.94*** |
| 5th grade | 93.02 (1.14) | 89.02 (1.14) | 9.95*** |

* $p < .05$, ** $p < .01$, *** $p < .001$

The Role of Copying Skill in early Chinese Word Reading and Writing

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Copying, or visual-motor integration, skills have been found to play an influential role in children's in primary stage of learning to write in English. Moreover, rote learning of Chinese characters has been emphasized as the most dominant approach for children to learn to write in the initial learning stage across Chinese societies. As some researchers have suggested that Chinese learning may make use of an even greater variety of cognitive skills than does alphabetic scripts learning because of the visual complexity and nontransparent phonology of the script, copying skill may be one of the crucial skills for Chinese literacy. The basic writing units of Chinese characters are composed of strokes forming various shapes in a particular order to make radicals; producing them focuses on visual structure and configurations. Thus, the beginning learning of Chinese character recognition and writing requires mapping of a seemingly arbitrary visual pattern to a sound. Copying strategies also probably enable children to learn about the structural knowledge of Chinese characters implicitly first. Gradually, children can then acquire the position and function knowledge of radicals, and finally develop a complete set of Chinese orthographic knowledge. Moreover, reading and writing development are inextricably linked to each other, in that some underlying predictors of writing can also facilitate the development of reading. In this way, visual-motor integration may be of greater importance in Chinese word reading and writing. Such skills come into play when children are asked to perform a copying task.

Thus, in the present study I tested relations among reading and copying in Chinese children. Sixty-eight Hong Kong second graders were tested in our ongoing study. All the children were given tasks of copying unfamiliar prints (in Hebrew and Vietnamese), Chinese word recognition and dictation, nonverbal reasoning, phonological awareness, morphological awareness, vocabulary knowledge and RAN in order to examine the unique role of copying skills in beginning Chinese word reading and writing. The results showed "pure" copying skill was significantly associated with Chinese word dictation (with magnitudes of .26). With nonverbal IQ, vocabulary skill, and rapid automatized naming (RAN) statistically controlled, "pure" copying skill independently explained 3% of the variance in Chinese word writing. In addition, Chinese word recognition and dictation were highly correlated. Copying was associated with early Chinese literacy skill, and this potentially highlight the importance of print-independent copying skills for children's learning to write in Chinese.

Key words: copying, visual-motor integration, Chinese reading and writing.

Meaning without Syntax

ERP Evidence from Simple Silent Reading of Chinese

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An event-related brain potential (ERP) experiment was conducted to investigate whether the construction of a grammatical local phrase structure using syntactic category (noun, verb, etc) information necessarily precedes semantic combination of individual words in a sentence. Participants read Chinese sentences that contained (a) no incoherence, (b) semantic incoherence, (c) syntactic (local phrase structure) incoherence, or (d) semantic and syntactic incoherence. They had no other task than to read for comprehension. Although semantic coherence (N400) effects were observed only for syntactically coherent sentences in the late (500–600 ms) time window, the N400 effects to semantic coherence were not modulated by syntactic coherence in the relatively early (350–450 ms) time window. In addition, syntactic coherence elicited a P600 effect. Our findings provide strong evidence that syntactic category processing does not necessarily precede semantic processing and support the independence of the initiation of semantic combinations.

Processing difficulty of Chinese relative clauses depends on animacy configuration of the head nouns

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Chinese relative clauses were typologically different from any other languages, which made it to be the optimal material to investigate the processing asymmetry of subject relative clauses (SRC) and object relative clauses. In this paper, we investigated Chinese relative clause processing by manipulating the animacy configuration of the head noun phrases in three experiments using a self-paced reading paradigm.

Experiment 1 showed that object-extracted relative clauses (ORCs) with double animate head NPs were more difficult to process in critical regions than subject-extracted relative clauses (SRCs) with the same animacy configuration. Experiment 2 showed that ORCs with double inanimate head noun phrases were easier to process in critical regions than SRCs with the same animacy configuration. Experiment 3 found that ORCs with inanimate-animate configuration were more difficult to process in critical regions than SRCs, while an inverse pattern was found when relative clauses had animate-inanimate configuration of the head noun phrases. These results suggest that animacy configuration of the head noun phrase has an important influence on processing of relative clauses in Chinese. Furthermore, these results provide more support both for the thematic role theory and for the experience-based theory accounts of processing complexity differences.

Keywords: animacy; Chinese relative clauses; thematic role

Nominal and Functional Semantic Functions of Chinese Classifiers

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Linguists have studied the usage and function of classifiers in different languages for over 70 years, and have provided useful insight concerning how a classifier is chosen to pair with a noun and what kind of function it serves in communication. For example, Allan (1977) argued that a classifier is a morpheme denoting some salient perceived or imputed properties of the entity to which its associated noun refers. Mandarin Chinese is a classifier-rich language. In reference of Allan's taxonomy, Tai (1994) analyzed Chinese classifiers, and was able to identify all the categories except location.

In linguistics, the relationship between nouns and classifiers was investigated usually based on how they were associated in text corpus (Tai, 1994). Linguists analyze logically how they are paired and come up with the kind of taxonomies mentioned above. Although these taxonomies exemplify the properties that an object may be perceived by a speaker, the relationships between classifiers and nouns are often intermeshed. As Erbaugh (1986) argued, in many cases, the mapping between classifiers and nouns is complex and how a classifier is chosen to signify a specific property from the multiple properties that an object possesses is not fully understood.

In order to explore further how classifier are chosen to describe nouns, and replicate Tai's idea of Chinese classifier taxonomy, this research collected 96 native Chinese speaking college students' responses to a cloze test like questionnaire which consisted of 144 non-repeated items. An item consisted of three words, “—” (an indefinite article), a blank space (a to-be-filled classifier), and a two-character noun. The responses were analyzed in two ways. First, the responses were categorized using Allen's taxonomy, and secondly, the results were analyzed using Latent Semantic Analysis.

There were 13,641 valid responses collected. From the responses, 214 different classifiers were identified. Basically, all the categories, except location, proposed by Allan were able to be identified using the first data analysis method. A noun-classifier co-occurrence matrix was submitted to Latent Semantic Analysis, and 10 “prototypical classifiers” were extracted, based on the scree plot method. These prototypical classifiers accounted for 76.67% of the data variance, and could be reclassified into 3 of Allen's categories. The categories were material (i.e. classifiers for animal, human, flowers), shape (i.e., classifiers for elongated, round, flat, slice-like objects, constrained and extended space), consistency (i.e., classifiers for countable objects).

The pattern of the results indicated the followings. (1) Six out of the seven categories proposed by Allan's were identified in the participants' responses to the questionnaire. (2) When a common college student encounters a noun, certain properties of the entity referring by the noun are activated easier than other properties, and that affects which classifier will be chosen to pair with the noun.

Tongue-Twister Effects in the Silent and Oral Reading of Japanese Sentences

Confirmation and Re-examination

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When reading sentences for comprehension, strings of connected words need to be temporarily stored in working memory in the form of speech code (Kleiman, 1975), and thus phonology is expected to be involved during reading regardless of the type of writing. This is typically evidenced in studies which reported the tongue-twister (TT) effect or the effect of phonemic similarity among the words that make up a sentence in English (Ayres, 1984; Haber & Haber, 1982; McCutchen & Perfetti, 1982; McCutchen, Bell, France, & Perfetti, 1991), Chinese (Tzeng & Wang, 1977; Zhang & Perfetti, 1993), and Japanese (Matsunaga & Vance, 2010).

In the present study, an experiment was conducted with an improved method to confirm the TT effects observed in the Matsunaga and Vance (2010) study in silent and oral reading of Japanese sentences, and to re-examine whether the physiological articulation difficulty associated with fricatives is reflected in silent reading. The hypotheses were: (a) there would be significant TT effects in both silent and oral reading; and (b) among TT sentences, repeated fricatives would be harder to read than repeated stops at both bilabial and alveolar positions. The results showed: (a) longer reading time (RT) for oral reading than for silent reading; (b) strong overall TT effects at both alveolar and bilabial positions measured by RT across reading type; (c) robust difficulties only with fricatives at the alveolar position, and equal difficulties with fricatives and stops at the bilabial position, measured by RT in oral and silent reading; and (d) strong TT effects of alveolar fricatives and bilabial stops measured by articulation error rates in oral reading. The difficulty with TT sentences found in this study generally confirmed the results reported in the Matsunaga and Vance (2010) study and other prior TT studies, but the difficulty with repeated fricatives was not necessarily greater than that with repeated stops across positions.

Based on the result showing the considerable challenge associated with repeated fricatives at the alveolar position, and repeated fricatives and stops at the bilabial position in both silent and oral reading, the possible implication that phonetic features such as place and manner of articulation might be reflected in working memory during reading (McCutchen et al., 1991) is discussed. Future research is suggested to test this implication, and to clarify the reason why fricatives were more difficult than stops only at the alveolar position.

Neural Correlates of Metaphoric Processing and Emotional Needs: The Study of 飢渴 and 渴望 in Chinese

Metaphor and emotion for hunger-thirst and thirst

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The present study was designed to explore the interaction of metaphoric processing and emotional needs with respect to “飢渴 (hunger-thirst for)” and “渴望(thirst for)” in Chinese. In English, the phrases “hunger for” and “thirst for” are traditionally treated as the same metaphor to indicate a strong desire. However, their subtle differences could be found because hunger and thirst have different physiological mechanisms (Chiang and Nebeshima, 2012). The differential mechanisms may derive distinct body reactions and desire intensity. In the current study, we hypothesize that the two phrases related to “desire” in Chinese may be associated with two kinds of needs. From daily usage, the object of “飢渴” may be more related to basic needs, whereas the object of “渴望” may be more related to all needs. The different sources of needs can be visualized by the hierarchy of needs, proposed by Maslow (1990). To test this hypothesis, functional magnetic resonance imaging (fMRI) was used to examine the neural correlates of metaphoric processing between “飢渴” and “渴望” in Chinese. Moreover, the phrases were further divided into two kinds of needs according to Maslow (1990). The lower needs included biological and physiological needs, safety needs, belongingness and love needs, as well as esteem needs. In contrast, the higher needs included cognitive needs, aesthetic needs, self-actualization, and transcendence. There were four conditions of sentences, divided by 2 phrases (“飢渴” vs. “渴望”) and 2 needs (lower, higher). The participants were asked to perform acceptability rating for each sentence during fMRI scans. The contrast of the “飢渴” versus “渴望” phrases produced greater activation in left anterior insula cortex (AIC) for the higher needs, not for the lower needs. Moreover, our behavioral data showed a less acceptable rating for the “飢渴” phrase at the higher needs as compared to that at the lower needs. The findings suggest that greater AIC activation may be associated with an increased demand on integrating body and emotion for the “飢渴” phrase at the higher needs, possibly due to a clash between metaphoric processing and emotional needs.

Processing Metaphors in Mandarin Chinese: An Event-Related Potential Study

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In recent years, more and more studies have used the event-related potentials technique to determine neurologically difference among types of metaphors in Indo-European languages, i.e., English and French (Coulson & Van Petten, 2002; Lai et al. 2009, Pynte et al. 1996 and Tartter et al. 2002). However, there is little research investigating the neural differences of metaphor processing in Asian languages. In the current study, we are going to look at the neural responses among three kinds of metaphors in Mandarin Chinese via event-related potentials. In our on-line reading task, event-related brain potentials were recorded from 22 participants when they read three metaphorical sentences in Chinese: (1) Conventional metaphors (e.g., 他們的戀情持續加溫, 很快就有好消息 “their love is heating, and we will get good news soon”), (2) novel metaphor (e.g., 他們的戀情早已除草, 不然很麻煩 “their love was weeded, otherwise it will be a trouble”) and (3) anomalous metaphors (e.g., 這個感情已經分娩, 這是昨天發生的事, “their love was born, and this happened yesterday”). Conventional metaphors were those used in daily conversation in Chinese. Novel metaphors were those that did not exist in Chinese but their metaphorical mappings (e.g., LOVE IS PLANT) were used in Chinese. Anomalous metaphors were those that did not exist in Chinese and their metaphorical mappings (e.g., LOVE IS A BABY) did not exist in Chinese, either. We controlled the three kinds of metaphorical sentences having similar syntactic structures and in each sentence, the target domain, i.e., “love”, was placed before the source domain, e.g., “heat”, “weed out”, and “childbirth”. Participants read the metaphorical sentences word by word and ERPs measured from 150-250 msec and from 350-450 msec after the onset of the sour domain (e.g., 加溫 “heat”, 除草 “weed out”, and 分娩 “childbirth”) for each metaphorical sentence. Our results show that the anomalous metaphors elicited the largest amplitude of N400 components (anomalous metaphors for -3.426) and show the significant difference between anomalous and novel metaphors ($p < .05$). However, conventional metaphors and novel metaphors elicited the similar amplitude of N400 components (novel= -2.526, conventional for -1.903) and no significant difference between conventional and novel ones ($p > .05$). This study, consistent with the fMRI study on Chinese metaphor processing (Ahrens et al. 2007), suggests that the involvement of metaphorical mappings affects the processing difficulty of kinds of novel metaphors.

Does an “imagined” listener induce gesture production?

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In a conversation, speakers often spontaneously and unwittingly produce “gestures” that are movements of their hands and arms in conjunction with their speech (McNeill, 1992). The function of co-speech gestures has been discussed from a listener-oriented perspective versus speaker-oriented perspective with and without face-to-face paradigms (e.g., Alibali, Heath, & Myers, 2001; Bavelas, Gerwing, Sutton, & Prevost, 2008; Cohen, 1977). For example, Alibali et al. (2001) asked participants to watch an animated cartoon, and then narrate the cartoon story to a listener in two conditions. In the face-to-face condition, the speakers and the listeners see each other. In the screen condition (i.e., not face-to-face), visibility between speaker and listener was blocked by a screen. Alibali et al. classified gestures as: representational gestures, which are gestures that depict semantic content related to speech, and beat gestures, which are simple, rhythmic gestures that do not convey semantic content. In their results, more frequent representational gestures were observed in the face-to-face condition than in the screen condition. In the screen condition, the speakers could not see the listeners, yet they still produced representational gestures. Beat gestures were produced at similar rates for both conditions. Alibali et al. suggested that gestures serve both the speaker-oriented and the listener-oriented functions.

One question that remains is: Does a speaker produce gestures same as under the face-to-face condition even when the listener is not present but the speaker imagines a listener is watching and listening him/her during the narration. To address this question, we compared gesture frequency in the face-to-face condition during the animation-narration task in the present study with that in Saito, Kano, Ito and Oi (2008) in which participants were asked to imagine a listener who watches and listens to his/her narration via a video camera and a microphone (imagination condition) during the animation-narration task. To examine whether different languages affect gesture production, we also compared the present data which was obtained from native speakers of Japanese with native speakers of Chinese in the imagination condition (Saito, Li, and Oi, 2010). All of the speakers were asked to narrate in their native language.

The participants of the face-to-face condition produced more representational gestures than those of the Japanese and Chinese in the imagination condition, while the beat gestures were produced at comparable rates among the three groups. These results suggest that an “imagined” listener does not have the same effect as a listener who is physically present for gesture production. One remaining point is that produced gestures, especially representational gestures, are functionally different between the face-to-face condition and the imagination condition. Future studies using brain imaging techniques such as near-infrared spectroscopy (NIRS) may reveal functional differences between the face-to-face condition and the imagination condition.

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A longitudinal Study on the literacy of underachievers

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The purpose of this study is to analysis the literacy of underachievers in elementary schools. Sixty-one underachieving students and sixty-one average achievers in the 3rd and 4th grades of A.B elementary schools in G Metropolitan city were involved. The study was focused on the relationship between literacy, phonological awareness, visual perception, short-term memory, naming speed, morphology and predictor variables of these students. The results were analyzed by descriptive statistics, T tests, correlation analysis and regression analysis.

First of all, it has been found that underachievers showed lower ability in literacy, phonological awareness, visual perception, short-term memory, naming speed and morphology compared to average achievers. On the other hand, there was no difference in comparison between their abilities in performing visual discrimination that is a sub-variable of visual perception and naming speed.

Secondarily, the study proved that the predictor variables of literacy for underachievers were visual figure-ground, short-term memory, naming speed, and morphology. Visual perception was not a part of the predictor variables for the average achievers.

Thirdly, the predictor variables for literacy of underachievers were phoneme awareness, number naming speed, object naming speed, visual figure-ground and morphology. However, the predictor variables of average students were number naming speed and morphology.

Fourth, in the second study, handwriting, morphological perform score was improved. The reason can be expected as a result of widening the vocabulary of the textbook grade goes up.

Morphological Cues Can Make It Easier to Recognize and Learn Sino-Korean words

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Higher level of morphological knowledge has been linked to better reading ability in the early grades (Nagy et al., 2003). And the knowledge may well develop even after elementary school, and even into adulthood (Hurry, Nunes, & Bryant, 2005). The present study focused on individual differences in morphological awareness (MA) in relation to lexical processing and learning in adults rather than any other meta-linguistic awareness—phonological or orthographic awareness. In particular, we examined the role of morphological knowledge in recognizing and learning Sino-Korean (S-K) words.

S-K words have been imported from the Chinese language over a long period in the history. They are mostly compound words, composed of two or more constituent morphemes. Each syllable (or Gulja) of an S-K word stands for a Chinese character, and has its own meaning and pronunciation. In the past, they were written in Chinese characters, but are written only in Hangeul in the modern-day Korea. One major consequence of this change is that Gulja-morpheme correspondence of S-K words has become irregular. One Gulja, or Korean character corresponding to a syllable, very often stands for several morphemes of S-K words, sometimes dozens of morphemes. Fortunately, whereas an isolated Gulja is morphologically obscure, its identity and contribution to the word meaning is usually obvious once it comes in a compound word. In other words, S-K constituents are opaque prior to lexical access, but transparent post-lexically. This is not the case for Japanese or Chinese compounds where constituent morphemes in most compounds have pre-lexical transparency.

Two experiments were conducted to determine if the providing of morphological knowledge is helpful to recognize and learn S-K words. Experiment 1 compared the relative effects of word and morpheme training on the processing of rare words. The results showed that the training with morpheme definitions facilitated lexical decision more than the word definition training. This suggests that the method of providing morpheme definitions is more helpful for students to learn difficult technical terms than the conventional method that only provides word definitions.

Experiment 2 focused on individual difference in morphological awareness when students are asked to guess the meaning of novel words and learn them. 20 high- and 20 low-MA students were given to-be-learned words within two different contexts—morphologically matched or mismatched. To see how robust the consequences of word learning are and how much word learning is influenced by MA, the performance of high and low MA group were compared both immediately and one-week after study. Participants with higher MA were better at learning the meaning of new words in contexts. The effects of MA on word learning suggest that the strength of links between words and morphemes differs from person to person. Compared with readers with low MA, readers with high MA possibly have a much greater number of links between words and morphemes and the links themselves are generally stronger.

The results showed that morphological information helped participants resolve the Gulja-morpheme ambiguity of S-K compounds. To explain the results, we proposed a model with the post-lexical morpheme level and compared it with other existing models.

The mora length effect in Japanese kanji character recognition

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The word length effect, referring to the finding that longer words are more difficult to recognize than shorter ones, has been reported in numerous studies with English words (e.g., Forster & Chambers, 1973; Balota et al., 2004) and also in some studies with Japanese syllabic katakana words (e.g., Tamaoka et al., 1998). In contrast to this inhibitory effect of word length, however, a facilitatory effect of phonological length has been found for Korean, specifically in comparisons of monosyllabic and bi-syllabic words (e.g., Yi et al., 2012). While word length and phonological length are positively correlated for both English words (and for other languages that employ the alphabet) and Korean words represented in hangul orthography, Japanese words represented in kanji orthography can vary in terms of phonological (mora) length, even when word (character) length is controlled for.

This study was conducted in order to investigate whether the mora length of single kanji also influences character recognition in Japanese, and, if an effect is observed, whether it is facilitatory or inhibitory in nature. Single kanji characters possessing an *on*-reading (a Sino-Japanese reading derived from the Chinese pronunciation) of either a single mora (mono-mora character word) or two morae (bi-mora character word) and no *kun*-reading (Native-Japanese pronunciation) were used as materials for a character decision task. The results from 50 undergraduate participants indicate that decisions to bi-mora characters took significantly longer time than responses to mono-mora ones, irrespective of the subjective familiarity of the characters.

This result suggests, firstly, that phonological activation occurs within the character decision task for morphographic kanji characters. It also suggests that phonological length has an inhibitory effect on kanji recognition, which contrasts with the length effect identified for hangul recognition. The contrast may reflect differences in the numbers of mono-mora or mono-syllabic words within Japanese and Korean. In Japanese, over three quarters of single mora can be regarded as content words based on our rough estimation. In other hand, there are less mono-syllabic words in Korean. Accordingly, recognition mechanisms may differ between the two languages as a result of fine-tuning to the statistical properties of words along the phonological dimension within the respective languages.

The Reverse Length Effect in Korean Word Recognition

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The length effect in word recognition refers to the phenomenon that shorter words have an advantage in word recognition compared with longer words. Although the effect has often been reported in English and other European languages, there is not much evidence for the same effect in Chinese, Japanese, and Korean. The fact that writing systems of those languages are based on different scripts and linguistic features than English implies the importance of comparative studies. In actuality, we recently found some evidence for the opposite effect of word length: Shorter words, mono-syllabic words in particular, have a disadvantage in Korean.

The present study focused on the processing of monosyllabic and bi-syllabic words written in Hangul. As in English, the Korean language also shows the general pattern of word length effect, but this is the case only for words with two or more syllables (Park, 1993). The reverse word length effect was reported for mono-syllabic words (Kim, 2010); monosyllabic words were harder to recognize than bi-syllabic ones. This result probably reflects the characteristics of the Korean syllable. The syllable is a basic unit of phonology, orthography, and morphology for the Korean language. However, Korean syllables usually correspond to more than one morpheme. In addition, unlike English equivalents, Korean mono-syllabic words can be recycled into disyllabic compounds.

Two experiments were conducted to examine the word length effect in Korean word recognition. In Experiment 1 to confirm the reverse word length effect, mono- and bi-syllabic words were tested in random order. The go/no-go lexical decision task was given to each participant. The results confirmed that the recognition of mono-syllabic words was slower than bi-syllabic words: the reverse length effect.

In Experiment 2, mono- and bi-syllabic words were grouped into separate blocks. The presentation order of blocks was counterbalanced across participants. The blocked presentation was to facilitate possible length-specific processing for mono-syllabic words. The results also confirmed the reverse length effect for mono-syllabic words. However, the effect was greater for high-frequency words than low-frequency words.

To explain the reverse length effect for mono-syllabic words in Korean visual word recognition, several facts about the Korean language should be taken into account. First, mono-syllabic words are smaller in number and less frequent in use than bi-syllabic words. Consequently, the more frequent bi-syllabic words might be easier to be processed. Second, two is better than one. Each individual syllable in a bi-syllabic word can cooperate to provide more relevant information for word recognition. Third, mono-syllabic words are more ambiguous in meaning than bi-syllabic words. As previous research shows, the more ambiguous a word is, the more difficult it is to be recognized.

To conclude, we showed that it is possible to obtain the different length effect according to language and writing system. To understand the underlying mechanisms, future studies should pay more attention to commonality and specificity of languages and writing systems.

The P200 component and the sub-lexical phonological processing in reading Chinese

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Purpose: The P200 component has been suggested to index early phonological processing in visual sinogram (i.e., Chinese character) recognition, but whether it is associated with sub-lexical phonological processing (i.e., the processing of radical pronunciation) is still unclear. This study examines whether P200 is sensitive to sub-lexical phonological processing. Behavioral primed naming experiments have demonstrated that when radicals (semantic or phonetic) are themselves legal sinograms (e.g., the radical 木, mu4, in the sinogram 校, xiao4), the pronunciations of radicals are activated at short SOAs (57 and 100 ms), particularly in low-frequency sinograms (Zhou et al., In press; Zhou & Marslen-Wilson, 1999). However, this was not taken into consideration in previous ERP studies with the priming paradigm. With the semantic judgment task, when the prime was homophonic or rhymed with the target, an enhanced P200 effect was observed (Kong et al., 2010). Despite longer reaction times for homophone pairs, this P200 effect was interpreted to reflect facilitated lexical phonological processing of targets for lexical homophone primes. Using the same paradigm and task, the current study further examines the impact of sub-lexical homophone primes.

Method: 72 low-frequency irregular sinograms (i.e., the pronunciations of the sinograms differ from those of their radicals) were selected as targets (e.g., 榛, zhen1). There are two within-subject variables: Prime level (LEXICAL vs. SUB-LEXICAL) and relatedness (HOMOPHONE vs. CONTROL). Each target was paired with four types of prime. The LEXICAL HOMOPHONE (LH) prime (e.g., 珍, zhen1) was homophonic with the target, whereas the SUB-LEXICAL HOMOPHONE (SH) prime (e.g., 琴, qin2) was homophonic with the radical embedded in the target. The two types of control primes matched with the two related primes, respectively, in terms of visual complexity, structure and word frequency, and served as baselines.

Results: P200 mean amplitude was calculated across the time window of 190–270 ms. A four-way repeated measures ANOVA was conducted on nine electrodes (F3/z/4, C3/z/4, P3/z/4). The four within-subject variables were prime level, relatedness, site (frontal, central, parietal), and region (left, midline, right). The results ($n=19$) show that the SH condition induced smaller P200 ($-0.8\mu\text{V}$) at Cz and Pz electrodes ($p<0.05$) compared to the SUB-LEXICAL CONTROL condition. In contrast, the LH condition had no effect on P200.

Conclusion: The current study shows a reduced P200 effect for sub-lexical homophone primes, but not lexical homophone primes, suggesting that P200 is sensitive to sub-lexical phonological processing. This is consistent with the aforementioned behavioral studies, which demonstrated sub-lexical phonological processing in reading low-frequency sinograms. Consistent with results of Liu et al. (2003), the aforementioned enhanced P200 effect for lexical homophone primes is absent in our study. This might be because only irregular sinograms are used as targets in the present study. Early phonological processing of irregular sinograms may not be strong enough to induce an enhanced P200. In our view, the reduced P200 effect of sub-lexical homophone primes may reflect either inhibited lexical phonological processing of targets, or facilitated lexical access to the orthographic representations of targets by sub-lexical homophone primes. However, these possibilities need further investigation.

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Coordination between the phonetic structure of onomatopoeic expression and the phases of the accompanying gesture

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Onomatopoeia is a special form of language expression in Japanese. Its phonological form (signifier) appears to be associated more directly than arbitrarily with its meaning (signified). In this form of expression, a word base is often accompanied by onomatopoeic constituents, such as "Q," "N," or a vowel "R." In this study, we considered the coordination of the time structure between speech and gesture. We used sentence-making tasks in which participants were asked to use word pairs (one onomatopoeic term + one word) to produce sentences with gestures. We then analyzed participants' actions, focusing on the coordination between the phonetic structure of the onomatopoeic expression and the phases of the accompanying gesture. We also compared coordination types among three variations with "Q," "N," and "R" constituents. Results: 1. In most cases, the stroke phase of the gesture was synchronized with the onomatopoeic expression. 2. Focusing on the coordination of gesture phases with the two onomatopoeic moras comprising the word "bata," we categorized relationships into three types: Type I: the second mora, "ta," is pronounced during the gesture stroke, with no gesture phase change; Type II: "ta" is synchronized with the transition between two strokes (rotating and non-rotating expression); and Type III: "ta" is synchronized with the endpoint of a hitting stroke, followed by a bouncing or holding gesture. 3. The frequency of the type I relationship was higher when the word root "bata" was accompanied by "R" than when it was accompanied by "Q" or "N." Finally, we propose the "motor coordination hypothesis" to explain the linkage between onomatopoeia and gesture, and discuss its implications for other language activities and language evolution.

Expressing “possibility” with intransitive and transitive verbs in Japanese

Evidence from Chinese Japanese Learners

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Using proper forms of verbs (intransitive or transitive, with possibility markers or without) to express the meaning of possibility has always been considered difficult for nonnative speakers of Japanese. Even highly proficient learners of Japanese who passed the highest level of tests still make mistakes in speaking and writing. One possible explanation is that some Japanese intransitive verbs have the implicit meaning of possibility so that it was regarded as mistakes if they were used with possibility marker “(ra)reru” (Zhang 1998, Aoki 1992, Lu 2008). However, due to its implicit nature, learners of Japanese were most likely unaware of this phenomenon, and tend to use either intransitive verbs together with “(ra)reru”, or transitive verbs with “(ra)reru” to express the meaning of possibility. The current study aims to test this hypothesis by examining the Chinese learners’ sensitivity to different forms of possibility in a self-paced reading experiment.

In the experiment, four types of sentences were constructed using intransitive and transitive verb pairs. Two of them are grammatical sentences with the following structures: 1) intransitive verbs that contain implicit meaning of possibility, such as “Ikura oshitemo mado-ga akanai”; 2) transitive verbs with necessary possibility marker “(ra)reru”, such as “Ikura oshitemo mado-ga akerarenai”. The other two are ungrammatical sentences with the following structures: 3) intransitive verbs with unnecessary possibility marker, such as “*Ikura oshitemo mado-ga akenai”; 4) transitive verbs with unnecessary possibility marker, such as “*Konokamera-ha yoku utsuseru”. In addition to the word-by-word reading time, a grammaticality judgment task was used to record readers’ perception of the sentences.

The results suggested that language learners showed differences in reading different types of sentences expressing possibility in Japanese. Discussions were made about language acquisition and the implication for Japanese teaching and learning.

The role of animacy in the production of Japanese relative clauses as an L2 by Spanish native speakers

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Various conceptual and syntactic factors play a role on sentence production (Bock & Levelt, 1994; Tanaka *et al.*, 2011), among which animacy is prominent. Animacy is thought to influence the Grammatical Function assignment phase (Bock & Levelt, 1994), in that the speaker tends to assign more conceptually salient elements -animates- to the subject function. However, studies on different languages, including Spanish (Prat-Sala & Branigan, 2000), have found an influence of animacy on word order (WO) preferences (i.e. at the Positional Level of grammatical encoding) as well, with a tendency to move the animate element to the beginning of the sentence. Studies in Japanese (Tanaka *et al.*, 2011) have proposed a possible influence in both phases: animate elements tend to be uttered both as subjects and as sentence-initial elements. However, the role of animacy seems to differ across languages. Montag and MacDonald (2009) showed that Japanese speakers produced significantly fewer (R)elative (C)lauses with inanimate subjects than English speakers, choosing passive RCs instead. Still, little is known about the role of animacy in Japanese and the use of animacy cues by L2 speakers at different proficiency levels. The present study explores the role of animacy in the production of RCs by Japanese native speakers and Japanese learners (JSL) whose L1 is Spanish.

Experiment: A picture elicitation task. We analyzed the proportion and nature of avoidances and mistakes in 25 learners of Japanese (L1 Spanish), at three proficiency levels, compared with a group of Japanese native speakers. Stimuli were (S)ubject and (O)bject RCs, with two animacy conditions: (1) SRC Animate Agent Inanimate Receptor (AI): *Aisukuriimu-o tabeteiru onna no ko-wa tsukareteiru*; (2) SRC Inanimate Agent Animate Receptor (IA): *Dansei-o okosu tokei-wa shikakui desu*; (3) ORC AI: *Onna no ko-ga tsukutta keeki-wa oishii desu*; (4) ORC IA: *Hikari-ga terasu kashuu-wa se-ga takai desu*.

Results and conclusions: The performance of Japanese native speakers replicates the pattern found by Montag and MacDonald (2009): they avoided RCs with inanimate agents, using passive RCs instead, especially ORCs. In turn, animacy errors committed by learners consisted mainly of changing case particles, so the animate elements received nominative case and inanimate ones accusative, regardless of WO. The pattern of responses in IA RCs (especially ORCs) changes along L2 development: learners resemble natives as they become more proficient; all groups differ in the ratio of errors/avoidances, except native speakers and advanced learners, suggesting that the latter are able to access the semantic cues of Japanese. Importantly, the number of animacy errors or avoidances improves with proficiency. Semantic access starts from intermediate level, and is achieved at advanced levels. Our results agree with the claim that animacy influences grammatical function assignment rather than WO for both Japanese speakers and Spanish JSL learners.

Do L2 Speakers of Japanese Use Accent Information Incrementally in Word Recognition?

An Eye-Tracking Study Using Artificial-Word Learning Paradigm

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【Purpose】 Previous studies have shown that accent information plays an important role in spoken word recognition (English¹, Japanese²). Although these studies have verified the effects of accent information, it still remains unclear exactly how and when listeners use accent information in the process of word recognition. Shin & Speer (2009)³ measured participants' eye movements during artificial word recognition and found that, whereas L2 English speakers used accent information, L1 English speakers did not employ accent information incrementally. In this study, we focused on Japanese, a pitch-accent language that has a wider range of minimal pairs with different accentual patterns than English. Using a paradigm that combines gaze measurements and artificial word learning focusing on a pitch-accent language, Japanese, we investigated how and when native Japanese speakers (L1) and Chinese learners of Japanese (L2) use accentual information in the course of word recognition processes.

【Methods】 We created 40 sets of auditory stimuli of three-morae artificial words in Japanese, where each set of artificial words consisted of target, competitor, and distractor, and their corresponding picture materials. Each mora duration of artificial words was about 300ms. Target and competitor had the same sounds in the first two morae (e.g., Adomi vs. Adore), but differed in the third one while distractors were different from the first mora (e.g., Ketoso). In the accent-same condition, the accentual patterns of target and competitor were identical, while they were different in the accent-different condition. For three days (1 hour per day) sixteen participants (8 native Japanese speakers, 8 Chinese advanced learners of Japanese) individually learned the artificial words, which were paired with pictures of objects. On the third day, we measured participants' eye movements during a task in which they selected one pictured object out of four.

【Results】 We compared the proportions of fixations in target and competitor in the time windows of 0-300ms, 300-600ms and 600-900ms. Results from L1 and L2 speakers showed that the proportions of fixations to the target compared to the competitor were significantly increased in 300-600ms in the accent-different condition, while increases were observed in 600-900ms in the accent-same condition. In addition, Chinese speakers recognized words faster than Japanese. These results indicated that, regardless of their native language, participants used accent information incrementally and recognized the word even before the entire word was processed. Faster word recognition by Chinese-speaking learners of Japanese than by native speakers may suggest that Chinese speakers used prosodic features that exist in their L1 in the L2 Japanese recognition task. This might be due to the positive transfer from their L1.

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Orthography to Phonology Consistency Hurts Chinese Word Recognition

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How readers retrieve and select the right representation among others in the mental lexicon has been a central focus of word recognition research. One approach to this question has examined effects of consistency. The feedforward consistency effect resulted from the degree of consistency on the mapping from orthography to phonology has been studied extensively and has been suggested to reliably facilitate naming across different scripts. Research of feedforward consistency on lexical decision, however, has not been firmly demonstrated. In the present study, we examined the feedforward consistency effect in Chinese lexical decision with characteristics of orthographic neighborhood manipulated to explore the influence of the mapping among lexical representations on Chinese word recognition.

Both the degree of consistency on the mapping from orthography to phonology and the size of orthographic neighborhood were systematically manipulated in Chinese lexical decision tasks. The orthographic neighborhood size was defined by the number of characters sharing the same phonetic radical and the degree of feedforward consistency was calculated by the ratio of the number of lexical friends, which were both orthographic and homophonic neighbors to the target character, to the orthographic neighborhood size. The present study demonstrated the inhibitory effect of feedforward consistency, suggesting that the consistency may hurt lexical processing, especially for characters with large orthographic neighborhood. The inhibitory consistency effect, in which high feedforward consistent characters were responded to slower than those with low feedforward consistency, could be explained by the feedback connections from phonological to orthographic representations. Our results thus suggested that the pattern of mapping among orthographic and phonological representations, rather than the degree of consistency per se, determined the speed of Chinese lexical processing.

The time-course of lexical activation in Japanese two-character word recognition

An eye-tracking lexical decision study

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This visual lexical decision with eye-tracking study investigated the time-course of lexical activation in Japanese two-character word recognition. Of special interest were (1) in what order the whole two-character word and its constituents (i.e., characters and radicals) are activated in the course of lexical access, (2) whether either the left character or the right character is relatively more important for lexicality judgment, and (3) whether lexical effects are modulated by readers' locus of attention.

Mixed-effects regression analyses of response times and subgaze durations revealed joint contributions of morphological units at all levels of the linguistic structure in the course of lexical decision, in line with the previous lexical decision with eye-tracking study on Dutch compound processing (Kuperman, Schreuder, Bertram, & Baayen, 2009). At the first subgaze, the magnitudes of effects associated with the features and character units were larger than those of the radical and whole word units. Interestingly, slight yet significant contribution of whole word frequency was observed already in this early time frame. The left and the right character frequencies contributed at different points in time in the left-to-right preferential processing path, with the magnitude and direction of these effects modulated by readers' locus of attention. The general pattern of lexical activation was unaffected by font sizes and nonword types.

Given the intricacy associated with two-character word lexical decision, we stress the advantage of considering morphological units at multiple levels and non-linguistic variables simultaneously in a single statistical model without pre-experimental control. The present results do not straightforwardly conform to the predictions of strictly top-down or bottom-up localist models of compound processing. We therefore propose a character-driven processing model with an assumption that connections from the feature level by-pass the lower radical level and link up directly to the higher character level.

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Evaluating the Effect of Character Frequency on Chinese Word Naming and Lexical decision

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Character frequency is defined as the summation of frequencies of all words sharing that particular character. It is then easily inferred that character frequency would covariate with the number of words embedding that character. Without considering this covariance, any experiment manipulating character frequency without number of words embedding it being kept balanced should not derive a logically clear conclusion. Due to this reason, experiments (e.g. Yan, Tian, Bai, & Rayner, 2006) simply adopting an orthogonal manipulation of word frequency and embedding character frequency to explore the role of character processing in the recognition of a word would face methodological problem. In this kind of experiments, not only the abovementioned covariance is neglected, but also the manipulation validity of character frequency would become unclear. This is because in an orthogonal factorial design of two factors, word frequency and embedding character frequency, the character frequency of a lower frequency character would be inevitably higher than the lower limit of the word frequency of a higher frequency word. This thus renders that the manipulation validity of character frequency becomes unclear, especially when the variance of word frequency is manipulated larger. To cope with this problem, the present study conducted two experiments in which both used the same design and the same stimuli while with different tasks. A two-way nest factorial design with manipulation of word frequency and leading character frequency of target words, with the latter designed as nested in the former, and with the neighborhood size of the orthographic neighbor words which shared the same leading character with the target word being kept balanced, were adopted to explore their influences on word lexical decision (Experiment 1) and word naming (Experiment 2). The results showed that lexical decision responses manifested a larger word frequency effect than naming responses, indicating that pre-lexical phonology was involved in multi-character word processing. In addition, word naming responses would be facilitated when the leading character frequency is high, irrespective of target word frequency. In contrast, word lexical decision responses would be inhibited when the leading character frequency is high, irrespective of target word frequency. Discussion about this surprising contrast will also be proposed.

Keywords: character/word recognition, neighborhood size effect, frequency effect, lexical decision, naming.

Semantic activation modulates neighborhood size effect: Studies with Chinese character decision task

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In word recognition, it has been acknowledged that response to recognize a target word is determined both on characteristics of that word and its orthographic neighborhood (see Andrews, 1997, for a review). For example, Andrews (1989, 1992) reported that words with many orthographic neighbors (large neighborhoods) are responded to faster than words with few neighbors. Sears, Hino, and Lupker (1995) also obtained facilitated neighborhood size effect at least for low-frequency words. The neighborhood size effect is generally interpreted in terms of the reciprocal activation mechanism embodied in the interactive-activation (IA) model (McClelland & Rumelhart's, 1981). Words with many neighbors have shorter response latencies because they receive more reciprocal activation from their sub-lexical constituents. Based on this idea, we wonder whether reciprocal activation between lexical level and semantic level would modulate neighborhood size effect since words with similar spellings may be semantically related (because of sharing morphological units) or may not be. In other words, when a target word activates its neighborhood, some activated orthographic neighbors are mutually semantically related (*depart-departure*) but others are not (*depart-department*). In Chinese, compound characters, such as the “海” (/hai3/, *the sea*) or the “洋” (/yang2/, *the ocean*), with same orthographic components which have semantic cuing function (the “氵” in above cases, called the semantic radical) are not only orthographically related but also semantically related. Theoretically, they (“海”, “洋”) facilitate each other by virtue of backward activation from semantic level. In the meanwhile, they inhibit each other for lexical competition mechanism according to IA model. To investigate the possibility that semantic activation modulate neighborhood size effect, the Experiment 1 in this study manipulated the neighborhood size (large vs. small) and semantic relation between neighbors (targets with many semantic-related neighbors vs. targets with no semantic-related neighbors) with mid-frequency Chinese characters. Rather than facilitated neighborhood size effect, an inhibition effect was found in the condition of targets with no semantic neighbors. Targets with many orthographic neighbors were responded to more slowly than targets with few neighbors. However, in the condition of targets with many semantic-related neighbors, the manipulation of neighborhood size had no significant inhibitory effect. It conforms to our hypothesis that semantic activation plays some role on neighborhood processing. Experiment 2 was conducted with additional targets frequency manipulation (high vs. low) to investigate the interaction of modulation effect that observed in Experiment 1 with character frequency effect. This study aimed at the purpose to ascertain the composition characteristics of neighborhoods as critical factors in character recognition.

Keywords: character recognition, neighborhood size, semantic activation, lexical decision

From usage to frame:

A case study of *hua* in Mandarin Chinese

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Abstract

The usage-based approach is assumed that the language systems of speakers are stemmed from utterances or usage events in their daily conversation (Kemmer & Barlow, 2000). This paper aims to examine various usage patterns of 花 *hua*-N from a usage-based theoretical point of view and elucidate the roles of frequency in structuring the linguistic representations of *hua*-N. It is found that *hua*, collocated with various nouns could be categorized into six categories, i.e. money, time, mind, energy, etc. With the semantic feature of nouns, concrete or abstract, the core meaning of *hua* is to spend but when *hua* collocates with abstract nouns, a departing sense is inserted.

Main body

The verbal meaning of *hua* is first seen in Han dynasty (BC 202~ AD 220) interpreted as blossom like *tao2 dong1 hua1* 桃冬花 ‘the peach flowers blossom in winter’. But the verbal usage was decreased because speakers use other verbs to combine with *hua* to express the same meaning, blossom. In Yuan dynasty, we found two entities, *hua1 yin2* 花銀 ‘high quality silver or the money to patronize prostitutes’ and 雪花銀 *xue3 hua1 yin2* ‘high quality silver’, which linked *hua* with the currency. Later, in Qing dynasty, *hua* extended its meaning to the commercial behavior. The collocate objective nouns of *hua* belonged to Money category including money, currency, capital, and family property. As can be seen, money has the most tokens and types of the three categories, and the total numbers of money is 59.

There are 731 (out of 1085) token of verb, 花 ‘*hua1*, spend’, and 42 distinct nouns were found with the proverb *hua*. The two highest frequent combinations of *hua* are Money (54 %) and Time (33%). These two categories make up the majority of the data. The reason why Money is more productive in Money and Time is that nouns in them have been developed in a long history. Although Time has the second biggest tokens of nouns, the types of nouns are only grouped in one type. We found that Time prefers to be expressed by a quantifier and specific time units such as *shi2 fen1 zhong1* 十分鐘 ‘ten minutes’. Nouns in Overlapping category embrace at least two interpretations involving Money, Time, Minds, and Energy concepts, such as *dai4 jia4* 代價 ‘price’. The Minds category involves the lexicons with thinking and senses, such as *asxiang3 fa3* 想法 ‘ideas’ and *nai4 xin1* 耐心 ‘patience’. The senses of Energy category cover energy and effort like *li4 qi4* 力氣 ‘strength’. The Other category is a minor group in which we only get *pian1 fu2* 篇幅 ‘paragraph’ and *pu4 chou4* 步驟 ‘step’.

Based on Bybee and Hopper (2001: 14), “the more often two elements occur in sequence, the tighter will be their constituent structure”. Hence, from token and type frequencies shown in Table 2, [*hua* + N_{money}] is the most productive template in which more phrases are derived and the core meaning of [*hua*-Noun]. The minor group of nouns reveals language creativity. Speakers apply the prime structure and add in new words to form a new verb phrase.

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Effects of Connected Speech Instruction on Spoken Word Recognition of Chinese EFL Junior High School Students in Taiwan

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Language in the spoken form is more challenging than the written form for most ESL/EFL learners. Previous studies (Brown & Hilferty, 1986; Matsuzawa, 2006; Ting & Kuo, 2012) mainly investigated the effects of explicit connected speech instruction on Japanese and Chinese EFL adult learners' spoken word recognition and positive results had been found. Nevertheless, Schmidt (1990) stated that children tended to learn language patterns through communicative interaction. Since Celce-Murcia, Brinton and Goodwin (2001) claimed that communicative competence should be cultivated, experimental studies have not been implemented to test the effectiveness of communicative task-based connected speech instruction. Additionally, Field (2008) emphasized the importance of helping learners from the early stages of learning to develop micro-listening strategies to deal with authentic English. Thus, this study compares the effectiveness of communicative and explicit connected speech instruction on improving Taiwanese junior high school students' spoken word recognition. To fully comprehend a naturally pronounced sentence well, EFL junior high school students need a basic knowledge of connected speech patterns including C-C linking, elision, C-V linking, contraction, and palatalization. This study therefore recruited three intact classes of eighth graders with one class receiving the explicit instruction, another class receiving the communicative instruction and the other class receiving no instruction on connected speech patterns. The two experimental groups received two 25-minute lessons per week for six weeks. The instruments included a background questionnaire, an outdated version of the elementary level GEPT listening test which is a standardized English proficiency test developed by Language Training & Testing Center in Taiwan, a 92-item self-developed cloze test with a high reliability coefficient of .983 and two versions of the treatment questionnaire. The paired-samples *t* tests results show that both experimental groups improved significantly on spoken word recognition. Compared with the control group, the ANCOVA results reveal that the explicit group made significant progress ($p = 0.01$), while the communicative group made marginal progress not reaching statistical significance ($p = 0.071$). Among the five connected speech patterns, both experimental groups outperformed the control group on contraction and elision. Furthermore, both experimental groups held positive attitudes toward the respective connected speech instruction contexts.

Phonological properties in the perception of spoken Japanese

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In the present study, we aimed at comparing the involvement of several speech properties in Japanese speech perception in a task that does not require listeners to purposely analyze the input. To this aim we used the observation of migration errors in a dichotic situation, where the illusory perception of a word target by migration of some sublexical property from one stimulus of the pair to the other reveals the implicit representations of speech perceptual components, namely of the consonants, vowels, morae or syllables. In order to control for the impact of literacy-associated knowledge on segmentation processes, in Experiment 1, we presented Japanese speakers with target words that could be written in either hiragana and/or kanji, which written symbols correspond to either morae or syllables, respectively. No effect of the script of presentation was observed. The results suggested that, in Japanese, speech segmentation relies on several sublexical units, including consonantal phonemes for which there exists no written isolated character. Yet, both the syllable and the first mora seem more important, with the mora providing the basis of the preferred segmentation strategy. To examine whether the result is specific to Japanese listeners, in Experiment 2 we presented the same material as in Experiment 1 to French-speaking listeners, with targets presented orally. They did not segment the Japanese material in the same way as the Japanese speakers of Experiment 1 did. In particular, they obtained less migrations for the first mora and syllable compared to the Japanese participants, and did not present the superiority of the mora over the syllable observed in Japanese native speakers. This indicates that the results of Experiment 1 reflect Japanese native language segmentation processes. Experiment 3 explored the possible influence of kanji representations because one kanji often consists of one syllable. Although in Experiment 1 we did not observe any influence of the script of presentation of the targets, Japanese native speakers could have activated kanji representations. To test this idea, in Experiment 3 we presented as targets only katakana words, i.e., loanwords, for which there exists no kanji representation at all. In addition, the material of Experiment 3 was more systematic and refined in terms of Japanese phonology and from a phonetic point of view. The results show that Japanese listeners produced migrations of the first consonant, indicating the intervention of script-independent sublexical properties. Compared to Experiment 1, the Japanese listeners of Experiment 3 did not show more first-mora migrations than syllable migrations: both speech properties led to a similar level of illusory percepts. This confirms that the numerous syllabic migrations observed both in Experiment 1 and 3 cannot be accounted for by the availability of kanji representations in Japanese native speakers. These findings, obtained through a task that required no conscious analysis of the input, suggest that not only morae but also syllables play a role in the perception of spoken Japanese by native listeners, and even phonemes, which have no corresponding isolated sign in the Japanese writing system. Consequently, we suggest that there is no effect of orthography at this early stage of prelexical spoken-word processing.

The Effect of Tonal Structure on Lyrics Comprehension in Cantonese Vocal Music

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Previous behavioural and neurophysiological studies have demonstrated the interdependence of linguistic and musical processing by showing their sharing of a common pool of neural resources (e.g., Poulin-Charronnat, Bigand, Madurell, & Peeremen, 2005; Slevc, Rosenberg, & Patel, 2009; Steinbeis & Koelsch, 2008). The present study extended these findings by examining pitch processing in a lexical context (language) and processing of the accompanying harmonic structure (music), as well as their effects on understanding lyrics involving a tonal language. In a lyrics comprehension task, sung sentences were presented to adult Cantonese speakers, with the lexical tone of words in the target segment being either matched or mismatched with their corresponding musical pitch. The harmonic expectancy was also manipulated such that these target segments were accompanied either by a harmonically expected chord (in-key chord) or by an unexpected chord (out-of-key chord). After listening to the sung sentences, participants were required to answer 2 two-choice comprehension questions directly relevant to the target segments as quickly and accurately as possible. Results revealed that a mismatch in the lexical tone of lyrics and musical pitch significantly impaired lyrics comprehension. However, the understanding of lyrics did not change as a function of the harmonic expectancy (in-key chord versus out-of-key chord). These findings are discussed and contrasted with those from prior studies, arguing that the interaction between linguistic and musical processing occurs in an earlier stage involving more basic processing units.

Cross-linguistic similarity and task demands in Japanese-English processing

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Research on bilingual language processing has demonstrated a robust processing advantage for cognates (e.g., guitar_{English}-guitar_{French}). More recently this processing advantage has been shown for bilinguals whose language do not share a script, such as Chinese-English, Korean-English, and Japanese-English, bilinguals process cognates faster than matched noncognates in a range of tasks (e.g., Hoshino & Kroll, 2008; Jiang & Forster, 2001; Kim & Davies, 2003). However, little work has been done to establish to what extent the cognate processing advantage is modulated by the amount of linguistic overlap. For example, does the English word *radio* have a greater processing advantage for Japanese-English bilinguals than *television* because there is greater overlap with the Japanese cognate (e.g., ラジオ /*rajio*/ vs. テレビ /*terebi*/)? Importantly, the cognate advantage may be modulated by a range of other factors such as L2 (second language) proficiency and lexical variables (e.g., frequency).

Thus to give a more complete picture of the cognate advantage, instead of using the more traditional binary cognate/noncognate distinction, the current study makes use of continuous measures of phonological and semantic overlap, L2 proficiency and lexical variables in mixed effects modeling of data gained from two different tasks: L2 picture naming (Experiment 1) and L2 lexical decision (Experiment 2). Crucially, the use of a production and comprehension task allows us to assess the influence of task demands as a modulating factor of cross-linguistic similarity effects.

For the mixed effects models, cross-linguistic phonological and semantic similarity measures were gained by asking Japanese speakers of English to rate word pairs such as ラジオ/*rajio*/ - *radio* and 耳 /*mimi*/ - *ear*. The ratings show that cognates and noncognates vary in terms of their amount of phonological and semantic overlap. In Experiment 1, we observed an interaction between phonological and semantic similarity, such that increased ratings on both of these measures lead to faster picture naming times. In Experiment 2, much stronger effects of cross-linguistic similarity were observed, such that increased phonological similarity (e.g., *radio*-ラジオ /*rajio*/ vs. *television*-テレビ /*terebi*/) lead to faster lexical decision times, while increased semantic similarity lead to slower responses. Subsequent post-hoc analyses using measures of concreteness and number of L2 senses variables in mixed effects modeling confirmed that for abstract items a greater number of senses speeds responses in lexical decision, as found in previous research (e.g., Hino, Lupker & Pexman, 2002; Tokowicz & Kroll, 2007). Importantly, cross-linguistic semantic similarity also appears to predict responses in lexical decision.

These results, particularly the effects of semantic similarity, demonstrate the importance of task demands in modulating cross-linguistic similarity effects and suggest that studies move towards continuous measures of cross-linguistic similarity when investigating bilingual processing. These experiments also indicate how proficiency and variables such as word frequency modulate L2 word processing. The findings from the current study are explained in terms of interactive activation models for bilingual production (e.g., Costa, Santestebana and Caño, 2005) and comprehension (e.g., the revised Bilingual Interactive Activation (BIA+) model; Dijkstra & van Heuven, 2002).

Perceptions of *Storybird* Digital Storytelling Website for Promoting Chinese EFL Young Learners' Writing Skills

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Robin (2009) considered digital storytelling as commonly used by students and educators to tell their own stories and to create a social community around these stories. Previous studies (Yuksel, Robin, & McNeil, 2010) mainly surveyed college or university instructors' perceptions about using this technology for general educational purposes and positive responses were found. In contrast, based on the evaluation criteria proposed by Chapelle (2001), the five researchers first evaluated three digital storytelling websites for promoting writing skills for Chinese EFL young learners. Among the evaluated websites of *StoryJumper*, *Tikatok*, and *Storybird*, *Storybird* was found to be the most appropriate website due to better learner fit, better teacher fit, and the extra provided functions of "Class Library" and "Discussion". In the second stage, twenty-three preservice elementary and secondary school English teachers enrolling in a computer-assisted language learning course were invited to fill in a 29-item 5-point Likert-scale questionnaire to evaluate the appropriateness of using *Storybird* to promote Taiwanese EFL young learners' writing skills. The self-developed questionnaire was constructed by referencing Liu, Liu and Hwang (2011) and Chen (2011). The items were further divided into three categories regarding different types of website accounts, namely as regular users, as class users, and as teachers. In the first part, the subjects were asked fourteen questions about their opinions and suggestions toward the functions of regular users provided by the website designed for the public. In the second part, the subjects were asked five questions about their opinions and suggestions toward the functions of class users provided by the website designed for teachers and students for their class use. Additionally, in the third part, the subjects were asked ten questions about their opinions and suggestions toward the functions of teachers provided by the website designed for the class use. In a computer lab all participants first received one-hour introduction to the design and functions of *Storybird*. They were then allowed an hour for using the student account to become familiar with the website before completing the questionnaire. The survey results indicate that *Storybird* can be used as a supporting tool to facilitate interactive writing and promote peer collaboration for Taiwanese EFL young learners during the digital story creation process.

Foreign Language Side Effect

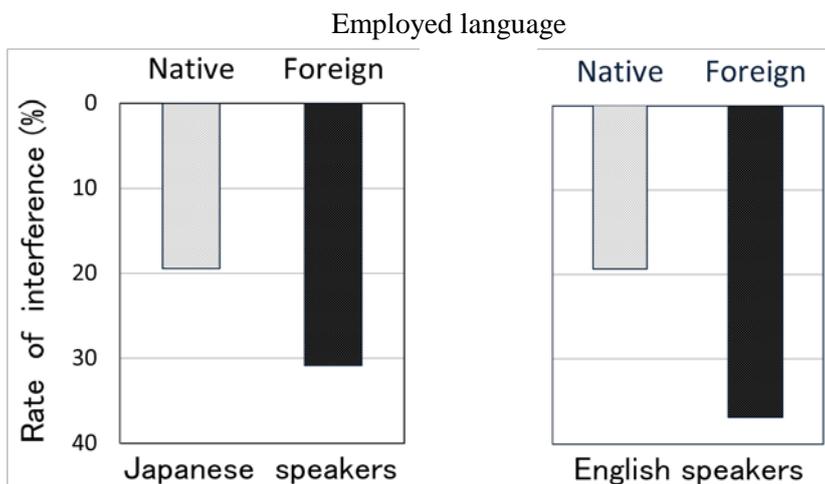
Temporary Decline of Thinking Ability

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The foreign language side effect refers to temporary decline of thinking ability while an unskilled foreign language is being used. It is not foreign language processing difficulty per se, but its interference with concurrent non-linguistic information processing. It was first demonstrated in dual-task experiments (Takano & Noda, 1993), in which both native speakers of Japanese and those of English had to perform both a verbal task and a thinking task concurrently. No foreign language was used in the thinking task (e.g., figure problems from intelligence tests). Their performance in the thinking task was significantly lower when the foreign language was used than when the native language was used in the concurrent verbal task (see the figure below). This deterioration of performance in the thinking task represents the foreign language side effect. The size of this side effect became larger with dissimilarity between the native and foreign languages (Takano & Noda, 1995). This side effect was also observed when the thinking task was accompanied by internal native language (e.g., syllogistic reasoning). In a debate game, intelligence of a debater was rated lower when a foreign language was used than when a native language was used, even though the effect of verbal fluency was controlled for.



First and second language processing of negation-aspect interactions in Chinese

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This study compares native and nonnative processing of negation aspect interactions in Mandarin (hereafter “Chinese”) to determine whether adult second language learners (“L2ers”) can acquire morphosyntax absent in their first language (L1) and process it in online sentence comprehension. The study also illuminates the ways natives and L2ers process morphosyntax in Chinese, a language well known for its scarcity of inflectional morphology (Zhou & Shu, 2011). The specific morphosyntactic features involve the interaction of negation and aspect, as in (1).

- | | |
|--|--|
| <p>(1) a. ta gang kan-guo zhe-ben shu. 3sg just look-GUO this-CL book ‘He/She has just read this book.’</p> <p>b. ta mei kan-guo zhe-ben shu. 3sg not look-GUO this-CL book ‘He/She hasn’t read this book.’</p> <p>c.* ta bu kan-guo zhe-ben shu. 3sg not look-GUO this-CL book</p> | <p>d. ta gang kan-le zhe-ben shu. 3sg just look-LE this-CL book ‘He/She has just read this book.’</p> <p>e.* ta mei kan-le zhe-ben shu. 3sg not look-LE this-CL book</p> <p>f.* ta bu kan-le zhe-ben shu. 3sg not look-LE this-CL book</p> |
|--|--|

Unlike English, which uses only one negator for clausal negation (i.e., *not*), Chinese has two negators: *mei* (negating the completion of an event) and *bu* (negating a situation with no endpoint). The two negators vary in their ability to co-occur with aspect markers such as experiential *-guo* and perfective *-le*. While *mei* can co-occur with *-guo* (1b)—but not with *-le* (1e)—in a [negator + verb + aspect marker] construction, *bu* cannot co-occur with either *-guo* (1c) or *-le* (1f) (e.g., Lin, 2003; Xiao & McEnery, 2008).

L2 representational-deficit theories (e.g., Hawkins & Chan, 1997; Hawkins & Liszka, 2003; Tsimpli & Dimitrakopoulou, 2007), in variants of the Failed Functional Features hypothesis, predict that because the negation-aspect interaction in Chinese is regulated by grammatical features not instantiated in their L1, L1-English L2ers cannot acquire this knowledge; and L2 processing-deficit theories like the Shallow Structure Hypothesis (Clahsen & Felser, 2006) predict that L2ers cannot use this knowledge online because it involves a nonlocal dependency relation (i.e., the relevant elements in [1] are separated by the verb).

The comprehension-focused, noncumulative moving-window, self-paced reading study, presented in simplified Chinese characters, uses 24 sets of experimental sentences like (1), distributed across 6 lists in a Latin square design, plus 64 fillers. The fillers include grammatical uses of *bu* in other sentence types so as to prevent participants from making any association between the appearance of *bu* and ungrammaticality. The L1-English L2ers’ Chinese proficiency is assessed via a fill-in-the-blank quasi-C-test (maximum score=50). The advanced L2ers ($n=30$; quasi-C-test scores: $M=28.3$, $SD=8.1$), but not the intermediate L2ers ($n=24$; quasi-C-test scores: $M=10.8$, $SD=5.1$), pattern like the natives ($n=30$; quasi-C-test scores: $M=45.6$, $SD=2.3$) in their processing profile, with a significant main effect of ungrammaticality at the post-critical *zhe* and *ben* regions both when the negator is *mei* and when it is *bu*. This indicates that L2ers whose L1 lacks any negation-aspect interaction are able to acquire such knowledge and use it in online sentence processing as proficiency rises. The results thus challenge deficit theories of L2 acquisition/processing. More generally, the study contributes to a better understanding of (native and nonnative) sentence processing in Chinese by demonstrating that in certain grammatical domains, morphosyntax plays an indispensable role.

Mandarin Speakers do not Show Uniformly a Vertical Bias in Temporal Judgment

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Do English and Mandarin speakers think about time differently? Boroditsky (2001) claimed they do, i.e., English speakers tend to conceptualize time horizontally while Mandarin speakers tend to do it vertically. This is because horizontal spatial metaphors are used to express time relations in English (e.g., March is before July), but vertical spatial metaphors are also used to express time in Mandarin (e.g., the month on the top ‘last month’). But the claim did not stand in three failed replications (Chen, 2007; January & Kako, 2007; Tse & Altarriba, 2008). Recently Boroditsky reported new data from a different task to support her claim, which was modified to emphasize the vertical dimension only (Boroditsky, Fuhrman, & McCormick, 2010). The task involved presenting English and Mandarin speakers two pictures one at a time and asking them to determine whether the scene depicted in the second picture (e.g., a young Woody Allen) occurred earlier or later than the scene depicted in the first (an old Woody Allen). In the horizontal condition, the participants pressed the left key for ‘earlier’ and the right key for ‘later’ on a computer keyboard, a response tendency that was considered the canonical one. Or, they pressed the keys reversely, producing noncanonical responses. In the vertical condition, the keyboard was mounted vertically perpendicular to the tabletop so that left and right keys became top and bottom keys. Both canonical (top being ‘earlier’) and noncanonical (bottom being ‘earlier’) responses were measured in this condition as well. The results show that canonical responses were made faster than the noncanonical responses (a canonicity effect) for the Mandarin participants in the vertical condition, but the canonicity effect was not observed in the same condition for the English participants. We reexamined the results reported in the literature as well as those in our recent study, all employing a similar temporal judgment task. The samples included four groups of English speakers from Pennsylvania and California and six groups of Mandarin speakers from Shanghai, Guangzhou, Beijing (China), Tainan (Taiwan), California and Singapore. The English speakers demonstrated a consistent horizontal bias (i.e., greater horizontal than vertical effect) across samples. But, the Mandarin speakers split in two subgroups, with one (Taiwan, Beijing, Shanghai, Singapore) demonstrating a consistent vertical bias but the other (Guangzhou and California) a consistent horizontal bias. Thus, although English speakers more clearly think about time predominantly horizontally, some Mandarin speakers do too. Therefore, language alone cannot be the real explanation of the cross-linguistic difference in the conception of time.

Relations of orthographic awareness to literacy and mathematics skills among Korean children living in urban and rural communities

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This study tested 98 and 95 kindergartners living in rural and urban communities of South Korea, respectively, with the tasks of literacy, mathematics, and cognitive-linguistic skills to compare performances in the two groups. This study also examined which cognitive-linguistic skills explain unique variance of literacy and mathematics skills. Specifically, this study included word reading and writing tasks for literacy, phoneme and syllable deletion tasks for phonological awareness, left-right reversal and lexical decision tasks for orthographic awareness, a number naming task, and two visual tasks of visual discrimination and visual spatial relationships. Parent's education level and family income were reported by parents.

Results showed that family income and father's education level of children of age 4 and 5 in urban communities were higher respectively than those in rural area. However, mother's education was not statistically different between two communities. Four-year old children living in urban community performed better than those in rural community in most tasks included except mathematics, whereas five-year old children living in urban area performed better in five tasks including Hangul reading, coda deletion, number naming, visual discrimination and lexical decision. Interestingly, vocabulary skill was higher among 4-year old children living in rural community than those in urban area. Hierarchical regression analyses showed that orthographic processing (left-right reversal and lexical decision) significantly explained 5% and 2% variance of Hangul reading and writing, respectively, after controlling for community type, age, and vocabulary in step 1, phonological awareness and RAN in step 2, visual and morphological tasks in step 3. Final Beta weights showed that community type, onset and coda deletion, number naming speed, visual discrimination, left-right reversal and lexical decision tasks independently explained Hangul word reading; vocabulary, onset and coda deletion and left-right reversal tasks explained Hangul word writing. In addition, vocabulary, syllable deletion, number naming speed and visual spatial relationships explained mathematics skills. This study suggests that orthographic processing contributes to Korean Hangul reading and writing among Korean young children.

The relationship of language and emotion: evidence from ERPs to semantic and syntactic anomalies

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Daily experience reveals that mood colours our perception, thinking and actions. In line with this research in several domains like memory and decision making has shown that mood influences how we process information. Surprisingly little is known about the interface between mood and language. In three ERP studies we investigated the effects of a person's background emotional state (i.e., mood) on visual language comprehension. The experimental approach was as follows: We induced different emotional states (happy vs. sad) by presenting film clips that displayed fragments from a happy movie or a sad movie. Participants read sentences while ERPs were recorded. In all three studies the mood induction was effective: participants were happier after watching happy film clips and sadder after watching sad film clips. In Study 1 (Chwilla, Virgillito, & Vissers, 2011) we studied the effects of mood on semantics, as tapped by N400, by investigating the effects of mood on mid-sentence critical words that varied in cloze probability (e.g., high cloze: "In that library the pupils borrow books" vs. low cloze: "The pillows are stuffed with books ..."). For N400, mood by cloze probability interactions were obtained. The N400 cloze effect was strongly reduced in the sad mood compared with the happy mood condition. The mood by semantic processing interaction for N400 supports embodied theories of meaning and challenges abstract symbol theories that assume that processing of word meaning reflects a modular process. In Study 2 we investigated the effects of mood on syntactic processing as tapped by P600 (Vissers, Virgillito, Fitzgerald, Tendolkar, Speckens, Oostrom, & Chwilla, 2010), by comparing the P600 effect to syntactic verb-agreement errors relative to correct sentences (e.g., "The daughter who about their parents talked [plural]" vs. "The parents who about their daughter talked [plural]"). For P600, a mood by syntactic correctness interaction reflected a strong reduction in P600 effect to syntactic errors in the sad mood compared to the happy mood condition. Three possible accounts for the P600 modulation by mood were provided: one in terms of syntactic processing, one in terms of heuristic processing, and one in terms of more general factors like attention. In Study 3 (Vissers, Chwilla, Egger, & Chwilla, under revision) we further determined the locus of the mood effects by investigating the effects of mood on the processing of semantic reversal anomalies compared to their plausible counterparts (e.g., "The cat that fled from the mice..." vs. "The mice that fled from the cat..."). These semantic anomalies are not syntactically ambiguous, but have been shown to reliably elicit a P600 effect which has been explained in terms of heuristic processing. For P600, a semantic plausibility by mood interaction revealed the presence of a P600 effect in the happy mood but absence of a P600 effect in the sad mood condition. The latter interaction can be explained in terms of heuristic processing (a stronger reliance on a good enough representation of the linguistic input in a happy than a sad mood), but not in terms of syntactic processing. Taken together, the results of the present ERP studies clearly show that emotional factors influence processes of language comprehension.

The same or different:

An investigation of cognitive and linguistic correlates of Chinese and English word reading for native and non-native Chinese speaking children

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In order to compare foreign and native learners of Chinese on metalinguistic correlates of word reading in both Chinese and English, we tested 102 third and fourth graders from an English-Chinese bilingual school in Hong Kong. Children were grouped based on their mother's first language being either Chinese or non-Chinese (primarily alphabetic) and tested on a range of reading related tasks in both Chinese and English.

The two groups, native Chinese speaking group (62 children, Mean age: 99.23 months, SD: 7.39 months) and non-native Chinese speaking group (40 children, Mean age: 97.18 months, SD: 7.78 months) performed equally well on most of the English reading related tasks except for English vocabulary and English phonological working memory, in which tasks the non-native Chinese group showed advantages. However, the non-native Chinese speaking group lagged behind the native Chinese group on most Chinese reading related tasks including word reading, vocabulary knowledge, working memory, rapid automatized naming, lexical tone awareness and Chinese orthographic skills, even after the age and nonverbal reasoning were statistically controlled for, although the two groups didn't differ on their Chinese phonological awareness skills at syllable, onset-rime and phoneme levels and pure visual skills.

Hierarchical regression analyses revealed that the unique correlates of Chinese word reading for both groups were Chinese vocabulary knowledge, Chinese working memory, lexical tone awareness, and visual-orthographic skills. For the non-Chinese group only, pure visual skills were also unique correlates of Chinese word reading skills. In comparison, similar analysis showed that the unique correlates of English word reading for both groups were English vocabulary, English phonological awareness. However, while visual skills have positive contribution to English word reading for the native Chinese speaking children, it contributed to English word reading negatively for the non-native Chinese children.

Taken together, the results showed that oral language and phonological skills are important for learning both languages. However while visual and visual orthographic skills are important for learning to reading Chinese as both a first and second language, it was not the same for English word reading. Only native Chinese speaking children apply visual skills in learning to read English.

A Web-based Approach To Chinese Word Segmentation

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Chinese text processing requires the detection of word boundaries. This is a non-trivial step because Chinese does not contain explicit white space between words. Existing word segmentation techniques make use of precompiled dictionaries and treebanks. The creation of dictionaries and treebanks is a labor-intensive process and consequently they are updated infrequently. Furthermore, due to their static nature, dictionaries and treebanks lack the latest words that enter the lexicon. This paper proposes a way to leverage content on the Internet to build a bootstrapping Chinese word segmenter. The segmenter can perform automatic updates allowing it to incorporate the latest lexicon.

A significant problem when segmenting Chinese text arises from the presence of out-of-vocabulary (OOV) words. The OOV word problem occurs due to the fact that no dictionary or treebank can possibly list all words encountered during an NLP task. There are several mechanisms for creating new words in Chinese. First, new words can be created through the concatenation of existing words, i.e. compounding. Second, a new word can be formed by using existing characters in a new combination. The third method is by transliteration which is used extensively in translating foreign names to Chinese. To successfully detect word boundaries when processing Chinese text, we need to properly handle out-of-vocabulary words.

The Internet provides a wealth of human generated content. In the last decade, China has seen an exponential growth in its number of Internet users. The country currently has over 513 million Internet users, nearly one quarter of the world users. New content is being generated to cater to these users (news, social media sites, etc.) and similarly the users themselves are generating content (web logs, wikis, online forums, etc.). This rich environment of natural language data has made corpus building an attractive idea.

Human generated content on the Internet can be found embedded within the tags of HTML pages. We leverage this generated content to construct a bootstrapping word segmenter. Initially, the segmenter begins with zero knowledge, running in a lexicon building stage. Once a sufficient lexicon is constructed, it can then begin to operate as a functioning word segmenter employing a longest matching technique. The framework we propose in this paper excels in the area of OOV word detection, a major hurdle in Chinese word segmentation research.

Reimagining the potential of word association data:

Thoughts from constructing the Japanese Word Association Database

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The word association task is undoubtedly one of the earliest methods used within psycholinguistic research to investigate the nature of lexical knowledge and the structures of the mental lexicon. In reporting on its first use in 1883, Francis Galton astutely realized its potential for exploring the foundations of human thought; an insight later echoed in the works of Cramer (1968) and Deese (1965). However, while presumably to some extent due to the subsequent emergence of corpus linguistics and the relative ease of extracting collocation data, together with the development of corpora-based projects like FrameNet, it is also fair to comment that linguistic, psycholinguistic and cognitive science research has tended to somewhat neglect the value of word association data more recently (Sinopalnikova & Smrz, 2004; Joyce & Srdanovic, 2008). Thus, despite its long tradition and an early period of extensive utilization, regrettably, there is also an undeniable ring of truth to Schmitt's (2010: 248) recent comment that vocabulary research using the word association task is "still waiting for a breakthrough in methodology which can unlock its undoubted potential".

A prime goal of the JWAD project is to develop lexical association network maps, as visual representations of the word association responses in terms of their ranges and frequencies at both single-word and small-domain levels, as a promising approach to capturing and highlighting the association patterns that exist between Japanese words. As Jackendoff (2002: 267) has commented, "meaning is the "holy grail"" of cognitive science, and this phrase is particularly poignant in both simultaneously emphasizing the fundamental importance of meaning and acknowledging the serious challenges to attaining this highly elusive prize. In further cultivating a tentative proposal outlined in Joyce (2011), this presentation also discusses the continuing development of a classification for the association relationships observed within the JWAD, as an extremely appealing approach towards examining the psychological validity of lexical relationships and towards more fully realizing the potential of word association data to provide important insights into lexical knowledge.

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Uncovering the Myth of Learning to Read Chinese Characters: Phonetic, Semantic, and Orthographic Strategies used by Chinese as Foreign Language Learners

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Chinese is considered to be one of the most challenging orthographies to be learned by non-native speakers, in particular, the character. Chinese character is the basic reading unit that converges sound, form and meaning. The predominant type of Chinese character is semantic-phonetic compound that is composed of phonetic and semantic radicals, giving the clues of the sound and meaning, respectively. Over the last two decades, psycholinguistic research has made significant progress in specifying the roles of phonetic and semantic radicals in character processing among native Chinese speakers. However, there is little evidence about the processes involved in learning novel characters among non-native Chinese language learners. In this study, we addressed this issue in three ways. First, we examined whether the native language learning experience affected the process of novel character learning. Second, we compared whether the learning strategies used by Chinese as foreign language learners changed due to the reading proficiency. Third, we also examined whether phonetic and semantic radicals are factors that could predict foreign language learners' character proficiency. A group of 93 Chinese as foreign language learners who are represented 28 languages spoken nowadays were asked to completed a picture-novel character mapping task with conditions: (1) no cue; the participants were asked to select one out of the five choices of pseudocharacters, which was best representing the picture provided based on their first impression as well as using their Chinese character knowledge; (2) phonetic cue provided; participants were asked to name the picture first, such as the picture bridge /qiao2/; and (3) semantic cue provided conditions; participants were provided with a short description of the graphic picture, such as the picture bridge, the participants was told that bridges in the old days were made of wood. There are five choices including two pseudocharacters, two non-characters, one target-irrelevant control for each picture. Two pseudocharacters represented the correct placement of semantic and phonetic radicals. Two non-characters represented the misplacement of the semantic and phonetic radicals. The target-irrelevant control is the pseudocharacter which didn't relate to the target picture at all. We found that Chinese as foreign language learners used semantic, phonetic and positional different strategies to learn novel characters while positional strategy was dominating across conditions. Moreover, native language learning experiences didn't influence the use of strategies in encoding novel characters. There was no difference found in learning strategies among beginning, intermediate and advanced learners. In addition, semantic radical was found to be a unique predictor of Chinese character recognition. Our findings suggested that the cognitive processing mechanism underpinning novel character learning is uniquely shaped by the unique features of Chinese and would not be affected by native languages and Chinese proficiency. Furthermore, our findings for the first time imply that Chinese character learning would not be challenging if one understands the language features thoroughly.

Co-construction of L2 discourse in group work

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Appropriate knowledge of pragmatics is indispensable for successful communication, and it has been well acknowledged that acquiring such ability in a second language (L2) is not an easy task. Although the importance of examining L2 learners' sociolinguistic knowledge is generally recognized, the majority of studies focuses on speech acts, utilizing discourse completion task (DCT) or role play, and overlook other aspects that delve into learners' ability to 'use' their L2.

In L2 classrooms, more and more teachers utilize group work or pair work in order to enhance learners' communicative competence. Previous studies (e.g., Nakahama, 2005; Ohta, 2001; van Lier and Matsuo, 2000) have shown that it is possible to provide L2 learners with great learning opportunities by having them work among themselves. With this background in mind, the current study attempts to extend the scope of previous studies on group work by allocating one L2 speaker who plays the role of 'facilitator' in the group work. The study was conducted in order to examine how L2 learners' autonomous participation in discussions can be achieved with the use of a facilitator within the framework of Sociocultural theory.

The group work sessions took place twice, 30 minutes at a time. There were four students in the group that included one facilitator whose L2 proficiency level was higher than the rest. They were asked to perform four sets of DCTs on speech acts (three on 'request' and one on 'warning'), discuss their answers and come up with the correct answers among them. The whole conversation was videotaped and transcribed for later analysis. The results revealed that though there were grammatical mistakes in the learners' discourse, they went uncorrected. However, when the lower proficient learners stumbled with certain expressions or phrases followed by silence, the facilitator gave them a helping hand. The learners occasionally repeated these words or phrases that were given to them by the facilitator. This 'helping hand' only occurred on the lexical level, but never on the grammatical level. This might indicate that the facilitator focused on leading the conversation in order to get across meaning, rather than being the teacher to the learners of lower proficiency level. The facilitator gave a plethora of back-channeling and nodding to learners when it was their turn, and that non-verbal behavior gave the other learners courage to jump into the conversation during the task. Laughter was also observed in both sessions of group work, and its function was mainly to create rapport among the learners. At the presentation, we will provide a detailed qualitative analysis of both verbal and non-verbal aspects of interactions among L2 learners found during the group work.

The study shed light on L2 classroom discourse research as to how learners co-construct L2 language use with the help of another learner whose proficiency level is higher than them. Our next objective is to compare group work with or without a facilitator to highlight the benefit of employing a facilitator in learner-learner interactions.

Factors Affecting Chinese EFL Learners' Intelligibility

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For ESL/EFL learners whose L1 is syllable-timed like Chinese and Japanese, the stress-timed nature and rhythm of English is a bottom-up skill they especially need (Celce-Murcia, Brinton, & Goodwin, 2001; Melenca, 2001), but the over-emphasis on syllables creates a "staccato rhythm," which directly causes problems in comprehensibility. While stressing the importance of pronunciation instruction, Gilbert (2008) indicates that "rhythm and melody" serve as "road signs" for the listener to follow the meaning of the speaker. In the English prosodic system, to correctly convey the message, the speaker needs to use appropriate prosodic markers for thought groups. And in every thought group there is a focus word. To put the necessary emphasis on the focus word, the speaker needs to appropriately use intonation. The employment of rhythm thus needs the knowledge of emphasis and de-emphasis, in which the knowledge and application of reduced forms plays an important role. Rhythmic production through application of reduced forms appears to be a bottom-up skill worthy of instruction for students to attain better intelligibility. To investigate the factors affecting Chinese EFL learners' intelligibility, the present study recruited 25 sophomore English majors with intermediate GEPT, a standardized English proficiency test launched by Language Training and Testing Center in Taiwan. The subjects were required to orally read a 24-sentence self-developed reading text with a high reliability coefficient of .926. The reading text is composed of six types of reduced forms, linking, flapping, elision, h-deletion, contraction, and palatalization. Following the scoring criteria encompassing 7 features proposed by Warren, Elgort, and Crabbe (2009), the rating was given on a 9-point scale by two experienced pronunciation instructors, a native speaker and a non-native speaker, with an average interrater reliability of .803. Results of Stepwise Multiple Regression analysis showed that among the 7 features, rhythm and intonation were the top two factors accounting for up to 88.4% of the variance. Next come vowels, sentence stress, rate, consonants, and word stress for affecting Taiwanese English majors' oral intelligibility. This result supports the necessity of instruction of prosody, which comprises intonation, rhythm, and sentence stress.

Are Students Cognitive Misers in Learning L2 Vocabulary?

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The issue of cognitive cost in students' learning strategies use has not been adequately examined in research. The findings from the few studies that have looked into this issue suggest that such cost has an influence on students' selection of strategies to use. For example, Uesaka and Manalo (2012) reported that, in math word problem solving, the greater cognitive transformational steps involved in the construction of more abstract diagrams (e.g., tables and graphs) render such diagrams less likely to be used compared to more concrete forms of diagrams (e.g., simple illustrations) that require less cognitive effort to construct. Manalo and Uesaka (2012) also found that, in the production of written explanations of learned information, university students were less likely to use a diagram when the information to be described was of lower imageability – and hence would likely require the use of greater cognitive resources to construct. However, aside from the use of diagrams in math word problem solving and in the provision of written explanations, no investigations had been carried out regarding other kinds of learning strategies in other subject domains.

In the present study, the question of whether students make adequate effort in learning second language (L2) vocabulary words was examined, along with possible reasons that may explain the amount of effort they use. The participants were 84 Japanese university students who were taking a second-year compulsory course in academic reading in English, which was the students' L2. The course required the students to learn words from Coxhead's (2000) academic words lists, and the students were administered bi-weekly tests on selected words from those lists. The students' performance in two consecutive tests were examined, along with their descriptions of strategies they used to study for the tests, and their appraisals of the difficulty levels of those strategies, their confidence in their ability to use the strategies, and their expectations about the effectiveness of the strategies – all information which was gathered from surveys the students were given immediately following each test.

The results showed that on average the students used a strategy requiring low effort (mean = 2.49 on a Likert-type scale of 1 to 5, where 1 = “very easy to use” and 5 = “very difficult to use”), and half of the strategies described (50%) were of a “shallow” processing type, involving only repetition and rote memorization. When asked if they could think of a more effective strategy to use, 62% of the students indicated that they could, and the perceived difficulty level and effectiveness of those strategies were significantly higher. However, in the second test, only 22% of the students reported using the “more effective” strategy they had thought of, while 71% reported using the exact same strategy as in the first test. An examination of the relationships between the difficulty levels and types of the strategies employed, and the students' scores in the tests, suggest that a disconnect between these may partly explain the students' cognitive miserliness in preparing for their vocabulary assessments. In other words, more effort did not necessarily equate to the use of “deeper” processing strategies; nor did it result in better outcomes in the tests. Implications for educational practice and for further research are discussed.

Masked Repetition Effect in Reading Chinese Word: Is a Processing of Composition or Decomposition?

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Many Chinese words have multiple constituent characters which could generate independent perceptual objects during reading. There are no convincing evidences indicated the lexical representation of a word accessed by multiple objects (constituent characters) or by one object (a compound). If the lexical processing was initiated by constituents, the processing of target word would obtain average cost from the unrelated prime. The repetition effects would be equal no matter the properties of unrelated prime (word frequency; word or nonword). If the lexical processing was initiated by compound, the processing of target words would obtain the less cost from the unrelated high-frequency words. Eventually the repetition effect based on the unrelated high-frequency words could be the shortest.

In the first study, two possibilities were tested in the masked repetition effect of two-character words across word frequency (high versus low). The repetition effects were measured in two types of baseline (unrelated real words versus unrelated nonwords). The repetition effect of high-frequency words based on the unrelated real words was significant smaller than that based on the unrelated nonwords, but this difference was insignificant for the repetition effects of low-frequency words.

In the second study, the repetition effects of high- and low-frequency words were measured respectively based on the unrelated high- and low-frequency words. For each pair of prime and target words, the word frequency and character frequencies of constituents were matched. The mean latencies showed a slightly larger but insignificant repetition effect for the unrelated low-frequency words. However, the analysis with mixed-effect model indicated the significant difference caused by the word frequency of unrelated prime words. In addition to the types of prime words, the first constituent character frequency of target words was the only fixed effect revealed by the latency data. These findings appear to support the by-compound hypothesis and could generate many productive issues about Chinese word reading.

Chinese Orthographic Decomposition and Logographic Structure

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Chinese orthographic decomposition refers to a sense of uncertainty about the writing of a well-learned Chinese character following a prolonged inspection of the character. This study investigated the decomposition phenomenon in a test situation in which Chinese characters were repeatedly presented in a word context and assessed whether the decomposition of a character is related to the boundness of its constituent radicals. Two experiments were conducted to compare differences in the rate of decomposition between two types of *LR-character* (i.e., such a character consisted of two radicals juxtaposed horizontally). One type was the characters with each character consisting of *unbound radicals* (i.e., the radicals can stand alone and have their own lexical entries). The other was those with each consisting of *bound radicals* (i.e., the radicals cannot stand alone and have no lexical entries). Results show that the decomposition of the LR-characters was robust but independent of the boundness and, hence, lexicality of their constituent radicals. This result suggests that the character decomposition is better understood by considering that the link between a visual character and its sound is not direct so that its sound cannot be used to bind its visual details into the gestalt in which the character is perceived, which may finally result in an orthographic decomposition.

The orthographic consistency effects in Chinese spoken word recognition

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In alphabetic languages, *orthographic consistency or feedback consistency* is defined as the degree of mapping consistency from phonology to orthography, or to be more specific, whether words had rimes that can be spelled in multiple ways (e.g., /ip/ in *heap* and *deep*). Studies have demonstrated the orthographic consistency effect, in which the auditory lexical decisions to feedback inconsistent words took longer and yielded more errors than did those to feedback consistent words. It suggests that the orthographic knowledge influences the spoken word recognition. Chinese has a relatively simple syllable structure. The pervasive homophony of Chinese implies the orthographic form is particularly important for selecting meaning and escaping homophony in Chinese. It is expected that there might be a greater impact from orthography during spoken word recognition in Chinese than in other alphabetic writing system. This study examined two types of orthographic consistency effects, namely homophone density and feedback consistency in the semantic categorical task with event-related potentials (ERPs) measurement. In this study, the homophone density is defined as the number of characters sharing exactly the same pronunciation (including tonal variation) and the feedback consistency is defined as whether a set of homophone can be subdivided into several subgroups based on their phonetic radical. The data revealed that the feedback consistency effect in the N400 time window with frontal central distribution and the homophone density effect in the late positivity component with central parietal distribution. The finding is congruent with the orthographic consistency effect found in English and supports the bi-directional interaction between orthography and phonology for Chinese word recognition.

Embedded word activation in Chinese

The case of phonetic radicals

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In previous experiments, Zhou and Marslen-Wilson (1999) showed that the meaning of phonetic radicals in Chinese complex characters is activated in a character naming task. This finding is interesting because a phonetic radical is by definition unrelated to the meaning of the carrying character and its semantic activation will serve no function but interfere with the normal character recognition process. We further explored the nature of this semantic activation in the present report. In Experiment 1, we manipulated the character frequency and demonstrated that the meaning of phonetic radicals was activated only in characters with low frequency. In Experiment 2, we employed a multi-prime lexical decision task and showed that the semantic activation of a phonetic radical was weakened by a prior context which was consistent with the whole character but not the radical. These data are interpreted as evidence for a competition between the meanings of a phonetic radical and the whole character. This competitive process is remarkably similar to the mutual inhibition between the whole word and an embedded word (e.g., “hat” in “that”) in European languages. Collectively, our results would contribute to the understanding of lexical embedding in Chinese.

What can two types of errors in gesture imitation tell us?

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In order to examine why people make mistakes in the imitation of hand/arm-gestures, we analyzed two types of imitation errors (“shape-type” errors: incorrect performance of gesture shape; “mirror-type” errors: reversal performance of right and left hand-gesture). A total of 139 healthy University students took an imitation task using meaningless hand/arm gestures. The participants were instructed to reproduce the gesture as quickly and accurately as possible in a non-mirror imitation mode (e.g., if the demonstrator raised his or her right hand, the participant was expected to raise his or her right hand). The gesture imitation task differed in the mode of presentation: one was a face-to-face condition in which a human demonstrated gestures, and the other was a monitor condition in which video-recorded gestures were presented on a monitor. These two imitation tasks were conducted in two consecutive block sessions (human condition and monitor condition).

The participants were assigned into three groups according to monitor size (7”, 17” and 50”) in the monitor condition, and all three groups participated in the human condition. The error rates in the three groups were analyzed. Furthermore, in order to examine the process of the imitation errors, we analyzed the “moving latency” of the imitation performance (from when a demonstrator begins his/her hand movement to when a participant begins his/her hand movement) under the 50” condition.

Error data: (i) shape-type errors were inversely proportional to the monitor size. The higher error rate resulted with the 7.1” monitor, while the 50” monitor resulted in the same low error rate as the human condition. (ii) mirror-type errors presented no differences between the human and the monitor conditions regardless of the monitor size and session order. These results suggest that imitation of hand shapes are more difficult to identify under reduced monitor sizes (7” and 17” monitor), while gesture rotation performance (mirror type error) is not affected by monitor size or task repetition.

Latency data: The “moving latency” of all error performances was shorter than that of the correct performances. These findings suggested that both shape- and mirror-type errors originated in an anticipated performance (insufficiency in observation and planning). The monitor condition showed longer “moving latency” only in shape-type errors, which suggests a deficit of clues (2D vs Real) in the demonstrator. The “moving latency” in mirror-type errors showed no differences in human and monitor conditions, which suggests that mirror-type errors may be originated in a more automatic mental process.

Brain-to-brain communication during social interaction

A near-infrared spectroscopy study

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Brain-to-brain coupling is analogous to a wireless communication system in which two brains are coupled via the transmission of a physical signal (such as sound or action) through the shared environment (Hasson et al., 2012). Communication is a joint activity between people in an embodied situation. Much of communication is mediated by speech. The speaker-listener brain coupling, including the inferior parietal lobule (IPL) and the inferior frontal gyrus (IFG), underlies successful communication (Stephens et al., 2010). Not only via the verbal speech, communication but also emerges through non-verbal interactions. To examine whether two persons show brain-to-brain coupling during social interaction without verbal communication, the present study, using near-infrared spectroscopy (NIRS), simultaneously measured the parietofrontal activations of the pairs of participants when they performed a computer game (Decety et al., 2004). One participant's task was to build a target pattern by placing circle tokens on a monitor as a builder, and the other participant's task was to help or disrupt the builder as a cooperater or a competitor, respectively. Two participants took turns placing the tokens (the builder always took the initial move). We analyzed the participants' concentration changes of oxygenated hemoglobin under the cooperation and competition conditions. The NIRS data demonstrated two main results. (1) The builder showed higher activation than the cooperater under the cooperation condition in the right IFG, but not in the left IFG or the bilateral IPL. There were no significant differences between the builder and the competitor under the competition condition bilaterally in either IPL or IFG. This result suggests that the builder under the cooperation condition was more actively engaged in the game playing than the cooperater. (2) Under the cooperation condition, the builder and the cooperater showed a significant positive correlation in the right IPL, but not in the left IPL or the bilateral IFG. Under the competition condition, the builder and the competitor did not show significant positive correlation in either bilateral IPL or IFG. The correlative activations between two persons suggest that the right IPL may govern brain-to-brain communication during non-verbal social interaction.

Keyword: Brain-to-brain communication, Cooperation, Competition, Inferior parietal lobule (IPL), inferior frontal gyrus (IFG), Near-infrared spectroscopy (NIRS)

Understand *after* Like, viewer's delight?

A NIRS study on behavioral/neural response in combined hedonic and cognitive appraisal of art

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This study investigated the behavioral and neural aspects of the interrelation of hedonic appraisals of *liking* and cognitive appraisal of *understanding* within a judgment task. The relation of these two modes of environmental appraisal has long been one of the core discussions of psychology, with researchers questioning their potential distinction, connection as well as their primacy or ordering effect—i.e., does understanding necessitate liking, or vice versa? Is appraisal of the environment predominantly a liking or understanding task?

Our goal was to explore three aspects of this discussion: 1) that either individual appraisals of positive or negative liking/understanding may show significant differences in subject attention/neural response; 2) that combinations of same (e.g., Liking + Understanding, Not Liking + Not Understanding) vs. mixed (NL+U, L+NU) appraisals may show higher or lower occurrence and neural response. And 3) that the specific ordering of liking and understanding appraisal modes themselves may show significant behavioral and neural difference depending on which mode one utilizes first. Specifically, we tested, for the first time, implications of a new model for processing the environment (Chatterjee, 2003; followed by Leder et al., 2006; Nadal et al., 2008; Cela-Conde et al., 2011) which suggests that perception begins first with the brain's appraisal for liking followed by understanding and suggesting that initial hedonic evaluation may prime an individual for a more involved subsequent cognitive response.

Using paintings, previously shown to be a particularly effective stimuli for evoking both liking and understanding assessments (e.g., Belke et al., 2010), thirty-two viewers were asked to view the art within one of two conditions. Half (N = 16, U-L condition) viewed first for 10s and then made an evaluation of Understanding/ Not Understanding via keypress, followed by 10 more seconds of viewing and an evaluation of Liking/ Not Liking. The other half made appraisals with questions reversed (L-U condition). Subject's brain activation was monitored via Near Infrared Spectroscopy, with bilateral Pre Frontal Cortex, previously noted as a major component of integrated hedonic/ understanding processing, as region of interest.

Artwork appraisal showed no inter-dependence of individual evaluations, with first positive or negative appraisals having no significant effect on subsequent (positive or negative) judgment. We also found no order effect, with both L-U/ U-L orders resulting in the same ratio of outcomes, roughly a 60:40 ratio of same and mixed evaluation. There was also no differences in time of keypress. However, neural response did show significant order and interrelation effect. Subjects asked to evaluate first for liking and then understanding had pronounced bilateral activation differences in the latter understanding task. One-way ANOVA comparison of the four evaluation outcomes showed significant differences as well as significant differences between same (i.e., 'Like + Understand') and mixed ('Like + No Understand') appraisals, with mixed appraisals showing heightened activation and same showing a lowered response. On the other hand, U-L order, regardless of evaluation made, showed no significant differences and generally dampened response throughout both appraisal tasks. Results suggest that, while behaviorally there are no apparent differences in question ordering, neurally, environmental processing may be driven by hedonic followed by understanding. That is, evaluating first whether or not one "likes" a stimulus may prime us for a more involved effort to cognitively understand, especially when one makes a mixed set of liking and understanding judgments.

A possible cause of the occurrence of the stepwise shape of word learning curves

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Recently, Minami et al. examined longitudinal diary data of 17 infants [3]; these data indicated that the shapes of word learning curves are not smooth but stepwise as shown in Figure 1.

Minami et al. stated that future studies should investigate the reason behind this. Therefore, this study shows one possible cause of the occurrence of the shape. However, the mechanism of the acceleration of the curves is not covered in this study.

Both McMurray [2] and Hidaka [1] simply assume that children acquire a word if they are exposed to it a given number of times. Their simulation results thus showed no stepwise transition. However, in our simulation, co-occurrence frequency of each word and its possible referents are counted, and a word is judged as acquired when the statistical significance of the co-occurrence of the word and its referent exceeds a threshold.

In Figure 2, there are several points, which are indicated by dotted circles, at which the number of acquired words rapidly increases. In these points, multiple words were simultaneously learned after a single utterance. We found that these words have a common pattern of co-occurrence frequency and believe that this is not a specific character of the proposed model, but generally occurs in competitive learning systems such as winner-take-all neural networks.

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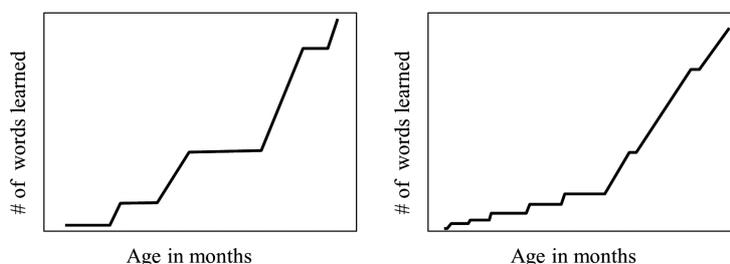


Figure 1: Two examples of the stepwise word learning curves reported in [3] (redrawn by the authors).

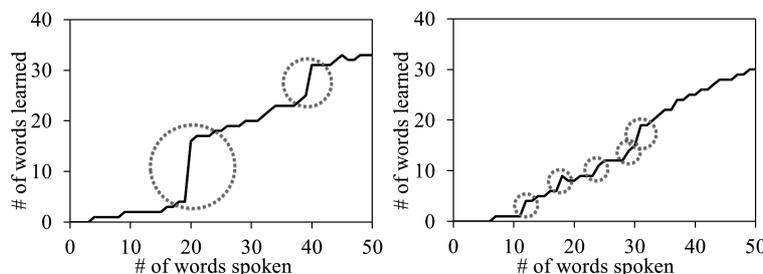


Figure 2: Two examples of our simulation results. The differences in the height and numbers of steps are caused by the simulation, that is, the numbers of the possible referents of each word.

Age of acquisition affects the retrieval of grammatical category information

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This study investigated age of acquisition (AoA) effects on processing grammatical category information of Chinese single-character words in a grammatical category decision task. In Experiment 1, nouns and verbs with different AoA were used as materials. Results showed that the grammatical category information of earlier-acquired nouns and verbs was easier to retrieve. In Experiment 2, AoA and predictability from orthography to grammatical category were manipulated in a grammatical category decision task. We found larger AoA effects in the lower predictability condition. In Experiment 3, a semantic category decision task was used with the same materials as used in Experiment 2. Different results were found from Experiment 2, suggesting that the grammatical category decision task is not merely the same as the semantic category decision task, but rather involves additional processing of grammatical category information. In summary, it was found for the first time that AoA affects the retrieval of grammatical category information, thus providing new evidence in support of the Arbitrary Mapping Hypothesis.

Key Words: age of acquisition, noun, verb, grammatical category

Morphological Priming Effects for High and Low Proficient Bilinguals

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While there have been many researches that studied the morphological priming effects in the visual word recognition process, the vast majority of the studies focused on the subject's native languages. This masked priming lexical decision experiment was carried out in order to observe the difference in lexical processing between high proficient and low proficient Korean-English bilinguals. All participants The experimental visual stimuli consisted of English words (L2) that had combinations of morphological, orthographic, and semantic relationships between the prime – target pairs, and were the same stimuli that Kathleen Rastle, Matt H. Davis, William D. Marslen-Wilson and Lorraine K. Tyler used in their 2000 morphological priming study. Previous masked priming studies by Kim and Davis (2010) showed that Korean natives used phonological cues to process Hangul, while Nam et al. (1999) found that Korean bilinguals utilized orthographic traits when recognizing English. Therefore, we predicted that High proficiency bilinguals would use morphological traits when recognizing English words, while Low proficiency bilinguals would utilize orthographic traits. The prime-target conditions were the following: (1) morphologically, semantically and orthographically related, (2) morphologically, and orthographically related, (3) orthographically related, (4) semantically related or (5) identical. The prime-target pairs were presented for 200ms, in order to compare results when the prime-target pairs were fully visible.

The results showed that highly proficient bilinguals had significantly faster response times, and showed a statistically significant priming effect differential between the two subject groups. Whereas high proficiency bilinguals showed inhibitory effects for all 5 conditions, low proficiency bilinguals showed significant priming effects in all conditions, except inhibitory effects in the orthographically related condition.

The results are conflicted with previous studies on priming effects, and offer a new outlook for morphological priming studies, especially combined with the field of bilingualism. The faster response time do in fact prove that high proficiency subjects were more comfortable with the stimuli, but a possible conflict in the activation of the lexicon may have contributed in the inhibitory effects shown in the results. Since the current study was based on 200ms visual presentation of the stimuli, more research on varying stimulus onset times should be done, with short presentation times in order to construct a more solid time course of how bilinguals process their second language.

Sentence comprehension and semantically anomalous sentences in EFL learners of Persian

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This study investigated the role of semantically anomalous sentences in the comprehension of the sentences in light of evidence from Iranian EFL learners. One hundred and twenty sentences with three word order types were provided as an online experiment on Author ware Macromedia. The Results are reported from the reaction time technique and grammatical judgment task from thirty Intermediate English students with Persian as their native language. Total reading times and correct judgments on three word order types were evaluated. The patterns of results indicate that word order does affect the comprehension of the sentences. The most significant variance is reported in SVO and OVS word order sentences.

The Role of Word Relation in Chinese Character Priming

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To explore the Chinese Character recognition process, manipulating relations between a prime and a target character in Chinese character priming tasks is an important research method. In previous research, semantic relation and associative relation drew great attention; however, in the Chinese writing system, the constituent characters of a word can be assigned as a prime and a target character in the tasks, and the word relation should be considered as an important theoretical relation as well. The purpose of the present study is to investigate whether the word relation is involved in automatic character recognition process or is only strategically used as a clue to predict target characters. A single-character priming paradigm with a lexical decision task and a naming task were used respectively in two experiments. In order to observe priming effects produced only by the word relation, the semantic and associative relations between prime and target characters were avoided; the character frequency of prime and target characters were carefully controlled. Word relation, word frequency, and neighborhood size of the prime character were then manipulated at three stimulus onset asynchronies (SOA). If the word relation is involved in the automatic recognition process, priming effects should be found at a short SOA. If the word relation is only involved in strategic processes, priming effects should be found only at long SOAs and the neighborhood size factor should affect the patterns of priming effects. In both of the tasks, the results showed that the word relation yielded priming effects at an SOA of 50 milliseconds. It evidenced that the word relation is involved in the automatic Chinese character recognition process. Furthermore, surprisingly, larger priming effects were found in the low word frequency trials. It may imply that, in the high word frequency trials, the processing of target characters was interfered by the automatic processing of high frequency word. At an SOA of 150 milliseconds, the results showed that different neighborhood size of prime character affected the patterns of priming effects in the lexical decision task but not in the naming task. This demonstrated that, in the lexical decision task, participants can use the word relation as a clue to predict target characters to improve their task performance when they have enough time to process prime characters. However, in the naming task, participants did not take the strategy and only concentrated on the pronunciation of target words; therefore, the patterns of priming effects at the SOA of 50 and 150 milliseconds in the naming task were quite the same.

Keywords: character recognition, word relation, priming

Orthographic and Phonological Neighborhood Characteristics Affect Chinese Feedback Consistency Effect

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Studies on word recognition suggested that recognition of individual words is influenced by the degree of consistency on the mapping from phonology to spelling. This effect, which is called feedback consistency effect, has specific theoretical value on whether connectionist and brain models of visual word recognition require designs of feedback connections from phonology to orthography (Lacruz & Folk, 2004; Stone, Vanhoy, & Van Orden, 1997; Ziegler, Montant, & Jacobs, 1997; Ziegler, Petrova, & Ferrand, 2008). Evidences of feedback consistency effect seemed successfully obtained in early attempts; however, Ziegler et al. (2008) suggested no reliable effect of feedback consistency in visual modality. In the present study, we re-examined the feedback consistency effect in visual lexical decision task manipulating the sizes of orthographic and homophonic neighborhoods to reconcile the instable problem in previous research on this effect.

The degree of feedback consistency in Chinese could be affected by the friends, which are both orthographic and homophonic neighbors to the target, and the enemies, which are homophonic but not orthographic neighbors to the target. Two experiments with lexical decision tasks were conducted in the present study, with the orthographic neighborhood size, but not the homophonic neighborhood size was controlled, in Experiment 1 and the homophonic neighborhood size, but not the orthographic neighborhood size, was controlled in Experiment 2. In such a way, the degree of feedback consistency in Experiment 1 was actually affected by the enemies of the target, whereas that in Experiment 2 was decided by the friends of the target. Both reaction times and accuracies for lexical decisions were measured. Only experiment 2, in which only homophone neighborhood size was controlled, demonstrated the effect of feedback consistency, suggesting that the number of friends, which are both orthographic and homophonic neighbors to the targets, determined the presence of the feedback consistency effect.

Neural correlates of semantic processing in youths with Autism Spectrum Disorder (ASD) with different social and communicational abilities

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Deficits in verbal/nonverbal communication and social reciprocity are core features of children with Autism Spectrum Disorders (ASD). Previous research has examined the neural mechanism of these two features separately. However, it has not been well understood if the deficits of communication and social reciprocity together would affect semantic processing in autism. In this study, we used functional magnetic resonance imaging (fMRI) to investigate neural correlates of semantic processing in children with ASD with different social and communicational abilities. We assessed 26 youths with ASD and 13 neurotypical controls (age range: 8-18). The ASD group was further divided into two groups (severe vs. mild) according to their composite scores of social interaction and communication subscales of the Social Communication Questionnaire (SCQ). Age, gender, handedness, and VIQ scores were matched across three groups. Participants performed the Chinese semantic judgment task during scanning. All the participants were further assessed with the Social Responsiveness Scale (SRS) for individual difference of social ability. For the semantically-related condition, both ASD groups showed reduced activation in left inferior frontal gyrus (IFG) and bilateral anterior insula cortex (AIC) as compared with controls, implying weaker ability of integrating semantic information with experiences, thoughts, and actions in autism. In addition, the severe group showed greater activation in right/left superior temporal gyrus (STG) than the other two groups, suggesting that ASD with severe social and communicational impairments may need more effort to understand the intention of instructions and requirements in the semantic task. Furthermore, across all 39 participants, signal intensity in left IFG and bilateral AIC were negatively correlated with scores of SRS, further supporting that children with worse social ability might have difficulty in information integration.

English Word Recognition Process by Chinese speakers

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Objective: A lexical decision task was employed to investigate the process of English word recognition by native Chinese speakers who are also known as ESL (English as Second Language) learners. The major issue is: Does a native Chinese reader retrieve an English word serially or holistically?

Method: 30 Taiwanese native speakers were recruited in the present study. The key variable we are interested in is the length of an English word. The letter length of a stimulus ranged from three to eight. A total of 96 real words and 96 pseudo words were adopted in the lexical decision task. Both real word and pseudo word pool have 16 words for each of the six different letter lengths. For real words, the familiarities of different letter lengths are controlled. The pseudo words are constructed by replacing one letter – either a consonant by another consonant, or vowel with another vowel – in a real word (e.g. *do*y for toy). In order to understand participants' English proficiency level, all participants also completed an English version of Peabody Picture Vocabulary Test-Revised (PPVT-R) and Word Attack, one of the subtests of the Woodcock-Johnson Psycho-Educational Battery.

Results: We observed that accuracy of real words is .90 and .78 for pseudo words. The participants' accuracy rate slightly declines as letter lengths increase. For the latency analysis, participants took longer time to recognize long real words, as shown in the response latencies for letter length three ($M = 660.42$, $SD = 68.43$), four ($M = 691.11$, $SD = 74.47$), five ($M = 707.30$, $SD = 84.06$), six ($M = 726.43$, $SD = 90.69$), seven ($M = 752.60$, $SD = 92.69$) and eight ($M = 794.50$, $SD = 101.42$) respectively. The response latencies for pseudo words increase as a function of the letter lengths (letter length three ($M = 774.24$, $SD = 88.77$), four ($M = 809.82$, $SD = 131.34$), five ($M = 817.83$, $SD = 117.95$), six ($M = 865.60$, $SD = 133.44$), seven ($M = 937.04$, $SD = 117.68$) and eight ($M = 946.25$, $SD = 154.36$)). Thus, robust letter length effect was observed for both real and pseudo words.

Discussion: In sum, a stable letter length effects was found for English words by native Chinese speaker, after controlling for familiarities in different letter length. We therefore concluded that a native Chinese speaker employed serial processing in identifying an English word. We are still recruiting participants in this study. Further analysis will examine whether there is an interaction between proficiency level and letter length effect.

Keywords: Bilingual, second language, visual word recognition, word length effect, vocabulary ability.

The constraint and cloze probability effects on Chinese classifier-noun agreement in two hemispheres

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Previous studies have suggested that the left hemisphere (LH) makes effectively use of the contextual information to predict the upcoming words, while the right hemisphere (RH) seems less efficient in using the contextual information but adapts a “wait-and-see” strategy for sentence comprehension. This event-related potential (ERP) study utilizes the unique characteristics of Chinese classifier-noun agreement to examine the hemispheric processing of the contextual constraint and the cloze probability to target words with the split visual field paradigm. In each trial, participants perceived either a strongly or a weakly constrained classifier presented in the central of screen. The classifier was then paired with a highly expected (high cloze probability, 75%), less expected (low cloze probability, 6.25%), or implausible noun, presented on the left or right visual field. A significant interaction between contextual constraint and cloze probability was found on the N400 component in RVF/LH, but not in LVF/RH. The result supports that the both hemispheres show differentially sensitivity to the contextual constraint. Only the LH efficiently uses the context information to predict the upcoming words. In contract, the RH processes words in a more integrative fashion and thus only main effects of contextual constraint and cloze probability were revealed on the N400.

Cognitive-linguistic contributions to academic achievement from Chinese children from low-and middle-socioeconomic backgrounds

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This study investigated the independent and interactive contributions of family socioeconomic status (SES) and cognitive-linguistic skills to academic achievement in Hong Kong Chinese kindergarteners. Executive functioning, parent-child verbal interaction, phonological awareness, visual skill, Chinese and English word reading, and applied mathematics problems were assessed among 199 Chinese-speaking children from low SES and middle SES backgrounds in the second year of kindergarten. Children from low SES exhibited lower levels of cognitive-linguistic skills and academic performance than their middle SES counterparts. Results also showed that executive functioning and verbal interaction had a direct effect on mathematics performance and phonological awareness mediated the association between executive functioning, verbal interaction, reading and mathematics attainment. Results underscore the importance of family SES inequalities and cognitive-linguistic skills for early reading and mathematics acquisition.

The role of radical properties for Chinese orthographic awareness: An eye movement study

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Very few studies investigating Chinese character recognition adopted eye movement patterns as clues to explore how the various properties of Chinese radicals involve the processes. For examining the eye movement patterns in reflecting the underlying processing of Chinese recognition, the present study recruited 40 Taiwanese university students to participate a real-word-decision task for assessing their orthographic awareness. Four radical position-based frequencies (HH, HL, LH, LL), three character-like degrees (P-WN, SN-WN, and P-SN), and two radical positions (left and right) were manipulated. The dependent variables are correct rate of the task and eye movement patterns collected by an eye tracking setting. The results show that, according to the correct rate analysis, radical position-based frequencies and character-like degrees would significantly impact the orthographic awareness task under several different situations. On the other hand, the eye movement data for two radical positions exhibited opposite patterns while relying on other factors. In sum, the study reports that the eye movement patterns during the recognition of Chinese characters indeed imply fairly complex but certain systematic internal processes of Chinese recognition in terms of orthographic awareness. These findings could shed light on teaching and learning of Chinese characters and psycholinguistics. Further researches pursuing the details of mechanisms are expected in the future.

Keywords: Chinese character processing, eye movement patterns, radical positions, radical frequencies.

Cross-modal correspondence between brightness and Japanese diacritical marks is not found in Chinese speaker

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Cross-modal correspondence is correspondent relationships between the stimuli belong to different sensory modalities. For example, Marks (1987) showed the cross-modal correspondence between brightness (visual stimuli) and pitch of tone (auditory stimuli) using Garner's speeded classification (Garner, 1974). Cross-modal correspondence is often argued about similarity toward sound symbolism and connection between these two phenomena is also considered (Hirata, 2008).

Hirata (2009) conducted an experiment to examine the cross-modal correspondence between Japanese diacritical marks (dakuten and han-dakuten) and brightness using Garner's speeded classification. Dakuten is a Japanese diacritical mark to change the voiceless consonants to voiced consonants (e.g. character of /sa/ with dakuten is pronounced as /za/). On the contrary, han-dakuten is a Japanese diacritical mark that has a function to change the pronunciation of the character /ha/ to /pa/. Hirata (2009) showed that dakuten is matched with darkness, and han-dakuten is matched with brightness.

This phenomenon is assumed that the cross-modal correspondence between evoked auditory information of voiced/voiceless consonants from dakuten and han-dakuten and brightness. However, the possibility for universal cross-modal correspondence between figural element of dakuten and han-dakuten and brightness need to be considered. If the universal cross-modal correspondence between figural elements and brightness consists, it would be observed in the non-Japanese speakers.

The same task as Hirata (2009) was conducted to the twenty-four graduate and undergraduate students in Shanghai, China. No one of the participants was reported that they have learned Japanese before. As the result, no cross-modal correspondence was found in Chinese speakers. This result indicates that the cross-modal correspondence between Japanese diacritical marks and brightness is based on the evoked auditory information of Japanese diacritical marks but not the figural elements of dakuten and han-dakuten. Chinese speaker with no Japanese experience do not know about the rule of Japanese diacritical marks to change the pronunciation and therefore no cross-modal correspondence was observed in this experiment. In conclusion, cross-modal correspondence of Japanese diacritical marks is limited for the speakers who learned Japanese and knew about the rule of pronunciation change.

Does number of stroke matter in naming Chinese character? For a fluent reader, maybe it is not the case.

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Objectives. The function of stroke number of a Chinese character had been taken as equivalent to the function of letter length in English. In the past, letter length effect in English by native English speakers had been observed in school children but not young adults. Number of stroke effect had also been observed by school children in Chinese. The main issue we address in this study is whether number of stroke matter in naming with the control of frequency by young adults. Collecting the responses to large number of words had been demonstrated to be an important method to understand the processes of word identification. In this study, we had collected the naming accuracy and latency rates of 5200 Chinese characters by undergraduate students of native Chinese speakers.

Methods. This study recruited totally 60 undergraduates participated this study. 5701 characters in daily used were employed as the stimuli. We split all the 5701 characters by frequency into two sections. 30 subjects were requested to response to one of the two sections. All the subjects were requested to name the character shown on the screen as soon as possible. We collected the accuracy and response latency of every character.

Results. After statistically partially out the effect of frequency, we observed that that there is no stroke number effect of a character, either by accuracy or response latency. Further analysis discussion and implication will be presented in the conference.

Keyword: word-length effect, number of stroke

The Time Course of Phonological and Semantic Processing in Chinese Orthographic Judgment Task

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The time course of phonological and semantic processing in Chinese word recognition has been extensively studied and has provided evidences for the universal phonology principle. One of such evidences came from the earlier interference of phonological processing in the synonym judgment task than that of semantic processing in the homophone judgment task (Perfetti & Zhang, 1995; Liu, Perfetti, & Hart, 2003). However, it could be argued that it is inappropriate to compare effects of interferences between two different judgment tasks since homophone and synonym judgment tasks may demand different cognitive processes and strategies. In the present study, we examined the time course of phonological and semantic interferences in one single orthographic judgment task, in which participants made form judgment on characters, to provide a better comparison between two processes.

In the present orthographic judgment task, participants were to decide whether the target characters were formed horizontally or vertically as accurately and as quickly as possible. Each target character was preceded by a prime character which was the homophone, synonym, or unrelated control of the target character. The design of the present experiment was a 2x2x3 mixed design with the SOA (stimulus onset asynchrony: 100ms vs. 200ms) as the between-participants factor, and the type of prime (homophone vs. synonym vs. control) and form (horizontal vs. vertical) as the within-participants factors. The results demonstrated an earlier and stronger interference of synonyms than that of homophones in our orthographic judgment task, suggesting that phonological processes, rather than semantic processes, may be optional in Chinese orthographic processing.

Developmental changes in the neural correlates of thematic processing to Chinese characters: an fMRI study

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A thematic relation indicates that the relationship between two stimuli is held together by external relations or a unifying scene/event. Such a thematic relation can speed up semantic processing in both children and adults. However, little is known about the neural correlates regarding the thematic relation between children and adults. In this study, character pairs were split into the strong and weak thematic relations while controlling for semantic association strength. A cross-modal semantic judgment task was used to decide whether a written character and a spoken character were related in meaning. Participants who underwent functional magnetic resonance (fMRI) scans were 20 children (10-14 years old) and 20 adults. The behavioral results showed faster reaction times for the strong than for the weak thematic relation in adults, but not in children. As to fMRI results, the contrast of the weak versus strong thematic relation produced greater activation in right thalamus and right superior temporal gyrus in adults than in children. In contrast, the same contrast produced greater activation in bilateral superior/middle frontal regions (BA 8) in children than in adults. These findings suggest that adults may activate thalamus to integrate cross-modal information more effectively than children. The greater involvement of frontal regions for children may be related to a more effortful cognitive loading to process the weak thematic relation.

Keywords: thematic relation, fMRI, development, cross-modal task

Code-switching effects in word recognition of visually presented ideograms:

An event-related potentials study on Chinese-Japanese proficient bilinguals

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Speakers familiar with more than one language often alternate languages within or between sentences. Such code-switching incurs cognitive costs, such as a slowdown in comprehension when stimuli involve mixed languages. Some studies have suggested that bilinguals of phonetic languages inhibit their first language when accessing word meaning in their second language^[1, 3, 4]. Would such effect be found with bilinguals of ideographic languages? ERPs provide a continuous account of brain activity to an external stimulus that requires no overt responses. Previous studies on phonetic languages observed ERP response unique to code-switching that can be regarded as indices for inhibitory control^[1, 2, 4]. The major aim of the current study was to use ERP measures to examine the language switching effects in proficient bilinguals of two ideographic languages, namely Chinese and Japanese.

14 native speakers of Chinese (L1) who had passed JLPT N1 participated in our study (12 women, mean age 25, SD = 1.6). All were right-handed and exposed to Japanese (L2) for at least one year. The stimuli consisted of 200 non-cognate words (100 in Japanese and 100 in Chinese) and 80 pseudowords where one kanji or hanzi was modified in real Japanese or Chinese words. Target words were visually presented on the screen one-by-one, in such a way that they could be either preceded by a word that is neither orthographically, phonologically, or semantically related to the target word from the same or different language. Pseudowords were randomly mixed with the target words. Participants pressed a button on the response box whenever pseudowords appeared (pseudowords: 28.6% of the entire trials).

Based on the International 10-20 system, the ERP data was recorded from 19 scalp locations. ERPs were quantified by taking the mean amplitude in two temporal windows (300-500ms; 600-800ms). These two epochs were analyzed separately in repeated measures analyses of variance. The factors included were switching (language switch vs. no switch) and electrode sites (Fz, Cz, Pz, F3/4, C3/4, P3/4). In the 300-500 ms window, within the Chinese-target trials, language-switch trials (L2-L1) were more negative than non-switch trials (main effects of switching: $F(1, 13) = 4.9, p < .05$). The comparable switch from Chinese to Japanese and no-switch (Japanese-Japanese) produced no significant difference in this epoch. In the 600-800 ms window, within the Chinese-target trials, language-switch trials (L2-L1) produced marginally more positive-going ERPs than non-switch trials at posterior sites (switching \times electrode site interaction: $F(8, 104) = 2.6, p = .06$). No significant differences were observed between and within language trials for Japanese targets.

This study examined the language switching effects in proficient bilinguals of two ideographic languages, Chinese and Japanese, and found that the amplitude of negativity in the 300-500 ms window is significantly enhanced in L2-L1 switching trials compared with those with no language switch. This indicates that language switching is costly in ideographic languages as well as in phonetic languages. We also observed that Japanese words were less sensitive to language switches. This is not consistent with previous research using behavioral data that report language-switch cost in generalized lexical decision is equally strong in L1-L2 and L2-L1^[5]. We leave a more detailed examination of these asymmetries for future research.

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Young children's visual perspective taking ability and word learning

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Taking other people's perspectives is an important ability to communicate with others effectively. The present research examined when children can exploit others' visual perspectives when learning new words.

Even young infants can understand others' visual perspectives that are different from theirs (e.g., Luo & Baillargeon, 2007). By 4 years of age, children can consult others' visual perspectives when figuring out the referents of others' words. For example, in Nurmsoo and Bloom (2008), children saw two novel objects being placed where the experimenter could see only one of them but the children could see both. The experimenter said, "Where's the [novel word]?" or "There's the [novel word]!" while looking at the visible object. Four-year-old children succeeded in finding the referents of the novel words in both *where* and *there* trials. However, younger children were able to find the novel words' referents only in *there* trials. Why did younger children fail in *where* trials? In the experiment, the experimenter was fixating her eyes at the visible object while uttering the sentences. Because gaze triggers one's attention automatically (Driver, Davis, Ricciardelli, Kidd, Maxwell, & Baron-Cohen, 1999), it might have been difficult for younger children to ignore the speaker's gaze toward the visible object in *where* trials. The current study examined whether younger children could understand the meaning of the word in both *where* and *there* trials when they do not have to ignore the speaker's gaze.

In Experiment 1, 3-year-old children participated in a choice task similar to Nurmsoo and Bloom (2008), except that the experimenter did not look at an object but looked at the child when uttering sentences. During the training phase, two novel objects were placed behind occluders on the apparatus floor. One object was behind the opaque occluder and the other was behind the transparent occluder. Thus the experimenter could see only one object (Figure 1), whereas children could see both. After looking at both occluders, the experimenter looked at the child and uttered a sentence - "Where's the [novel word]?" or "There's the [novel word]!" During the test phase, the speaker asked child to give her the referent of the novel word, by asking "Can you give me the [novel word]?" There were 2 *where* and *there* trials each, and children were more likely to choose the referents of novel words than predicted by chance, at least on the first *where* and *there* trials.

In Experiment 2, we tested younger children, 2-year-olds, in a preferential-looking version of the task. They watched a video including the training and test phases. During the training phase, children watched a video scene identical to the training phase of Experiment 1. During the test phase, children watched a video scene including two objects alone on the apparatus floor, and heard a sentence "Which one is [novel word]?" Two-year-old children looked longer at the correct referent of the novel word on *there* trials, but not on *where* trials.

The current findings suggest that at least by 3 years of age, children can understand the relationship between others' visual perspectives and words like adults and older children (Brown-Schmidt, Gunlogson, & Tanenhaus, 2008; Nadig & Sedivy, 2002; Nurmsoo & Bloom, 2008). Two-year-olds had difficulties with selecting an object hidden from the experimenter's view as her word referent. Future studies will examine whether 2-year-olds' difficulties could be due to limited cognitive processing abilities or limited sensitivity to others' perspectives.

Effect of linguistic experience on the discrimination of Shona lexical tone

Lexical tone processing

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The issue of perception of non-native lexical tone perception has been addressed mainly through East Asian languages, whereas studies on African tonal languages have been scarce. This paper examines how experience with a tone language (Thai) and with pitch variations at the sentential level (German) influences the perception of a typologically different tone language (Shona). Tone perception in adults is influenced by experience with the phonological inventory of one's native language. However, the extant data demonstrates that good to ceiling performance on tone perception is not restricted to tone language listeners. To this effect tone perceptual discrimination was investigated in experiment 1 using minimal pairs of Shona words and their filtered homologues, whereas experiment 2 tested the effect of increasing the number of phonetic contrasts using minimal and non-minimal pairs in Shona words and hums. The results revealed that the Shona and Thai listeners discriminated both the Shona words and low-pass filtered stimuli significantly better than the non-tone listeners in both experiments. In experiment 2 it was also observed that although the accuracy performance of the tone language listeners is comparable, the types and pattern of errors committed are quite different. Results are discussed in light of phonetic and phonemic processing.

Difference between Word and Syllable Boundary on Spoken Word Recognition in Korean Continuous Speech

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The purpose of this study was to examine the effects of the re-syllabification process on the perception of Korean speech. In Experiment 1, the stimuli were divided into two conditions; the first one is the syllable alignment condition (e.g. CVC-CV for two word syllables and (C)VC-CVC for the target word), and the second the misalignment condition (e.g. CVC-CVC for two word syllables and (C)VC-CVC for the target word). Results showed that misalignment condition was faster than in the alignment conditions. In Experiment 2, each condition's context was non-word syllable. Results showed that the detection of targets in the alignment condition was faster and had a lower error rate than in the misalignment conditions. Experiment 3, was conducted to generalize the re-syllabification effect. Results of Experiment 3 were the same as the result of Experiment 2. That is, Korean continuous speech is segmented by re-syllabification processes and syllable boundary cues.

The Role of Strong Syllables in Segmentation of English by Koreans

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English native listeners use the Metrical Segmentation Strategy (MSS) for the segmentation of continuous speech, perceiving strong syllables as potential word onsets. This study investigates whether Koreans employ the same strategy when segmenting speech input in English. Word-spotting experiments were conducted using bi-syllabic targets embedded in nonsense tri-syllables. Only good performers showed less error rates in the detection of strong-initial words, compared to weak-initial words. Poor performers showed no effect of strong syllables. As for reaction times, both groups were slower to detect strong-initial words. These findings suggest that Korean listeners do not use the MSS in the same way as English listeners do. These results are discussed in terms of intonational properties of the Korean prosodic phrase which serve as lexical segmentation cues in the Korean language.

A Multi-dimensional Analysis of Gesture Employment among Native Cantonese Speakers

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Non-verbal behaviors are used together with spoken language in human communication. According to Knapp and Hall (2010), co-verbal gestures are often used to supplement verbal communications, maintain and establish attention of conversations, and add emphasis to speech. This investigation aims to develop a multi-dimensional classification framework that codes and quantifies gesture forms and functions employed during spontaneous speech tasks. The development of this system was motivated by the lack of a distinction between forms and functions in most previous works. Specifically, we explored the relationship between gesture forms and functions. How linguistic proficiency and age affected the use of gestures was also examined.

Methods

Language samples were collected from 119 neurologically unimpaired right-handed male and female native speakers of Cantonese of different ages (18;00-39;11, 40;00-59;11 and $\geq 60;00$) and education levels (higher or lower than secondary school for the two younger groups, and higher or low than primary school for the oldest group). Three speech tasks, including personal monologue, sequential description, and story-telling, were used for elicitation. Each orthographically transcribed language sample and digitized video were linked using the EUDICO Linguistic ANnotator (ELAN; Max Planck Institute for Psycholinguistics, 2002). Three independent tiers were generated in each ELAN document to annotate the (1) linguistic information of the transcript, (2) forms of gestures appeared, and (3) function for each gesture used.

Results

A total of 3,061 gestures were annotated from 82 participants throughout all tasks. The remaining 37 speakers did not produce any gestures. The majority of gestures were non-content-carrying (non-specific: 84.1% and beats: 3.4%). Distribution of content-carrying gestures was as follow: deictic (5.8%), iconic (3.3%), metaphoric (2.3%), and emblems (1.1%); they mainly functioned as helping listeners to decode verbal messages (82.9 to 92.7%). Beats, on the other hand, served to emphasize speech content (78.6%) or to regulate flow of conversation (21.4%).

Speakers with a higher linguistic proficiency (as reflected by a higher type-token ratio in discourse) tended to use fewer gestures. An age effect was found in which older speakers demonstrated an increased frequency of gestures. Use of non-specific gestures was also found to always accompany incidents of dysfluency, such as pauses, interjections, repetitions, prolongations, or self-corrections.

Conclusion and Future Direction

Our findings suggested that gesture employment in normal speakers differed as a function of linguistic performance and age. Further extension will involve the application of the current quantification system to speakers with aphasia and related cognitive-communicative disorders.

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The Role of Syllable in Visual Word Recognition: Evidence from Korean Monosyllabic Words

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Three experiments were carried out to investigate the role of syllable frequency when visually recognizing Korean monosyllabic words. In Experiments 1 and 2, Korean non-homophonic words were used as experimental materials, whereas Korean homophonic words were used in Experiment 3. Results showed facilitatory effects of both word and syllable frequency in lexical decision task (Exp.1), and facilitatory effect of syllable frequency only in naming task although the magnitude of the effect was considerably weakened (Exp.2). Results from Experiment 3 also revealed a facilitatory effect of word frequency but the effect of syllabic neighborhood size was not significant. In conclusion, the results of this study suggest that syllable units play an important role during the visual recognition of Korean words, and that orthographic syllable rather than phonological syllable is more responsible for accessing the mental lexicon.

The role of semantic radical awareness and stroke order on early Chinese acquisition in writing

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The purpose of the present study was to investigate the relationship between orthographic awareness and Chinese writing, as well as the relationship between stroke order and Chinese writing. Orthographic awareness in the study specifically referred to the understanding of the representation of the internal components of a character, that is, the functions of the semantic radical and the phonetic radical comprising given compound characters. Stroke order referred to the correct sequence in writing a Chinese character. The importance of orthographic awareness in non-alphabetic language such as Chinese has been confirmed in many studies; meanwhile researchers have started to pay attention to the role of copying in Chinese learning. Several studies have shown that copying plays an important role in learning to read and write Chinese. In the present study, stroke order, which entails not only copying but also the correct sequence in writing Chinese characters, was analyzed and examined in relation to writing. Eighty Hong Kong kindergarteners from four schools were recruited in the study and they were tested on nonverbal IQ, Chinese word reading, semantic-radical awareness tasks, which included semantic radical knowledge by picture and semantic radical knowledge by character, and dictation writing. Results were that word reading was significantly correlated with all other tasks; while semantic-radical awareness tasks were both positively correlated with Chinese dictation, even after nonverbal IQ and word reading were statistically partialled from the equation. The findings of this study shed light on the importance of semantic-radical awareness on children's Chinese acquisition in early literacy acquisition. Children who can represent their knowledge of semantic radicals can make good use of these to learn to write Chinese. Also, perhaps by explicitly being taught semantic-radical knowledge, children can benefit from understanding the semantic information across characters, hence facilitating their writing.

Key words: orthographic awareness, semantic-radical awareness, stroke order, Chinese writing

Flexibility of choosing reading units: A study of Chinese poor readers

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Introduction

The basic units in the Chinese writing system are characters (e.g. 刀 /dou1/ [knife]). Each character in general corresponds to one syllable, which is the basic phonological unit in Chinese. In modern Chinese, there exist single-character words and multi-character words (e.g. 牛奶 /ngau4 naai5/ [milk]). Among them, two-character words are the majority [1]. Previous studies have demonstrated that Chinese children are able to use both character-by-character strategy and holistic strategy to name Chinese two-character words [2]. Specifically, it has been reported that children are able to use the character-by-character strategy to name low frequency two-character words. On the other hand, they tend to use the holistic strategy to name high frequency two-character words. It appears that not only the ability to use the character-by-character and the holistic strategy but also the ability of shifting between naming strategies according to word frequencies is essential to children's reading development. It is hypothesized that difficulties in developing such ability of strategy shifting might result in poor performance in naming certain types of two-character words.

The current study tested the above hypothesis by comparing the abilities of naming two-character words and of naming single characters in a group of Chinese poor readers. If there exist a group of poor readers who have difficulties developing the ability of strategy shifting, a mismatch between the naming of two-character words and single characters is expected.

Methods

Twelve Cantonese-speaking children (10 males; mean age = 10.22 yrs) with reading difficulties took part in the study. All participants had normal non-verbal IQ. They all scored at or below -1.33 SD on the two-character word reading subtest of the Hong Kong Test of Specific Learning Difficulties in Reading and Writing (HKT-SpLD) [3]. The participants' abilities to name Chinese characters were assessed using the Hong Kong Graded Character Naming Test (HKG CNT)[4]. Their verbal vocabulary, phonological processing skills and visual-spatial memory abilities were also obtained.

Results and Discussion

Nine poor readers (8 males) failed in the HKG CNT (average z-score = -3.2) but three poor readers (2 males) passed (average z-score = -0.36). The poor performances in naming two-character words but normal abilities in naming single Chinese characters observed in the latter group suggest that the group has difficulties applying the character-by-character strategy to compensate their difficulties in naming two-character words. Results revealed that the latter group may be not flexible enough in choosing reading units [5, 6]. Analyses of the cognitive profiles between the two groups yielded no difference in phonological processing skills and visual-spatial memory abilities. However, the latter group scored significantly lower in the verbal vocabulary task than the former group. Educational and theoretical implications will be discussed.

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Syntactic Profiling of Chinese Pre-schoolers

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This study aims to bridge the gap with an examination of Chinese syntactic structures in the language samples produced by preschoolers at different ages, in order to provide developmental age trends in the development of these skills. The project will result in an analysis framework, Syntactic Profiling Procedure (SPP) that allows users to describe individual children’s syntactic ability.

In order to capture the advancement of syntactic skills, we will develop a framework of syntactic analysis for codifying the milestones in Cantonese. Such kind of profiling procedure had been well developed for English-speaking children, (e.g. Language Assessment, Intervention and remediation, LARSP, Crystal, Fletcher, & Garman, 1989) and was widely adopted to analyze samples from typical children and children with oral language disorders and dyslexia. Given the linguistic differences between English and Chinese, the analysis methods suggested in the Western countries cannot be applicable to the Chinese language. We adopt the traditional Cantonese grammar as the framework of analysis to better capture the developmental milestones in Cantonese and Mandarin speaking children

The syntactic structures of compound words are basically similar. According to Zhu (1982), Chinese compounds can be syntactically categorized into five different types with respect to the structural relationship between component characters, namely modifier compound (偏正), verb-object compound (述賓), supplement compound (述補), subject-predicate compound (主謂), and coordinative compound (聯合). Sentences in Chinese can has six different types. Among them, five categories are identical to those mentioned above. The additional category is double predicate construction (連謂).

More complex sentences development can be captured by a level analysis. For example,

| | | | | | | | | | | |
|---------------------------------|---|---|-----|---|---|---|---|--|---------|---------|
| 我 班 裏 面 · 同 學 成 日 講 無 禮 貌 嘅 · 話 | | | | | | | | | | |
| 主 | | | | | 謂 | | | | | Level 4 |
| 定 | | | 中 | 述 | | 賓 | | | | Level 3 |
| 主 | 謂 | | 狀 中 | | 偏 | | 正 | | | Level 2 |
| | | 偏 | | | 正 | | | | Level 1 | |

Based on these rules of word and clause combination, we attempt to capture Chinese children’s development in syntactic complexity in terms of the type of the rules as well as level of complexity by trialing out the framework in real data in a pilot study. Conversational samples from 13 preschool children, 9 Cantonese speaking and 4 Mandarin speaking, were collected and analyzed in this pilot study. Preliminary data revealed that these profiling procedures is feasible and can reveal some general developmental trend in the syntactic development in Chinese speaking children. But certain modifications are necessary to fully capture the advanced syntactic development in later school years. For example, complex sentence with the use of conjunction and should be taken into account.

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Evaluating the effect of neighborhood size on Chinese word naming and lexical decision

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Character frequency is defined as the summation of frequencies of all words sharing that particular character. It is then easily inferred that character frequency would covariate with the number of words embedding that character. Without considering this covariance, any experiment manipulating neighbor words size without frequency of the commonly shared character being controlled should not derive a logical clear conclusion. Huang et al (2006) and Tsai et al (2006) manipulated word frequency and word neighborhood size to explore their effects on word lexical decision. Both studies obtained the same pattern of word frequency effect but conflict patterns of word neighborhood size effect. Tsai et al (2006) obtained a marginal significant main effect of first-character based word neighborhood size. Words with more neighbor words sharing the same first character were responded faster. There was no interaction effect between word frequency and word neighborhood size on the response latencies. Instead, Huang et al (2006) obtained no significant main effect of word neighborhood size but a significant interaction effect between word frequency and word neighborhood size. High frequency words with more neighbor words were responded to faster while low frequency words with more neighbor words were responded to slower. It is noted that both studies did not keep character frequency balanced among different conditions of word neighborhood size. To solve the conflict between these two studies, the present study conducted two experiments in which both used the same design and the same stimuli while with different tasks. Word frequency and orthographic neighborhood size based on the computation of number of different words shared a same leading character were simultaneously manipulated, with the leading character frequency of the target word being kept balanced, to explore their influences on word lexical decision (Experiment 1) and word naming (Experiment 2). The results showed a robust effect that target words with more neighbor words sharing the same first character would be responded to faster irrespective of word frequency and tasks. Chinese written system contains more than 100,000 different words constituted from about 5,000 common characters. Each character denotes a primitive meaning. It leads that there exists a semantic relationship among orthographic neighbor words which share a common particular character. The semantic relationships between characters and words construct the unique and rich semantic networks in the Chinese written system. And further, the comparison of the effect sizes of word frequency between these two tasks shows that lexical decision responses manifested a larger word frequency effect than naming responses, indicating that a sub-word level processing of character and phonology was involved in multi-character word recognition. Both experiments were also replicated with different samples of participants and obtained the same pattern of results as the present demonstration.

Key words: character/word recognition, neighborhood size effect, frequency effect, lexical decision, naming.

Longitudinal Predictors of Reading Comprehension in Chinese as an L1 and English as an L2 in Beijing Chinese Children

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This longitudinal study aimed to explore the longitudinal predictors of children's reading comprehension ability in both Chinese and English, and to seek possible transfer between L1 Chinese and L2 English. Vocabulary knowledge, phonological awareness, rapid automatized naming (RAN), and word reading tasks were administered to 288 children in Beijing at age 8, and reading comprehension was assessed at age 11. Children were required to answer multiple choice and short-answer questions in tasks tapping their ability of understanding passages written in Chinese and English. In addition, a picture comprehension task in English was included in order to capture the lower end of reading comprehension of L2 learners. Multiple regression analysis was used to examine the predictive power of reading related skills in both English and Chinese for Chinese reading comprehension and English reading comprehension separately. Chinese word reading and vocabulary knowledge at age 8 and gender significantly predicted subsequent L1 reading comprehension, with L2 English reading comprehension statistically controlled. English vocabulary knowledge, Chinese word reading and mother educational level were included as reliable predictors of English reading comprehension, with L1 Chinese reading comprehension statistically controlled. In addition, the correlation between reading comprehension skills in Chinese and English was high ($r=.57$), and the unique contribution of reading comprehension in one language to reading ability in the other language existed with demographic factors and lower level processes statistically controlled. Lower order processes focusing on the word level at an early age predicted the subsequent higher order processes, reading comprehension. Both L1 reading comprehension and L1 lower-level reading related processes (word reading) appear to have transferred and facilitated L2 reading comprehension to a certain extent. At the same time, L2-specific abilities are also important for L2 reading. Moreover, mothers' education level has an apparently particularly important impact on children's L2 English learning.

Visual complexity of Japanese logographic words

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Past psycholinguistic studies on logographic word recognition in Japanese and Chinese indicate that visually complex words with many strokes are generally processed slower than those with fewer strokes. In the present regression study, together with the classical measure of stroke counts, we simultaneously assessed relative contributions of various other visual complexity measures: a number of sub-character constituents, JPEG picture complexity of kanji characters, and character prototypicality.

In an off-line complexity rating task, the four measures of character complexity all co-determined complexity ratings of non-native and native readers of Japanese, with the exception of the number of constituents for non-native readers. A stroke effect was found to be positive decelerating and quantitatively more important than the other measures. When a mixed-effects model for off-line complexity ratings was fitted to response time data in a progressive demasking word identification task and to first subgaze duration data in an eye-tracking lexical decision task, the visual complexity effects were largely replicated. Interestingly, we observed a leftish bias in logographic character recognition (Hsiao & Cottrell, 2009). This can be, at least partially, understood by character prototypicality based on a composite image (Galton, 1878) derived from 1,945 characters: the visual information is typically concentrated in the left-side of a character.

The results indicate that the classical measure of character strokes is insufficient to capture the full visual complexity relevant in Japanese logographic word recognition, in which words are dynamically perceived both as an ordered set of strokes, as an ordered set of constituents, and as an image.

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The Study of Representation and Lexical Access of Korean Ambiguous Homograph

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Lexical ambiguity advantage effect refers to the effect that ambiguous words which have multiple meanings are perceived faster than non-ambiguous words. Some studies showed that the advantage is due to the cumulative frequency of multiple meaning. Word frequency was known as one of major factors for deciding lexical decision, and ambiguous words have various frequencies by meaning. Therefore it was hard to determine the representative meaning, and what the most decisive frequency factor is.

The present study investigated the representation and lexical access of Korean ambiguous words using different word frequencies. Three experiments were carried out using Korean homograph that has different pronunciations and word frequencies by meaning. Non-ambiguous words were used, and their frequency was controlled by frequency of homograph's each meaning.

In experiment 1, the stimuli were consisted of homographs (H), relative-high frequency words (HF) and relative-low frequency words (LF). Participants were instructed to decide whether the presented stimulus was real word or meaningless non-word. The results showed that there was no significant difference of RT between the homograph condition and the relative-high frequency condition (HF). In experiment 2, same lexical decision experiment was conducted with almost same stimuli for experiment 1. There was cumulative frequency condition instead of relative-high frequency condition. The results were similar to those of experiment 1, there was no difference between homographs condition and the cumulative frequency condition (CF). The little difference between the high and cumulative frequency condition was resulted from the non-significant difference of frequencies. Additional correlation analysis showed that only relative-high frequency and RT for homographs have significant correlation.

Experiment 3 was conducted with word naming task utilizing same stimuli. Participants should name the presented word immediately. There was no significant difference between conditions in response time. The result showed that words passed only sublexical route without lexical access when word naming experiment.

The results of two lexical decision experiments showed that Korean ambiguous words are represented independently by meaning, and lexical access was occurred with the one frequent meaning which has relatively high-frequency.

Morphological Representation for Prefixed Derivational Nouns in Korean

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This study examined the effects of morphological overlap related to meanings of prefixes in Korean, in order to explain the process of lexical access of derivational words using the Masked Priming Paradigm. The present study consisted of three sub-experiments as SOA; 57msec, 300msec and 750msec, And 156 students conducted the experiments used three conditions designed to affix the same meaning prefix; the derivational nouns affixed with the same meaning prefixes, the derivational nouns affixed with the same orthography, and the unrelated nouns. The results showed an orthography priming effect in 57msec and 300msec SOA, but a morphology priming effect in only long SOA without the orthography priming effect as well as the orthography inhibitory effect. The results provide evidence that the prefixed nouns in Korean represented in the whole-word form is connected at the higher level. And this supports a supralexical hypothesis account of morphological representation.

Semantic similarities among radical-neighbors of kanji characters based on multi-dimensional scaling

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Many Japanese kanji characters consist of multiple radicals. Most typically, complex characters consist of two radicals horizontally aligned (known as left-right kanji). For example, the character 海 (meaning *sea*) consists of the left radical 氵 (*water*) and the right radical 每 (*every*). The left radical of 氵 is also used to form other characters, such as 池 (*pond*), 波 (*wave*), and 減 (*diminish*). In many cases, the left radical provides an indication to the semantic category of the kanji. Thus, kanji characters sharing the same left radical form a set of semantically-related words, which may be called *semantic radical-neighbors*. Semantic activation of left radicals is believed to facilitate recognition of presented whole kanji characters during the earlier stages of processing (e.g., Flores d'Arcais, Saito, & Kawakami, 1995).

However, the degree of semantic similarity naturally differs among semantic radical-neighbors. For example, the semantic similarity between 海 and 減 may be assumed to be relatively lower compared to that between 海 and 波. The purpose of the present study is to investigate the semantic structures of semantic radical-neighbors within the mental lexicon using multi-dimensional scaling (MDS).

The participants were 47 undergraduate students; all were native speakers of Japanese. The stimuli were selected from among the Japanese Educational Kanji List (*Kyōiku Kanji*). We focus on the four radicals of 亻 (*person*), 氵 (*water*), 言 (*language*), and 木 (*tree*), which have the highest type frequencies within the list. For each radical set, twelve kanji characters were selected and 66 pairings were created by combining two kanji characters. Thus, in total, 264 pairings (66 pairings x 4 radical sets) were generated and printed in a questionnaire. The participants were asked to rate the degree of semantic similarity between kanji pairs on a seven-point scale ranging from 1 (very dissimilar) to 7 (very similar).

The results from the semantic-similarity rating task were analyzed for each radical set using the MDS procedure. Based on the results of tests for goodness of fit that utilized both stress-1 values (Kruskal, 1964) and R^2 , three-dimensional solutions were adopted for the four radical sets. The results for each radical set indicate that the semantic information of the shared radical was extracted as dimension 1, respectively. Dimension 2 and 3 are interpreted as activities and dynamics common to the four radical sets. The results indicate that semantic radical-neighbors are represented within the mental lexicon as one dimension, based mainly on the radical meaning. Furthermore, the two other semantic dimensions, which are shared by some of the radicals, appear to be related to human and natural activities and dynamics.

Examining Shifting Attention with Pip-and-Pop Task on Children with Reading Disabilities in Taiwan

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Studies have suggested that the deficiency in magnocellular system may relate to reading problems, resulting in visual attention deficits and sluggish attention shifting (SAS) (Hari & Renvall, 2001; Stein, 2003; Stein & Walsh, 1997). Pammer and Vidyasagar (2005) proposed that the sluggish attention shifting in dyslexics related to their poor abilities in serial allocation of attention and their problems in the disengagement of attention in searching tasks. In the newly developed pip-and-pop task, participants were to visually search a horizontal or vertical line around tilted distracters. Both targets and distracters changed colors (red or green) randomly with or without pip sound synchronized with the color change of the target (Van der Burg et al., 2008). A recent study by de Boer-Schellekens and Vroomen (2011) showed that the performance on visual search task by dyslexic adults could be improved to the normal level with the synchronized pip sound, suggesting that their deficits in attention shifting could be compensated by improving their disengaging attention.

In the present study, we first adopted the pip-and-pop paradigm to examine shifting attention on children with poor reading abilities in Taiwan.

The design of the present study was a 2 x 2 x 2 three-factor mixed design, with reading group (normal children vs. poor readers) as the between-participants factor, set size (large vs. small) and sound (present vs. absent) as the within-participants factors. Our results on children with poor reading abilities did not replicate what has been found in de Boer-Schellekens and Vroomen's (2011) study on dyslexic adults.

Whereas the set size affected the RTs of the present visual search task, poor readers did not improve their performance with the pip sound synchronized with the color change of the targets. Our data suggested that not all dyslexics could benefit from the improvement of their disengaging attention and that different types of dyslexics should be taken into account in this line of research.

Recognition of vocal emotion

Comparison between Japanese and Chinese

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The purpose of the current study was to compare the recognition of vocal emotion between Japanese and Chinese individuals. Participants were ten native Japanese speakers (J-participants) and ten native Chinese speakers (C-participants). None of the participants had lived outside of their home countries for more than one year. The emotions included in the vocal stimuli were emotionless, happiness, anger, disgust, fear, and sadness. The stimuli consisted of short sentences such as “Eleven-thirty” and “Is that so?” in both Japanese and Chinese, spoken by ten professional actors (five Japanese and five Chinese). Each actor spoke two sentences: one expressing emotionless and the other expressing one of the remaining five emotions. There were two separate sessions for the Japanese speakers and the Chinese speakers. All vocal stimuli were given to the participants through headphones at a comfortable level. Participants were instructed to listen carefully to what the speaker was saying and to judge the emotion. They did not need to identify *what* the speakers said; only the emotion. Each judgment had to be made within 3 s. The order of the two sessions and the presentation of emotions in each session was random.

When the vocal emotion identified by a participant matched what the speaker intended to express, the response was judged correct. Both similarities and differences were found between J- and C-participants responses. Not surprisingly, J-participants were better than C-participants in the case of J-speakers, and C-participants were better than J-participants in the case of C-speakers. This indicates that participants were able to identify the vocal emotion of speakers with whom they share a native language better than that of those with whom they do not. Statistical analysis (ANOVA) supported this result. On the other hand, Shigeno (1998, 2009) compared the recognition of emotions between Japanese and North Americans and reported similar results, although the difference between Japanese and North Americans was greater than the difference between Japanese and Chinese. Further comparison of the relation of emotions plotted in a two-dimensional space calculated by MDS indicated additional differences: both the Japanese and North American participants categorized the six emotions expressed by the North American speakers into three categories, not six. This suggests that the emotional voice of a typical North American speaker is not as delicate as that of a typical Japanese speaker. In contrast, in the current study, both J- and C-participants categorized the emotional voices expressed by Chinese speakers into six categories. This means that both Chinese and Japanese speakers are delicate to vocal emotions. These results are discussed in light of the cultural and linguistic similarities and differences between Japanese and Chinese and between Japanese and North Americans.

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Evaluation of sluggish attentional shifting hypothesis in developmental dyslexia in Chinese

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Introduction

The ability to rapidly disengage attention from one verbal stimulus, spoken or written, and to shift attention to the next stimulus is critical to spoken and written language processing. Previous studies using nonverbal attentional blink or stream segregation paradigms reported that individuals with reading difficulties since childhood showed prolonged attentional shifting (or sluggish AS, SAS) in the auditory modality (Hari, Valta, & Uutela, 1999; Helenius, Uutela, & Hari, 1999; Lallier, Thierry, Tainturier, Donnadieu, Peyrin, Billard, & Valdois, 2009), or both visual and auditory modalities (Lallier et al., 2009; Lallier, Berger, Donnadieu, & Valdois, 2010a; Lallier, Tainturier, Dering, Donnadieu, Valdois, & Thierry, 2010b). Deficits in AS thus seem to impact on normal language and/or literacy development. However, existing reports have come from adult dyslexic readers of alphabetic scripts, with one exception from French children with reading impairment (Lallier et al., 2009). This study assessed the AS hypothesis with young poor and normal readers of Chinese, which is considered a logographic writing system.

Methods

Twelve Cantonese-speaking children (10 males; mean age = 10.22 yrs) with reading difficulties and 12 chronologically age-matched (5 males; mean age = 9.96 yrs) with normal reading abilities took part in the study. All participants had normal non-verbal IQ. Poor readers (PR) scored at or below -1.33 SD on the reading subtest of the Hong Kong Test of Specific Learning Difficulties in Reading and Writing (HKT-SpLD, Ho, Chan, Tsang, & Lee, 2000). Age-matched normal readers (CA) scored higher than -0.5 SD on the relevant tasks in the HKT-SpLD. The participants' speeds of auditory AS and visual AS were evaluated using an auditory and a visual segregation stream task as in (Lallier et al., 2009; 2010b), respectively. The order of tasks was rotated across participants.

Results and Discussion

Results of t-test did not revealed any difference between PR and CA groups in either modality, $p > 0.5$ (PR: auditory AS (mean: 105.13ms, SD: 77.37ms); visual AS (141.86ms, 28.97ms); CA: auditory AS (109.06ms, 74.91ms); visual AS (145.48ms, 29.46ms)). The discrepancy between findings from previous studies and the present one does not seem to arise from sample size (Lallier et al., 2009; 2010b). Interestingly, while visual AS for both PR and CA participants was slower than auditory AS in this study, the thresholds in the two modalities were comparable for both dyslexic and control participants in Lallier et al. (2009; 2010b). Moreover, the speed of auditory AS of our participants was similar to that of controls in Lallier et al. (2009), but our participants' visual AS threshold was comparable to that of their dyslexic individuals. It is not clear whether the observation of auditory AS is due to the fact that dyslexic participants in Lallier et al. (2009; 2010a; 2010b) had phonological awareness deficits, whereas our PR participants were selected mainly based on reading scores. In any case, if AS thresholds are intended to be used as early diagnostic tools of developmental dyslexia, future studies in this direction should focus on examining young readers, rather than adult readers.

The ERP study for the phonological and the orthographic priming in Korean word recognition

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One of important debate in word recognition has been the role of phonological recoding in lexical access. It has been usually tested using the phonological priming and the orthographic priming in which the prime and the target are manipulated according to the degrees of phonological overlap. This topic has been the subject of intense debate in studies using masked priming but has not been resolved unequivocally. The current study takes the approach to resolving this controversy by examining ERP.

Participants made lexical decisions to the phonological priming condition, the orthographic priming condition and, control condition. The results showed an indication for the role of phonology, but it was not conclusive. More ERP studies should be conducted using different stimuli and SOAs. Implications of the results have been discussed and future directions are suggested.

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Syntactic Awareness in Relation to Discourse-Level Reading Comprehension in Chinese Fifth Graders

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This study aimed to investigate the association between syntactic awareness and discourse-level reading comprehension in 136 Hong Kong Chinese children. These children, age 11 years old, from a longitudinal study, were administered a set of cognitive and linguistic measures. Correlational analyses showed that children's performances in two syntactic tasks were significantly correlated with their discourse-level reading comprehension ($r = .55$ and $.59$ for syntactic judgment and correction task, and conjunction usage task, respectively). A multiple hierarchical regression analysis indicated that syntactic skills, especially the usage of conjunctive words still accounted for 2.0% of variance in the total variance of discourse-level reading comprehension even when controlling for the variance from age, nonverbal IQ, phonological awareness, morphological awareness, vocabulary knowledge and word recognition as well as the autoregressive effect of previous reading comprehension skill in this study. Our findings strongly suggest that syntactic awareness is uniquely associated with discourse-level reading comprehension.

Key words: syntactic awareness, reading comprehension, syntactic judgment and correction, conjunction cloze task

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Eye movement evidence of continuous mapping for recognizing Mandarin spoken characters

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One eye-tracking experiment was conducted to investigate the onset- and offset-mismatch effects of Mandarin Chinese spoken characters. Eye movements to an array of four Chinese characters on a screen were recorded as participants listened a spoken instruction, e.g., “Please use the mouse to click on /chao1/ ”. The visual display contained the target character (e.g., 鈔 /chao1/), a phonological competitor that mismatched target on either onset or offset phoneme (e.g., the onset- and offset-mismatch competitors of the target 鈔 /chao1/ were 稍 /shao1/ and 娼 /chang1/, respectively), and two unrelated distractors. Fixation proportion of offset-mismatch competitors was larger than unrelated distractors started at around 200ms after the acoustic onset of the targets and this effect was weaker for onset-mismatch competitors showing a late and small difference from distractors. The fixation proportion curve of offset-mismatch competitors began to diverge from targets at around 400 ms and the onset-mismatch competitors, similar to unrelated distractors, showed the divergence from targets at around 200 ms. These competitor effects support continuous mapping models (e.g., TRACE) that, as speech unfolds over time, lexical access takes place continuously without strictly sequential constraints. The results also confirm McQueen and Viebahn (2007) and several studies that the use of printed-character or word display is valid to show the temporal dynamic of spoken word recognition.

Interpretation of a protagonist's misrepresentation:

An investigation of linguistic strategies in narrating a picture book

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Narratives are constructed from a sequence of events presented in a temporally- and causally-related manner. More specifically, Labov and Waletzky (1967) define narratives in terms of referential and evaluative functions. Referential functions depict events and actions of protagonists in the story plot and evaluative functions serve to infer the mental states of protagonists and possible causal relations between events. This study focuses on the evaluative functions of narratives. Drawing on a method of analysis used by Aksu-Koç & Teldemir (2004) and Küntay & Nakamura (2004), the present study investigated how a protagonist's misrepresentation is depicted in written narratives in relation to other linguistic strategies as a part of the evaluative function.

Written narratives were collected from 120 female students, whose main course of study was either Psychology or Early Childhood Education. They were instructed to look through the pictures of the wordless book *Frog, where are you?* (Mayer, 1969) and then write a narrative. The written narratives were coded for linguistic strategies of: references to mental states and physical-state emotions, hedges, negative qualifiers, character speech, causal connectors, enrichment expressions, onomatopoeias and mimesis. In the misrepresentation plot, where a boy mistakes the antlers of a deer for a tree branch, the students' narratives were coded for the use of 1) tree and deer, 2) mental state references, and 3) the unintentional nature of the boy's encounter with a deer.

Overall, 59% of the participants made explicit narratives regarding the boy's misrepresentation. However, significantly fewer Early Childhood Education students depicted the misrepresentation in comparison with Psychology students ($\chi^2(1) = 4.29, p = .05$). Students who mentioned the boy's misrepresentation plot tended to use more mental state references in the overall narratives ($r_s = .24, p = .008$). On the other hand, those who did not mention the same scene as a misrepresentation tended to focus on using character speech ($r_s = -.24, p = .001$) and onomatopoeias ($r_s = .25, p = .001$). Individual differences in adult narratives regarding the references to mental state representations were discussed.

Orthographical Information may Boost Pseudohomophone Effects in Processing Chinese Compound Words

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For Chinese readers, the pseudohomophones are the pseudo-words composed of two real characters. Both constituent characters are phonologically similar but semantically dissimilar to the constituents of the real word. The pseudohomophone effect in reading Chinese words implies that the rejection of pseudo-words would have to resolve the phonological information of constituents. In the study of Zhou and Marslen-Wilson (2009), the largest effect to delay the lexical decision responses was happened to the pseudohomophones sharing first constituent of real word. Because of the orthographic overlap between pseudohomophones and real words, we conducted two experiments to evaluate the confounding of character frequency and orthographic similarity. In the first experiment, we strictly controlled the character frequency of the originated real words of the pseudohomophones. This experiment replicated the findings of Zhou and Marslen-Wilson that obtained an increasing pseudohomophone effect with the increasing word frequency of real words. In the second experiment, we introduced the pseudohomographs having the constituents which are orthographical similar to those of the real words. These pseudo-words have character frequency as equal as the pseudohomophones. This experiment found the pseudohomograph effects as large as the pseudohomophone effects. The current findings reveal the alternative implication that the orthographic information of constituents would be more necessary in the rejection of pseudo-words.

(Dis)connections between specific language impairment and dyslexia in Chinese

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Specific language impairment (SLI) and dyslexia describe language-learning impairments that occur in the absence of a sensory, cognitive, or psychosocial impairment. SLI is primarily defined by an impairment in oral language, and dyslexia by a deficit in the reading of written words. SLI and dyslexia co-occur in school-age children learning English, with rates ranging from 17% to 75%. For children learning Chinese, SLI and dyslexia also co-occur. Wong et al. (2010) first reported on the presence of dyslexia in a clinical sample of 6- to 11-year-old school-age children with SLI. The study compared the reading-related cognitive skills of children with SLI and dyslexia (SLI-D) with 2 groups of children: children given a single diagnosis of SLI and normal controls. Results suggest that some of the cognitive deficits that characterize children with dyslexia could be associated with SLI.

The study aimed to test a modified version of the three hypotheses on the co-morbidity of SLI and dyslexia (Catts et al., 2005) that were originally proposed for children learning alphabetic scripts. Instead of focusing only on phonological processing deficits, this study examined a broad range of cognitive deficits documented in the literature. The ‘Severity’ hypothesis posits that children with SLI are more severely affected than those with dyslexia on the same cognitive deficits. The ‘Dyslexia-plus’ hypothesis posits that children with SLI and dyslexia share a similar level of the same cognitive deficits, but the former suffer from additional cognitive deficit(s) that results in their oral language difficulties. The ‘Distinct’ hypothesis suggests that dyslexia and SLI are distinct disorders with entirely different underlying cognitive deficits.

This study involved 60 5- to 6-year old kindergarten children with SLI and 65 normal age controls. 111 returned for testing after they completed Primary 1 and 40 failed the literacy composite in the norm-referenced test for dyslexia. These children were classified into four groups, 47 children in the Normal group, 13 children in the dyslexic group, 23 in the SLI group and 27 children in the SLI-D group. A series of 2 (Dyslexia (+/-)) X 2 (SLI (+/-)) ANCOVAs were conducted with the children’s nonverbal IQ and age as covariates. A significant main effect of SLI suggests that children with SLI perform worse than children without SLI. A significant main effect of dyslexia suggests that children with dyslexia perform worse than children without dyslexia. The absence of an interaction effect suggests that the effects of SLI and dyslexia are statistically independently of each other. One-way ANCOVAs were also conducted to test the “severity” hypothesis that children with a co-morbid diagnosis show more severe deficits than children with SLI or children with dyslexia.

Results indicate that orthographic awareness and rapid automatic naming are the effects of dyslexia. This finding is consistent with earlier reports that these are the core deficits of dyslexia in Chinese children. Phonological memory, phonological awareness and morphological awareness are the effects of SLI. The co-morbid group did not perform worse than the single diagnosis group on these skills. Together, these findings support the “distinct” hypothesis. Implications of these findings on the early identification of dyslexia will be discussed.

The brain mechanism of unconscious semantic processing of crowded words

Unconscious semantic processing of crowded words

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Word recognition in a clutter is severely impaired, a consequence of the phenomenon known as “crowding” which is ubiquitous and affects reading speed. In contrast to the conventional view that treats reading as a sequential process proceeding from word recognition to semantic activation, evidence from our behavioral and brain-imaging experiments suggests parallel processing of orthographic and semantic information. In the behavioral experiment, we observed a robust semantic priming effect from crowded and unrecognized words suggesting that semantic activation survives crowding. We then used an event-related design in functional magnetic resonance imaging (fMRI) to examine the brain mechanism of such unconscious semantic processing of crowded words. Participants performed a lexical decision task for a crowded word or an isolated word that was presented for 500 ms at a 5-degree eccentric location on top of the fixation sign. Eye positions were monitored to ensure the retinal position of the target. Using the brain areas of semantic networks of Chinese as regions of interest (ROIs), we found that crowded words activated the same brain regions as isolated words: the left Fusiform Gyrus (FG) for orthographic processing, the left Middle Temporal Gyrus (MTG) for semantic representation, and the left Inferior Frontal Gyrus (IFG) for controlled retrieval and selection of semantic knowledge. For crowded words, the brain activation (i.e., blood oxygenation level dependent, BOLD signal) was more robust in IFG than in FG, and lower than isolated words in FG and MTG. The BOLD signals were similar for both crowded and isolated words in IFG. Unlike other methods that render visual input invisible such as binocular rivalry wherein robust neurophysiological signal is detected at an earlier stage but much reduced or absent at a later stage, we demonstrated a stronger activation in the high-level semantic area (IFG) than the earlier orthographic processing area (FG). These results therefore provide evidence against a simplistic hierarchical model of orthographic followed by semantic processing in reading Chinese.

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