BRITISH COUNCIL
RESEARCHER LINKS

NSFC
National Natural Science Foundation of China

Newton Fund

RESEARCHER LINKS WORKSHOP: Improving Literacy: Understanding Reading Development and Reading Difficulties across the Lifespan

Tianjin Normal University,
Tianjin, China
21-23 September, 2016

With the support of:

British Council Researcher Links Programme

Newton Fund

National Science Foundation of China

Tianjin Normal University

University of Leicester

University of Southampton

Tuesday 20 September

Welcome Reception and Meal

Wednesday 21 September
Breakfast available from 7.00 at University refectory.

9.00-9.30 Official Opening

9.30-10.00 Keynote Lecture: Using Eye Movements to Study Typical and Atypical Reading Development in English and Chinese. Prof Simon Liversedge (University of Southampton)

10.00-10.30 Tea/Coffee Break

10.30-12.00 Early Career Research Talks (talks are 12 minutes + 3 for questions)
10.30-10.45 Helen Breadmore: Eye movements in skilled, typical and atypically developing readers
10.45-11.00 Ascención Pagán: Do frequency and contextual diversity influence children's learning of new words when reading text?
11.00-11.15 Nina Liu: Eye movements of developing Chinese readers: Effects of predictability and frequency
11.15-11.30 Jamie Lingwood: Evaluating the effectiveness of a shared book reading intervention
11.30-11.45 Shirley-Anne Paul: Evaluating methods to support the reading skills of pupils with reading difficulties in the transition to secondary school.
11.45-12.00 Lijing Chen: Thinking the world by using metaphor: A developmental study.

12.00-13.30 Lunch

14.00-15.30 Workshop on Linear Mixed Effects Modelling (Led by Michael Cutter and Chuanli Zang). An introduction to the application of Linear-Mixed Effects modelling.

15.30-16.00 Tea/Coffee Break

16.00-16.30 Informal discussion of career development opportunities

16.30-17.15 Invited Educational Speaker: Dr Holly Joseph (University of Reading)

17.15-18.30 Early Career Research Talks (talks are 12 minutes + 3 for questions)
17.15-17.30 Qingqing Qu: Writing: A psycholinguistic perspective
17.30-17.45 Abby Laishley: Using mobile eye-tracking to investigate functional linguistic units during encoding and production processes in a word copying task
17.45-18.00 Ze-Long Meng, Hong-Yan Bi: The influence of word copying and visual-motor integration on Chinese reading
18.00-18.15 Tania Cerni: Motor expertise for typing impacts word recognition
18.15-18.30 Rosa Kwok: English word learning by Chinese and British students

19.00 Evening Meal

Thursday 22 September

Breakfast available from 7.00 at University refectory.

9.00-9.30 Keynote Lecture: Eye-Guidance in Chinese Reading. Prof Xingshan Li (Chinese Academy of Sciences)

9.30-10.00 Keynote Lecture: Age-Related Declines and Reading Performance in English and Chinese, Prof Kevin Paterson (University of Leicester)

10.00-10.30 Tea/Coffee Break

10.30-12.00 Early Career Research Talks (talks are 12 minutes + 3 for questions)
10.30-10.45 Lei Cui: Character frequency effects in Chinese compound processing
10.45-11.00 Christopher Hand: Predictability, frequency and parafoveal preview effects in fluent reading.
11.00-11.15 Michael Cutter: Do readers process orthographic information from multiple parafoveal words in parallel
11.15-11.30 Sha Li: Adult age differences in eye-guidance during Chinese reading: Effects of word length
11.30-11.45 Lin Li: Aging and the effects of character complexity during Chinese reading
11.45-12.00 Bernhard Angele: Parafoveal preview benefit effects during reading: A Bayesian meta-analysis

12.00-13.30 Lunch

14.00-15.00 Early Career Research Talks (talks are 12 minutes + 3 for questions)
14.00-14.15 Juan Su: Eye movement control and word identification during vertical and horizontal reading: Evidence from Mongolian
14.15-14.30 Wenshuo Chang: Nonstructural effects modulate the process of anaphor resolution of Chinese reflexives
14.30-14.45 Jimnian Yang: Transparency effects on semantic activation of morphemic characters in reading Chinese: Evidence from eye movements
14.45-15.00 Bo Yao: Implicit prosody in silent reading of direct versus indirect speech quotation

15.00-15.30 Informal discussion on how to form international collaborations

15.30-16.00 Tea/Coffee Break

16.00-17.00 Mentoring Event

17.00-19.00 Early Career Researcher Poster Session

19.30 Evening Meal

Friday 23 September

Breakfast available from 7.00 at University refectory.

9.00-9.30 Keynote Lecture - Studying Deaf Chinese Readers, Prof Guoli Yan (Tianjin Normal University)

9.30-10.00 Keynote Lecture - Studying Dyslexia in Chinese Readers, Prof Xuejun Bai (Tianjin Normal University)

10.00-10.30 Tea/Coffee Break

10.30-12.00 Early Career Research Talks (talks are 12 minutes + 3 for questions)
10.30-10.45 Rhiannon Barrington: Parafoveal processes in Dyslexia
10.45-11.00 Li Liu: The neuroanatomical basis of Chinese developmental dyslexia
11.00-11.15 Hong-Yan Bi: The magnocellular–dorsal pathway deficit in Chinese children with developmental dyslexia
11.15-11.30 Fiona Kyle: Predictors of reading achievement levels in deaf children
11.30-11.45 Jo Black: Imagining counterfactual worlds in autism spectrum disorder
11.45-12.00 Yanping Liu: Using machine learning to understand the developmental of adaptive eye movement control during reading

12.00-13.30 Lunch

14.00-14.30 Overview of Research Base and Funding Opportunities in China and UK

14.30-16.00 Networking Session

16.00-16.30 Tea/Coffee Break

16.30-17.00 Discussant Event - the purpose of this session will be to reflect on issues and topics raised by the meeting and draw together conclusions and proposals for future activities. A summary of the discussions and information from other activities, including funding opportunities, will be circulated to attendees after the workshop.

17.00-17.30 Closing Ceremony

19.00 Closing Meal

End of Workshop

Guidelines on Talks

Keynote Speakers give a 20-25-minute research talks that ends by highlighting outstanding research questions and future research directions. For several keynote slots, a moderator (another Established Researcher) will host 5-10 minute discussion section in which participants ask questions or make comments relevant to the talk. Early Career Researchers give talks in 15-minute time-slots.

Guidelines on Posters

Poster boards will be provided for the Poster Session on Thursday 22 September. Please put up your poster during the afternoon tea/coffee break. Posters should be landscape (horizontal) and A1 in size. Posters presenters should be available throughout the poster session for discussions.

Poster Titles (Thursday 22 September)

1. Nina Liu, Feng Song, & Guoli Yan. The acquisition of novel words during picture-book reading by Chinese young children
2. Feifei Liang, Chuanli Zang, Hazel I. Blythe, Xuejun Bai & Simon P. Liversedge. Landing position effects during Chinese word learning and reading in children and adults
3. Wen Wang, Ke Tan, Yana Li, Mingzhe Zhang, Xuejun Bai. Executive functions in Chinese developmental dyslexia
4. Sha Li, Lin Li, Victoria McGowan, Xuejun Bai, Kevin Paterson, & Jingxin Wang. Benefits of increased character and word spacing for developing Chinese readers with dyslexia: Evidence from eye movements
5. Suxia Wang & Lizhu Yang. Development of oculomotor inhibition in children
6. Jing Zhao, Yun Ding, & Zhiguo Wang. Impairment of covert inhibition of return in Chinese dyslexic children
7. Xuejun Bai, Zhiying Guo, Ke Tan, Wen Wang, Mingzhe Zhang. Visual crowding effect is modulated by visual complexity and character-spacing: A study in Chinese children with developmental dyslexia
8. Ying-Hui Yang & Hong-Yan Bi. Audio-visual integration in Chinese children with dyslexia
9. Ke Tan, Wen Wang, Mingzhe Zhang, & Xuejun Bai. Phonological deficit in Chinese-speaking children with developmental dyslexia
10. Xiuhong Tong, Catherine McBride, Hua Shu Morphological awareness in reading and spelling difficulty in Chinese developmental dyslexia
11. Muwang Ye: Semantic processing by children with developmental dyslexia using the picture-word interference paradigm
12. Maihefulaiti Kanji & Xiangping Liu. Language processing of developmental dyslexic children in Uyghur
13. Julie Kirkby, Rhiannon Barrington, & Timothy J Slattery. Inter-letter and inter-word spacing and dyslexia: An eye movement study
14. Jing Zhao, Menglian Liu, Hanlong Liu, Chenchen Huang. Developmental difference in the relationship between visual rapid processing and Chinese reading fluency
15. Lu Liu, Ziming Song, Zhuyang Li, Yingchao Wang, Wenhui Bao, Yifan Cui, Yalin Gao, & Guoli Yan. Visual attention of deaf readers is enhanced in the parafovea during lexical processing
16. Philippa Howard, Simon Liversedge & Valerie Benson. Do adults with autism spectrum disorder make anaphoric links on-line?
17. Victoria Brunsdon, Elisabeth Bradford & Heather Ferguson. Age-related differences in perspective-taking during a referential communication task
18. Chuanli Zang, Manman Zhang, Xuejun Bai, Guoli Yan, Kevin Paterson, & Simon Liversedge. Frequency and complexity effects of two-character words on eye movements of young and older Chinese readers

19. Lin Li, Sha Li, Jingxin Wang, Victoria McGowan, Pingping Liu, & Kevin Paterson. Aging and the Optimal Viewing Position Effect in visual word recognition: Evidence from English
20. Zhifang Liu & Wen Tong. Effects of adult aging on word encoding in reading Chinese: Evidence from disappearing text
21. Kayleigh Warrington, Sarah White & Kevin Paterson. Aging and the parafoveal processing of text: Evidence from the moving window paradigm.
22. Elisabeth Bradford. Differences in Theory of Mind processes in older and younger adults
23. Bai Xuejun, Gao Xiaolei, Gao Lei, & Wang Yongsheng. An eye movement study of the perceptual span in reading Tibetan
24. Qi Gao & Xiping Liu. The accessing mechanism of proficient Chinese-Korean bilinguals' lexical representation of homographs
25. Lili Yu. Character complexity effects in reading and visual search
26. Junjuan Gu, Xingshan Li, & Huadi Zhang. The effect of transposed-character distance in Chinese reading
27. Fu Gan. Reading direction and the perceptual span: Evidence from right to left Chinese reading
28. Jian Huang, Suiping Wang, & Hsuan-Chih Chen. Dynamics of brain activation in semantic priming: A study combining ERP and event-related optical signals

Abstracts

An Eye Movement Study on the Perceptual Span in Reading Tibetan language

Bai Xuejun[1], Gao Xiaolei[12], Gao Lei[2], Wang Yongsheng[1]

([1]Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300074; [2] Normal College, Tibet University, Lhasa, China, 850000, gaoxiaolei2010@163.com)

Abstract: Perceptual span in reading refers to the range of useful information that can be obtained from each fixation of the reader during the reading process. Perception span is not only a basic question in reading research, but also is a problem with an important practical value. The divergence of the perceptual span in reading can effectively reflect the efficiency and the processing strategy for reading across individual readers. Perceptual span is an important component of language processing, which varies to characteristics of the languages themselves. The exploration of the perceptual span of phonetic characters and Chinese reading has been completed by a lot of researches until recently. However, the attribute of perceptual span in reading of the Tibetan language which is alphabetic writing and at the same time has the characteristics of ideograms remains largely unclear.

The moving window paradigm proposed by McConkie and Rayner (1975) is one of commonly used methods in reading perceptual span studies. In order to probe the size of perceptual span in reading Tibetan language, the present study recruited 35 Tibetan university students as participants, and instructed them to complete the reading task which was presented using the classic moving window paradigm including 7 kinds of window (5, 9, 13, 17, 21, 25, and the entire line), in this process the EyeLink1000Plus eye tracker was applied to trace the eye movement during reading. Corresponding to the previous studies, this study took the average fixation time, fixation times, total fixation time, reading speed, and the jump magnitude to the right as the analysis index.

The variance analysis of repeated measures was used to measure the window variables. The results of variance analysis showed that, with the increase of overall trend window, the average fixation time, total fixation times, and total fixation time decreased, but the reading speed and the right eye jump amplitude increased. In order to determine whether the set of the maximum window conditions are valid, two kinds of comparisons were carried out. First, the maximum window condition and the condition of the whole line were compared. It showed that the maximum window condition did not affect reading, thus the maximum window condition was set to be appropriate. Second, in order to determine the right side scope of perceptual span in reading, the conditions of L2R2, L4R4, L6R6, L8R8, L10R10 and the condition of L12R12 were compared. The result showed that when the time windows were increased to L8R8, the reading would not be disturbed.

For conclusion, the data of the present study suggested that the Tibetan language perceptual span of Tibetan college students was 4～8 character spaces to the right of the fixation. Compared with other languages, the Tibetan language obtains different stylistic features, and the range of perceptual span of reading is also of difference. Together, the present study provides evidence for that the reading perceptual span the Tibetan language exist specificity during language processing.

Key words: Tibetan language, perceptual span, moving window paradigm, eye movement

Visual crowding effect is modulated by visual complexity and character-spacing: A study in Chinese children with developmental dyslexia

Xuejun Bai, Zhiying Guo, Ke Tan, Wen Wang, Mingzhe Zhang

(Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300387, bxuejun@126.com)

Abstract: Previous studies showed that Chinese dyslexics exhibit more pronounced visual crowding effect (VCE) than controls and that VCE was modulated by character-spacing (Bai et al., 2016). Visual complexity of Chinese characters (defined by stroke numbers) can also modulate VCE (Zhang et al., 2009). In current study, we investigated how visual complexity (average strokes: below 8 / above 12) and character-spacing (default、±3pt、±6pt、+12pt) influence dyslexics reading. Results showed dyslexics were influenced more by VCE while reading high visual complexity sentences. Spacing with +3pt and +6pt led to worse reading performance for dyslexics, while spacing with +12pt didn't, indicating visual complexity influences dyslexic children's reading by modulating VCE; and that low visual complexity and enlarging character-spacing facilitate their reading.

Keywords: developmental dyslexia, visual crowding effect, character-spacing, visual complexity, eye movements

The work described in this article was supported by a grant from the Natural Science Foundation of China (81471629).

Parafoveal Processing in Dyslexia

Rhiannon S. Barrington[1], Denis Drieghe[2], Simon P. Liversedge[2], and Julie A. Kirkby[1]

1) Bournemouth University, UK 2) University of Southampton, UK

A single phonological deficit does not seem to be sufficient to cause dyslexia (Peterson & Pennington, 2012). One potential risk factor is weak visual attention (Vidyasagar & Pammer, 2010), which may affect the ability to parafoveally process words during reading. Using the boundary paradigm (Rayner, 1975), eye movements were recorded from children and adults with and without dyslexia in order to explore parafoveal processing for dyslexic readers. Parafoveal previews were either manipulated orthographically or phonologically. The findings of these experiments will be discussed along with the implications for theories of dyslexia.

Imagining Counterfactual Worlds in Autism Spectrum Disorder

Jo Black

University of Kent

Specific impairments in counterfactual processing, as well as difficulty with imaginative thinking, are common in people with Autism Spectrum Disorders (ASD), however only a handful of published studies have empirically tested counterfactual thinking in this group. We present two eye-tracking experiments that explore how imaginability influences counterfactual reasoning in individuals with ASD and typically

developing (TD) participants in an anomaly detection reading task. Experiment 1 depicted everyday counterfactual events that incur a minimal change from reality. Experiment 2 described alternative versions of known historical events that require readers to suspend their knowledge of reality and imagine a novel version of the world. Results revealed both ASD and TD participants detected anomalous words within the same time course. However, the disruption caused by the anomaly was greater within factual than counterfactual contexts in Experiment 1, and participants with ASD showed increased difficulty integrating reality-altering counterfactuals in Experiment 2.

Differences in Theory of Mind Processes in Older and Younger Adults

Elisabeth E.F. Bradford

University of Kent

Theory of Mind (ToM) – the ability to understand and attribute mental states to ourselves and other people – plays a key role in everyday social communication. Using a computerized false-belief task, the Self/Other Differentiation task, the research presented here explores how ToM abilities are utilized in older (60+ years old) and younger (19-30 years old) individuals, when identifying mental states that belong to the 'Self' versus 'Other', as well as how we may shift between perspectives. We explore how differences in belief-attribution processes may be highlighted in both behavioural and eye-tracking measures, and what may produce these differences (e.g. sentence processing).

Age-related differences in perspective-taking during a referential communication task

Victoria Brunsdon, Elisabeth Bradford & Heather Ferguson

The ability to take a communicative partner's perspective is vital for successful social interaction. In the CogSoCoAGE study, younger (20-40 years old) and older adults (60-80+ years old) completed the Keysar task. Participants' eye movements were tracked, time-locked to the auditory instructions from a communicative partner. Fixations to the available objects, as well as object selection responses, were recorded as an indicator of perspective use. This study provided a measure of the ability to integrate the communicative partner's perspective with her verbal instructions. The study also investigated whether egocentric errors (revealed through eye movements) differed across the age groups.

Motor expertise for typing impacts word recognition

Tania Cerni

Centre for Applied Linguistics, University of Warwick

The aim of the present study was to directly test whether word recognition, measured with the lexical decision task, was impacted by typing motor expertise. To address this issue, we have built a set of words and pseudowords differing by the bimanual transition ratio between letters, an index of typing difficulty. An effect of typing difficulty was observed in expert typists who were actually typing the items, and not in non-experts. A similar effect was observed in lexical decision: latencies varied as a function of typing motor difficulty. This constitutes a first suggestion that motor representations built during the acquisition and practice of the typing skill have a collateral effect on visual recognition processes.

Do Readers Process Orthographic Information from Multiple Parafoveal Words in Parallel?

Michael G. Cutter, Denis Drieghe, & Simon P. Liversedge

We investigated whether orthographic information from one parafoveal word influences the processing of another parafoveal word. We used the boundary paradigm to present participants with an identity preview of two words after the boundary (e.g. *hot pan*), a preview in which two letters were transposed between words (e.g. *hop tan*), or a preview in which two letters were substituted (e.g. *hob fan*). We hypothesized that we may observe preview benefits for the transposition relative to substitution condition, if words are processed in parallel. No such effect was observed. These findings are considered in relation to serial and parallel lexical processing.

Nonstructural constraints modulate the process of anaphor resolution of Chinese reflexives

Wenshuo Chang[1], Jinjin Qian[2], Yunyan Duan[1], Fuyun Wu[2], Xiaolin Zhou[1]

[1] Center for Brain and Cognitive Sciences and Department of Psychology, Peking University, Bejing 100871, China, Email: wschang@pku.edu.cn

[2] Institute of Linguistics, Shanghai International Studies University, Shanghai, 200083, China

Previous studies have demonstrated that Chinese bare reflexive *ziji* (self) is not always bound in its local domain as the Principle A of Chomsky's (1981) Binding Theory claimed. We conducted two eye movement experiments to examine the role of nonstructural constraints, the reference of verbs and gender congruency, in anaphor resolution of Chinese reflexives. Our experiment 1 found that, in the sentence with a structure 'matrix subject + verb+ local subject + adverb + local verb + *ziji*…', relative to the local reference local verb, long-distance reference local verb lengthenedregression path duration on*ziji*. Our experiment 2includedthe sentences with the same structure but *ziji* was substituted with Chinese compound reflexive*taziji*.The gender of the matrix and local subjects were varied such that the subject could be congruent or incongruent with *taziji.*We found that, on *taziji,* the total viewing duration was longer when *tazijiw*as incongruent with the local subject than when it was congruent. These results suggestthat, at the later stage of processing, *taziji* is predominantly linked to the local subject.

Keywords: Chinese reflexive, anaphor resolution, eye movement, Binding Theory

Character frequency effect in Chinese compound processing

Lei Cui[1], Jue Wang[1], Shouxin Li[1], Simon P. Liversedge[2]

1. Shandong Normal University, China
2. University of Southampton, UK

The purpose of the present study was to explore accounts of compound word processing whilst readers' eye movements were measured as they read Chinese. We used single sentences containing two-character

compound target words for which we varied the first and the second character frequency, whilst controlling for whole word frequency. First pass reading time measures showed that there was neither a first character frequency effect, nor the second character frequency effect during the processing of the compound word. Also, reading time was same for the whole compound word regardless of their high or low frequency character constituents. The results were consistent with, and extend a previous study by (Ma, Li, and Rayner, (2015), indicating that the two characters in a compound word are processed as a single whole (a multi-constituent unit). This is generally consistent with a parallel processing model of eye movement control in Chinese reading (e.g., Engbert, Nuthmann, Richter, & Kliegl, 2005).

Contact: cuilei_cn@163.com

Thinking the World by Using Metaphor: An Developmental Study

Xuan Du & Lijing Chen

(Department of Psychology, Fujian Normal University, Fuzhou, China, 350117, chenlj@fjnu.edu.cn)

Abstract: The present study explored whether the children have the “left-past/right-future” time metaphor schema or not. 90 children from four age groups (third, sixth, eighth and eleventh grade) took part in the experiment. Results showed a significant main effect of time metaphor schema. There was no interactive between Grade and Time metaphor schema. These results indicated that the children in each grade have the “left-past/right-future” time metaphor schema. Hence, the results support Lakoff’s theory that the time metaphor is a basic way of thinking.

Keywords: Metaphor, Language development, Embodied Cognition.

Reading direction and the perceptual span: Evidence from right to left Chinese reading

Fu Gan

Yancheng Normal University, psyfgan@163.com

Abstract: Many researchers have found that reading perceptual span is asymmetry. In Chinese and other languages read from left to right, the perceptual span to the right side of the fixation is larger than the left one to the fixation. For the languages read in the opposite direction (from right to the left), the perceptual span to the left side of the fixation is larger than the right one. However, the asymmetry of the perceptual span for the languages written in the opposite direction of the normal reading has received very little attention in empirical research. Accordingly, we investigated the perceptual span for the opposite direction of Chinese normal reading using a gaze-contingent window paradigm in which a region of text was displayed normally around each point of fixation, while text outside this region was masked by “※”. 99 sentences were presented in 9 viewing conditions(C, 1L+C, 2L+C, 3L+C, 4L+C, 4L+C+1R, 4L+C+2R, 4L+C+3R, the whole line) to examine the perceptual span of 16 graduate students as they read the Chinese sentences from right to left. After calibration and validation, the participants were asked to read the instructions for the experiment. At the beginning of each trial, a calibration square appeared in the same position of the first character of the sentences to be read. The participants were asked to focus it and to press a button on a control pad. After pressing it, the sentence appeared. When he/she finished reading it for comprehension, he/she pressed the button again. There were 30% comprehension questions randomly presented after the corresponding sentences. Each participant should read all the sentences of the

experiment. The results are as follows: the graduate students' perceptual span of Chinese reading from right to left is 2-3character to the left side of the fixation and 3-4character to the right side of the fixation. These findings show for the first time that there is a rightward asymmetry in Chinese not only it is read from left to right but also it is read in the opposite direction. These results provide a new indication that the perceptual span for Chinese reading is not modified by the overall direction of reading.

Key words: Reading direction; Eye movements; Perceptual span

The accessing mechanism of the proficient Chinese-Korean bilingual's lexical representation to homograph

Qi Gao & Xiping Liu

(Department of Psychology,Tianjin Normal University,Tianjin,China, 300387, lqgq18@qq.com)

The lexical representation of three kinds of Chinese-Korean homograph was researched by the masked translation primed lexical decision task with 30 high proficient Chinese-Korean bilinguals. The experiment takes the translation direction and the word type as the independent variable. The results shows a significant masked translation priming effect for both directions, which is affected by the type of the homograph. Concept and phonology both facilitated the translation prime, with a greater priming effect of the former. It appeared that the bilingual interactive activation model best accommodates the data on bilingual word recognition in Chinese-Korean homographs.

Keywords: high proficient Chinese-Korean bilinguals, masked translation effect, homographs, lexical representation

Do Adults with Autism Spectrum Disorder make Anaphoric Links on-line?

Philippa L. Howard, Simon P. Liversedge & Valerie Benson

University of Southampton

Performance accuracy for tasks that require inferential processing has previously been reported to be reduced in individuals with autism spectrum disorder (ASD), relative to typically developed controls. This study examined the on-line computation of co-referential inferences in ASD by measuring participant's eye movements as they read mini discourses that included a category noun (e.g., *bird*) either preceded by a co-referring typical (e.g., *pigeon*) or atypical (e.g., *penguin*) exemplar. An effect of typicality was evident for gaze durations upon the category noun that was comparable across groups, suggesting that at this basic co-referential level, inferential processing is intact in ASD.

The effect of transposed-character distance in Chinese reading

Gu Junjuan[1]; Li Xingshan[2]; Zhang Huadi[3]

[1,3]College of Psychology, North China University of Science and Technology, Tangshan, China 063000, jjshujing@163.com

[2]Institute of Psychology, Chinese Academy of Sciences, Beijing, China, 100101

In this study, we explored whether the effect of transposition distance was modulated by positions of transposed charactres in Chinese reading. We used three-character words (Experiment 1) and four-character words (Experiment 2) as our targets. We embedded the target words into sentences and then manipulated the transposition distance (adjacent vs. nonadjacent) and transposition position (including the first character vs. including the last character). Results indicate that nonadjacent character transposition is more disruptive than adjacent character transposition, especially when the first character is transposed. The effect of transposition distance is modulated by positions of transposed characters in Chinese reading. Although there is no space between characters in Chinese text, the first character of a word has a privileged role over other characters of a word.

Keywords：Character transposition, Eye movements, Chinese reading, Character position

Dynamics of Brain Activation in Semantic Priming: A Study Combining ERP and Event-Related Optical Signals

Jian Huang [1], Suiping Wang [1], Hsuan-Chih Chen [2]

[1]School of Psychology, South China Normal University, China,

[2] Department of Psychology, Chinese University of Hong Kong, Hong Kong

This study used the Event-Related Optical Signal (EROS) technique that has both high temporal and spatial resolution to examine the dynamics of brain activation in semantic priming. Fourteen participants read pairs of words and made a lexical decision to the second word in each pair. Words were presented sequentially with short(250ms) and long(1000ms) SOAs in separated blocks. EROS responses were recorded time-locked to the second words. The EROS results revealed activation in left superior/middle temporal gyrus(LS/MTG) in the early time window and the N400 window for the short SOA condition. For the long SOA condition, activation in LpIFG in the early time window, and activation in the LMTG, LaIFG and left inferior temporal gyrus/fusiform gyrus in the N400 time window. These results suggest that spread activation and strategic inhibition occur very early and strategic retrieval exists in the N400 time window.

Keywords: semantic priming, EROS, LMTG, LIF

Email: huangjianpsy@gmail.com

The Magnocellular–Dorsal Pathway Deficit in Chinese Children with Developmental Dyslexia

Yu-Zhu Ji, Hong-Yan Bi*

(Key Laboratory of Behavioral Science, Institute of Psychology, Chinese Academy of Sciences, Beijing 100101, China)

Studies from alphabetic languages evidenced that the main cause of developmental dyslexia (DD) was the visual magnocellular-dorsal (MD) dysfunction. Our studies found Chinese children with DD showed lower contrast sensitivity, lower coherent motion sensitivity and less vMMN amplitude than the age-matched controls in the M condition. We also conducted a magnocellular-based visual-motor intervention on Chinese children with DD and found MD function and phonological awareness of training dyslexic group were improved to a normal level as age-matched normal children after intervention. It supported MD deficit theory, and suggested MD deficit might be the core deficit of Chinese DD.

Keywords: developmental dyslexia, magnocellular–dorsal pathway, Chinese reading, visual-motor intervention.

Language Processing of Developmental Dyslexic Children in Uyghur

Maihefulaiti Kanji(Mehpiret Kenji) [1], Xiangping Liu [2]

[1] Colege of Educational Science, Xinjiang Normal University, Urumqi, 830054, mkanji@163.com

[2] School of Psychology, Beijing Normal University, Beijing 100875, lxp599@163. com

Abstract: The aim of this study was to investigate language processing of developmental dyslexic children in Uyghur. Language processing ability such as phoneme awareness, rapid naming, articulation speed, orthographic awareness and morpheme awareness of Uyghur developmental dyslexic children and normal children of the same chronological age were compared and the linguistic variables predicting accuracy for the incidence of dyslexia was analyzed. The results supported that the language processing problem of the developmental dyslexic children consisted cross-orthographically. Some unique characteristics, such as more significant speed problems, are related with the writing system with transparent orthography.

Keywords: Uyghur writing system, Developmental dyslexia, Language processing, Transparent orthography

Inter-letter and inter-word spacing and dyslexia: an eye movement study

Julie A Kirkby, Rhiannon S Barrington, & Timothy J Slattery

Bournemouth University, UK

Recent research has demonstrated that reading text with increased space improves reading rate for dyslexic readers (Zorzi et al., 2012). Improving accessibility of text is a valuable intervention for dyslexia. However, whether a benefit occurred due to inter-letter or inter-word spacing is unclear. We recorded eye movements from adults with and without dyslexia as they read single-line sentences in these conditions: 1) default spacing, 2) increased inter-word, default inter-letter spacing, 3) increased inter-word and inter-letter spacing, 4) double increased inter-word, increased inter-letter spacing. Reading rates and typical patterns of eye movements will be reported.

Rosa Kwok

Department of Psychology, Coventry University

I report an experiment in which 20 native speakers of Cantonese studying at a British university and 20 native English speakers learned 4- and 7-letter novel English words. Participants read them aloud as quickly as possible 10 times in a first learning session and a further 10 times in a second session 7 days later. Accuracy levels were high in both groups. The naming latencies of the English group showed a pattern of results similar to that reported previously by Kwok and Ellis (2015), with RTs becoming faster and the word-length effect reducing over the first 5 blocks on day 1, and good retention of learning across the 7-day period. The RTs of the Cantonese group were considerably slower than those of the English group across both days. RTs decreased across session 1 and across the first half of session 2 on day 7. RTs were faster to shorter novel words across session 1 and in the first 5 blocks of session 2. We note the similarity

between the results of the Cantonese group and the results of a group of British dyslexic students reported by Kwok and Ellis (2014) and suggest that the slower reading of the Cantonese speakers and the retention of the length effect across the two testing sessions reflects a failure to achieve a full transition from sublexical to lexical reading as a result of poorer phonological awareness in English and a smaller English vocabulary.

Predictors of reading achievement levels in deaf children

Fiona Kyle, City University London

Although literacy difficulties are extremely common in deaf children, there is huge heterogeneity in their reported achievement levels. Recent technological advances have created expectations about improvements in reading levels but the available supporting evidence is equivocal. In this talk I will briefly present data from several studies showing current achievement levels and developmental trajectories of reading in deaf children in England. The rest of the talk will focus on identifying skills that are important for successful reading in deaf children from mixed language backgrounds. In particular, I will discuss the role of vocabulary, speechreading and phonological skills as predictors of deaf reading ability.

Using mobile eye tracking to investigate functional linguistic units during encoding and production processes in a word copying task.

Laishley, A. E.[1], Liversedge, S. P.[2], & Kirkby, J.A.[1]

1. Bournemouth University 2. University of Southampton

During a seemingly simple word copying task, there is a cognitively complex eye-mind-hand interaction that co-ordinates visual encoding, mental representation, and written production. The current research uses mobile eye-tracking to investigate the nature and time-course of language processing during copying. We aimed to examine language processing as it develops, specifically, the functional units over which encoding and production processes operate, at different stages of reading development. Data regarding how the characteristics of word units (length and frequency) and subword units (number of syllables) impacted on encoding and production behaviour will be discussed.

Aging and the Optimal Viewing Position Effect in Visual Word Recognition: Evidence from English

Lin Li[1], Sha Li[1], Jingxin Wang[1], Victoria A. McGowan[2], Pingping Liu[3], Kevin B. Paterson[2*]

[1] Academy of Psychology and Behaviour, Tianjin Normal University, Tianjin, China, 300374

[2] Department of Neuroscience, Psychology and Behaviour, University of Leicester, UK, LE1 7RH, kbp3@leicester.ac.uk

[3] Centre on Aging Psychology, Institute of Psychology, Chinese Academy of Sciences, Beijing, China, 100101

Words are recognized most efficiently by young adults when fixated at an optimal viewing position (OVP), which for English is between a word's beginning and middle letters. How this OVP effect changes with age is unknown but may differ for older adults due to visual declines in later life. Accordingly, a lexical decision experiment was conducted in which short (5-letter) and long (9-letter) words were fixated at various letter positions. The older adults produced slower responses. But, crucially, effects of fixation location for each word-length did not differ across age-groups, indicating that the OVP effect is preserved in older age.

Keywords: Aging, Visual Word Recognition, Optimal Viewing Position

Benefits of Increased Character and Word Spacing for Developing Chinese Readers with Dyslexia: Evidence from Eye Movements

Sha Li[1], Lin Li[1], Victoria McGowan[2], Xuejun Bai[1], Kevin Paterson[2], Jingxin Wang[1*]

[1] Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300374,wjxpsy@126.com

[2] College of Medicine, Biological Sciences and Psychology, University of Leicester, Leicester, UK, LE1 7RH

The present experiment examined how adding spaces between characters affects the performance of atypically-developing (dyslexic) readers and age- and ability-matched typically-developing readers. Text was presented normally, or with spaces between all characters or character pairs that combined to form either words or non-words. Compared to normal text, increased spacing showed no overall facilitation for typically-developing readers, and incurred a cost for all readers in the non-word condition. But clear facilitation was observed for atypically-developing readers when spaces were added between characters or words. The results suggestthat increased character spacing maybenefit the reading performance of Chinese dyslexic readers.

Keywords: Eye movements, Chinese reading, dyslexia, word spacing

Landing position effects during Chinese word learning and reading in children and adults

Feifei Liang[1], Chuanli Zang[1], Hazel I. Blythe[2], Xuejun Bai[1] & Simon P. Liversedge[2]

[1] Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300074, feifeiliang_329@126.com; [2] School of Psychology, University of Southampton, Southampton, UK, SO17 1BJ

The present study adopted a word learning paradigm to examine whether children and adults differ in their saccade targeting strategies when learning novel words within contexts. The results showed that children and adults did not differ in their basic pattern of saccadic targeting during word learning within contexts. However, only adults' initial landing positions were affected by corresponding launch sites; there was no such effect for children. Together these results indicate differential maturity of the systems controlling saccadic targeting in children. It appears that sensitivity to target characteristics develops more rapidly in children than sensitivity to contextual word length.

Keywords: landing position effect, word learning, children, Chinese reading

Evaluating the effectiveness of a shared book reading intervention.

Jamie Lingwood, University of Liverpool

There is a virtuous circle between reading and language development. Thus, the more we can encourage parents to read with their preschool aged children, especially disadvantaged parents, the more likely these children are to be protected against reading delay/difficulties at school. The current study evaluated the impact on the language of disadvantaged children of a shared reading for pleasure intervention: The Reader's *Get into Reading* programme. Sixty parents of children (3- to 4-year olds) are taking part in an 8 week-long local Get into Reading programme and 60 further families, have been recruited to an active reading control group and have been asked to attend their local library group once a week. The effect of the intervention is being assessed by comparing (a) children's vocabulary language gains, (b) parental attitudes to reading, and (c) dyadic reading behaviours during shared book reading, pre- and post-intervention.

The Neuroanatomical basis of Chinese developmental dyslexia

Li Liu

(National key laboratory of cognitive neuroscience and learning, Beijing, China, 100875, lilyliu@bnu.edu.cn)

Using MRI and DTI, from both local segregation and inter-region integration perspectives, we found abnormal micro-structure of gray matter and white matter in Chinese dyslexia in multiple brain regions, which include classic regions for reading and speech, as well as regions for executative function and early visual perceptual processing. We also found abnormal connectivity patterns in Chinese dyslexia in both cortical thickness network and surface area network, with Chinese dyslexia more bilaterally and anteriorly connected. Our DTI study revealed reduced FA in Chinese dyslexia in the hippocampal part of the left cingulum, left cortical spinal, right superior longitudinal fasiculus and anterior tract of radiation.

Keywords: VBM, DTI, cortical thickness, surface area, connectivity.

Visual Attention of Deaf Readers is Enhanced in Parafovea during Lexical Processing

Lu Liu, Ziming Song, Zhuyang Li, Yingchao Wang, Wenhui Bao, Yifan Cui, Yalin Gao, Guoli Yan

Academy of Psychology and Behavior, Tianjin Normal University, 300074, liullu0201@126.com

In low-level visual perceptual tasks, deaf individuals are more distracted by irrelevant information in extrafoveal vision, when focusing centrally is required for deaf individuals. Does this happen when the deaf readers were reading the Chinese? In the present study, two experiments were carried out to explore whether the foveal processing were more easily distracted by the enhanced parafoveal processing for deaf readers during lexical decision. The result showed that the deaf readers were more efficient at processing parafoveal information. In sum, visual attention of deaf readers is enhanced in parafovea during lexical processing.

Keywords: deaf readers, parafoveal visual attention, gaze-contingent foveal masking paradigm

The Acquisition of Novel Words during Picture-book Reading for Chinese Young Children

Nina Liu, Feng Song, & Guoli Yan

(Tianjin Normal University, Tianjin, China, 300387, lnnair@163.com)

We investigated whether the Chinese young children can acquire words during shared picture-book reading in Chinese. The eye-movements of thirty children in first grade were tracked when they read picture-book. Thirty-two target pseudo-words were embedded in the story book. Results indicated that children can learn pseudo-words even their fixation times only accounted for 16% of the total reading time. The effects of learning and eye-movements patterns on pseudo-words were modulated by the frequencies of semantic and phonetic radicals of target pseudo-words. We discussed implications of our findings for the nature of learning novel word during picture-book reading.

Keywords: picture-book reading, novel word learning, semantic and phonetic radicals, eye movements.

Eye movements of developing Chinese readers: Effects of word frequency and predictability

Nina Liu [1] , Xia Wang [1],Guoli Yan [1], Kevin B. Paterson [2]

1 Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China

2 Department of Neuroscience, Psychology and Behavior, University of Leicester, Leicester, UK

Word predictability and frequency have important influences on the eye movements of skilled adult readers for both Chinese and alphabetic languages like English. However, almost nothing is known about the use of this information during reading development, although this will be important for understanding how children learn to read. Accordingly, we examined the effects on the eye movements of developing Chinese readers by parametrically manipulating the frequency and predictability of two-character target words in sentences. Interactive effects of word frequency and predictability were observed in both skipping rates and fixation times for the target words, indicating that these factors jointly influence the eye movement behavior of developing Chinese readers. We discuss these findings in relation to the acquisition of lexical processing skills by beginning readers of Chinese.

Using Machine Learning to Understand the Development of Adaptive Eye Movement Control During Reading

Yanping Liu

Sun Yat-sen University

Previous models of eye-movement control have already described the rich patterns of eye-movement behaviour in reading, however, it is impossible to know how and why these sophisticated models emerge as they present. To understand the development course of these intelligent eye-movement control, computational modeling were developed using artificial reading "agents" that are subject to known physiological (e.g., limited visual acuity) and psychological (e.g., limited attention) constraints and capable of learning to move their eyes and allocate attention to read as efficiently as possible. These modelings will

insight us how humans may exploit whateve rinformation in learning to decide when and where to move their eyes during reading.

Keyword: Reading Development, Eye-movement control, Computational modeling, Deep reinforcement learning, Neural Network.

Effects of adults aging on word encoding in reading Chinese: Evidence from disappearing text

Zhifang Liu[1], Wen Tong[2]

[1]. Department of Psychology, Ningbo University, Ningbo, China, email: lzhf2008@163.com;

[2]. Department of Psychology, Shanxi Normal University, Linfen, China, email: twaaa@126.com

The effect of aging on the process of word encoding for fixated words and words presented to the right of the fixation point during reading of sentences in Chinese was investigated with two disappearing text experiments. The results of Experiment 1 showed that the 40-ms onset disappearance of word n did not disrupt young adults' reading performance. However, for old readers, the disappearance of word n caused disruptions until the onset time was 120 ms. The results of Experiment 2 showed that the disappearance of word n+1 did not cause disruptions to young adults, but these conditions made old readers spend more time reading a sentence compared to the normal display condition. These results indicated a reliable aging effect on the process of word encoding when reading Chinese, and that the encoding process in the preview frame was more susceptible to normal aging compared to that in the fixation frame. We propose that sensory, cognitive, and specific factors related to the Chinese language are important contributors to these age-related differences.

Keywords: Chinese reading, disappearing text, words encoding, aging, eye movements

The Influence of Word Copying and Visual-Motor Integration on Chinese Reading

Ze-Long Meng, Hong-Yan Bi*

(Key Laboratory of Behavioral Science, Institute of Psychology, Chinese Academy of Sciences, Beijing 100101, China)

Some studies figured that Chinese children with developmental dyslexia (DD) had word copying deficit and copying skills had influence on Chinese reading. Present study showed that Chinese children with DD had slower word copying speed and lower visual-motor integration ability than age-matched controls. Results of hierarchical regression exhibited that visual-motor integration and word copying could explain 14% and 16% of variance in Chinese reading separately. Visual-motor integration could still have a unique contribution to Chinese reading when reading-related cognitive skills were statistically controlled, however word copying could not. It suggested visual-motor integration played an essential role in Chinese reading.

Keywords: developmental dyslexia, word copying, visual-motor integration, Chinese reading.

Do frequency and contextual diversity influence children's learning of new words when reading text?

Ascensión Pagán, Phoebe Rodgers, Helen Norris & Kate Nation

University of Oxford

Children often encounter new words in text. We examined whether frequency and contextual diversity influence new word learning by recording 10-year-old's eye movements as they read new words embedded in stories (training phase). The new word appeared either three or six times; half of the children read the same stories and half read different stories over two training sessions. The new words were also read in neutral sentences to test learning (testing phase). In both phases, there was a frequency effect with shorter fixations on the words seen six times. There was also an effect of diversity: children who read the same stories showed shorter reading times on the new words than children in the diverse condition, across both early and late measures, suggesting that new words encountered in different contexts need more time to be processed and integrated.

Evaluating Methods to Support the Reading Skills of Pupils with Reading Difficulties in the Transition to Secondary School.

Shirley-Anne Paul; Paula Clarke; Charles Hulme; Glynnis Smith; Maggie Snowling

A randomised controlled trial evaluated two interventions designed to improve secondary school pupils' reading skills. 287 pupils in 27 schools were randomly allocated to one of three groups: Reading Intervention, Reading Intervention + Comprehension, and a delayed treatment control. The Reading Intervention included reading and phonological awareness activities, while the comprehension element included vocabulary, listening, figurative language, and narrative activities. Regression-based structural equation modelling revealed that neither intervention produced statistically significant gains in word reading scores but the Reading Intervention plus Comprehension intervention produced significant gains of a moderate size in reading comprehension (d =.29) and vocabulary (d = .34.).

Writing: A Psycholinguistic Perspective

Qingqing Qu

(Key Laboratory of Behavioral Science, Institute of Psychology, Chinese Academy of Sciences,

Beijing, China, 100101, quqq@psych.ac.cn)

Today, 757 million people worldwide still cannot read or write (UIS, 2015). Over the past few decades, a vast amount of research has been dedicated to exploring reading from developmental, educational or cognitive perspectives. However, the ability to read did not necessarily imply the ability to write, and writing, as an important literacy skill, has been paid little attention. In this talk, I will present my work concerning following several issues, namely the extent to which handwriting is constrained by sound-based codes, what are temporal properties of cognitive processes underlying writing, and whether writing knowledge affects other language processes, i.e., spoken word recognition, and spoken word production. Gaining a detailed understanding of these questions is important not only for theories of writing, but also has relevance for how writing is being taught in educational settings.

Keywords: literacy, writing, phonology, orthography, time course.

Predictability, frequency and parafoveal preview effects in fluent reading

Sara C. Sereno[1,2], Christopher J. Hand[3], Aisha Shahid[2], Bo Yao[4], and Patrick J. O'Donnell[2]

[1]Institute of Neuroscience and Psychology, University of Glasgow

[2]School of Psychology, University of Glasgow

[3]Department of Psychology, Social Work and Allied Health Sciences, Glasgow Caledonian University

[4]Division of Neuroscience and Experimental Psychology, University of Manchester

Research has generally demonstrated additive effects of contextual predictability and word frequency on fixation time measures. Studies of parafoveal preview have shown greater preview benefit obtained from predictable, higher frequency words versus less predictable, lower frequency words. In two experiments, we investigated combined effects of target word predictability, frequency, and parafoveal preview. A 3 (Predictability: low, medium, high) × 2 (Frequency: low, high) design was used with Preview (valid, invalid) manipulated between experiments. With valid previews, we found main effects of Predictability and Frequency in fixation time and probability measures, including an interaction in early fixation measures. With invalid preview, we found no evidence of an interaction. Predictability interacted with Preview in early fixation time and probability measures. Our findings suggest that high levels of contextual constraint exert an early influence during lexical processing in reading. Results are discussed in terms of models of language processing and eye movement control.

Keywords: contextual predictability, word frequency, parafoveal preview, eye movements, reading

Bo Yao

University of Manchester

Implicit prosody in silent reading of direct versus indirect speech quotations

Converging behavioural, eye-tracking and neuroimaging evidence suggests that hearing individuals mentally simulate more enriched prosodic representations during silent reading of direct speech (e.g., Mary said, "This dress is beautiful!") as opposed to indirect speech (e.g., Mary said that the dress was beautiful). By contrast, preliminary data indicate that congenitally deaf individuals may mentally represent direct and indirect speech comparably and in signs. The implications of our results are discussed in relation to embodied cognition and the implicit prosody hypothesis.

Eye Movement Control and Word Identification During Vertical and Horizontal Reading: Evidence from Mongolian

Guoen Yin [1],Juan Su [1,2],Xuejun Bai [1],Guoli Yan [1],You Hou[3],Simon P. Liversedge[4],Kevin B.Paterson[5*]

[1] Academy of Psychology and Behavior，Tianjin Normal University，Tianjin，China

[2] Collegeof Statistics and Mathematics，Inner Mongolia Finance and Economics University，Hohhot，China

[3] Collegeof Education Science, Inner Mongolia Normal University，Hohhot，China

[4]School of Psychology, University of Southampton, UK

[5] Department of Neuroscience, Psychology and Behaviour, University of Leicester, UK, LE1 7RH,kbp3@leicester.ac.uk

Mongolian is a cursive alphabetic language (similar to Arabic) that is conventionally printed vertically (so that sentences are effectively rotated 90° from horizontal) and so naturally read from top to bottom, but can also be printed horizontally. This language is therefore ideal for assessing the versatility of word identification and oculomotor control when reading text in different directions. Twoexperiments addressed this issue by examining the influenceof reading direction and both word frequency (Experiment 1) and word length (Experiment 2) on eye movement control. In both experiments, horizontal reading was slower than vertical reading, although effects of word frequency and word length were similar for the two reading directions. Crucially, the initial landing positions of fixations on words were also broadly similar for the two reading directions, and in Experiment 2 were closer to the beginnings of longer words. Thus, while reading is generally slower for the less familiar reading direction, this did not disrupt normal processes of word identification or saccade-targeting (e.g., Rayner, 1979). The findings therefore reveal that processes of word identification and eye movement control are highly adaptable to these changes in reading direction.

Keywords: Mongolian, reading direction, eye movement control

Character Complexity Effects in Reading and Visual Search

Lili Yu

University of Southampton, UK

Three experiments were conducted to examine how Chinese character complexity (i.e., number of strokes) influences different readers' eye-movement behaviors in different tasks. In Experiment 1 and 2, native English and native Chinese readers searched for specific low-, medium-, and high-complexity target characters in a multi-page text. In Experiment 3, Chinese readers read and comprehended the same text as previous experiments. Complexity effect of fixated characters was observed across participants and tasks. However, there was a different pattern of target complexity effect between English and Chinese readers. The results may reflect the requirement of whatever visual processing in Chinese language.

Phonological deficit in Chinese speaking children with developmental dyslexia

Ke Tan, Wen Wang, Mingzhe Zhang, Xuejun Bai

Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300074, bxuejun@126.com

Previous studies in alphabetic languages have identified that developmental dyslexics showed impairment in phonological processing (Snowling, 1980; Shaywitz et al., 1998; Ramus, 2001), which includes three main dimensions: phonological awareness, verbal short-term memory and lexical retrieval (Wagner & Torgesen,1987; Ramus, 2008). Whether Chinese dyslexics showed phonological deficit is still under debate (Shu et al., 2006; Ho et al., 2002). In the current study, we aimed to investigate three main dimensions of phonological processing of Chinese dyslexic children. Twenty developmental dyslexic children (DD)

matched by 20 chronological age (CA) and 20 reading level controls (RL) participated in the study. All subjects were tested by consonant/vowel/tone discrimination, digit span, verbal working memory and rapid automatized naming in digits/colors tasks. The results showed that the phonological awareness of DD was not only worse than their chronological peers, but even worse than younger children, which suggested phonological awareness deficit of DD; and that the abilities of verbal short-term memory and lexical retrieval of DD was only at a 2yrs lower level than their chronological peers, indicating an inadequate development of DD. We concluded that Chinese speaking children with dyslexia showed deficit in phonological processing.

Keywords: developmental dyslexia, phonological processing, phonological awareness, verbal working memory, Rapid Automatized Naming

Morphological Awareness in Reading and Spelling Difficulty in Chinese Developmental Dyslexia

Xiuhong Tong[1], Catherine McBride [2], Hua Shu[3]

[1]Institute of Psychological Sciences, Zhejiang Key Laboratory for Research in Assessment of Cognitive Impairments, and Center for Cognition and Brain Disorders, Hangzhou Normal University

[2] Department of Psychology, The Chinese University of Hong Kong

[3] National Key Laboratory of Cognitive Neuroscience and Learning, Beijng Normal University

This study investigated the associations of morphological awareness to word reading and spelling in Chinese children with and without dyslexia. Fifteen children who had been diagnosed as having dyslexia by professional psychologists, and 15 other children manifested average reading ability and had been randomly selected involved in this study. Results suggested that the dyslexic groups had poorer performance in morphological awareness and RAN across all three years. However, phonological awareness was not stable in distinguishing the groups. Findings suggest that morphological awareness is a relatively strong correlate of spelling difficulties in Chinese, but phonological awareness is not.

Keywords*:* morphological awareness, reading and spelling, dyslexia, Chinese language.

Parafoveal Preview Benefit Effects During Reading: A Bayesian Meta-analysis.

Martin R. Vasilev & Bernhard Angele, Bournemouth University

How much information do readers obtain from the words to the right of fixation? A large number of gaze-contingent boundary experiments (Rayner, 1975) have been conducted to investigate this question, but so far no attempt has been made at quantitatively summarising the results. We performed a Bayesian meta analysis of 93 boundary experiments. We report three main conclusions: 1) the advantage of previewing the second word to the right (n+2) is non-zero, but modest in size; 2) Chinese readers seem to show slightly stronger preview benefit effects than readers of alphabetic languages 3) less word-like masks cause parafoveal interference effects. We will discuss the theoretical implications of our findings.

Adult Age Differences in Chinese Reading: Effects of Character Complexity

Jingxin Wang[1], Lin Li[1], Sha Li[1], Fang Xie, Kevin Paterson[2*]

[1] Academy of Psychology and Behaviour, Tianjin Normal University, Tianjin, China, 300374

[2] Department of Neuroscience, Psychology and Behaviour, University of Leicester, Leicester,UK,LE1 7RH, kbp3@leicester.ac.uk

Previous research has revealed a characteristic pattern of age-related reading difficulty for Chinese. The present research assessed the effects of character complexity, as this may be a particular source of difficulty for older Chinese readers. Young and older adult participants read sentences containing a high-complexity (>9 strokes) or low-complexity (<=7 strokes) two-character word (matched for frequency and predictability).Typical patterns of age-related reading difficulty were observed. Crucially, older readers also had greater difficulty reading high- than low-complexity words compared to young adult readers, suggesting older adults have particular difficulty processing more complex characters due to visual/cognitive declines in older age.

Keywords: aging, Chinese reading, character complexity

Adult Age Differences in Chinese Reading: Effects of Word Length

Jingxin Wang[1], Sha Li[1], Lin Li[1], Kevin Paterson[2*]

[1] Academy of Psychology and Behaviour, Tianjin Normal University, Tianjin, China, 300374

[2] Department of Neuroscience, Psychology and Behaviour, University of Leicester, Leicester, UK,LE1 7RH,kbp3@leicester.ac.uk

Previous research with young adults shows effects of word length for words receiving one first-pass fixation during Chinese reading. But whether landing-position effects change with age is unknown. To investigate this issue, young and older adults were presented with sentences containing 2-or 4-character words(matched for frequency, complexity and predictability). Word length effects were observed for young but not older adults for words receiving one first-pass fixation, and for neither age-group for words receiving multiple first-pass fixations. Chinese readers therefore can produce word length effects when parafoveal word-segmentation is possible, but the effectiveness of this strategy declines with age.

Keywords: aging, Chinese reading, word length

Development of oculomotor inhibition in children

Wang Suxia & Yang Lizhu

(Department of Psychology, Liaoning Normal University, Dalian, China, 116029, wangsuxia1988@126.com)

Abstract: To investigate the development of the voluntary control of saccadic eye movement, we examined eye movements in 90 normal children (6-11 years). Children were asked to fixate a central gray cross. A target was then presented, either to its right or left. In the mixed-saccade task, the colour of fixation cross was the cue for whether the required saccade was to be a pro (gray cross turns green) or an antisaccade (gray cross turns red). Two major results were obtained: Frist, younger children made more antisaccade errors. Secondly, the mean saccadic latency difference between pro and antisaccades decreased with increasing age.

Keywords: Development, Children, Prosaccades, Antisaccades, Inhibition.

Kayleigh Warrington, Victoria A. McGowan, Sarah J. White, and Kevin B. Paterson

Department of Neuroscience, Psychology and Behaviour, University of Leicester, UK

The extent to which parafoveal processing of text changes with older age is controversial. To investigate this issue, we used a gaze-contingent moving-window technique to assess the parafoveal processing of orthographic information by young (18-30 years) and older (65+ years) adult readers. This involved substituting letters in words at locations to the right and left of fixation. The results revealed that, contrary to expectation, older adults appear to have intact parafoveal processing of orthographic information and demonstrated a perceptual span similar to young adults. These results have important implications for understanding the nature of the initial processing of words within text.

Executive functions in Chinese developmental dyslexia

Wen Wang[1], Ke Tan[1], Yana Li[2], Mingzhe Zhang[1], Xuejun Bai[1]

[1] Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300074, Email: bxuejun@126.com

[2] Experimental Primary School, Hebei District, Tianjin, China, 300143

Abstract: Developmental dyslexia (DD) refers to those who have normal intelligence, education and social-cultural opportunities, while exhibiting specific difficulties in reading. Recent studies argued that dyslexics showed underlying general cognitive deficits, e.g., executive functions (EF) deficit, other than phonological deficit. In current study, 30 DD with 30 chronological-age (CA) and 30 reading-level matched (RL) children underwent Stroop, trial-making and digit-span task, corresponding to inhibitory control, cognitive flexibility and working memory in EF. Results showed that dyslexics' inhibitory control and working memory capacity were stuck at a lower-grade level, while their cognitive flexibility were significantly flawed.

Keywords: developmental dyslexia, executive function, inhibitory control, cognitive flexibility, working memory

Transparency Effects on semantic activation of morpheme characters in reading Chinese: Evidence from Eye Movements

Jinmian Yang

(Department of Psychology, Fudan University,

Shanghai , China, 200433, jinmianyang@fudan.edu.cn)

The current study aimed to investigate to what extent the dominant meaning of a critical character is activated when it was part of a two-character word. Readers' eye movements were monitored as they read sentences containing either a two-character target word (transparent or opaque words), or the initial character of them. The main results showed a significant interaction between word number and word transparence, suggesting that the dominant meaning of the critical character was activated in both

transparent and opaque word conditions, and thus provided more facilitation to the processing of the transparent words than to opaque words.

Keywords: morpheme character, transparency, semantic activation, eye movement

The Ability of Audiovisual Integration in Chinese Children with Dyslexia

Ying-Hui Yang, Hong-Yan Bi*

(Key Laboratory of Behavioral Science, Institute of Psychology, Chinese Academy of Sciences, Beijing 100101, China)

Alphabetic studies evidenced that developmental dyslexia (DD) have deficits in the crossmodal integration of visual and auditory information. This deficit was revealed in both linguistic and sensory processing (Snowling, 1980; Fox, 1994; Rose et al., 1999; Harrar et al., 2014; Shaul, 2014). The present study conducted a lexical decision task with linguistic material and a target detection task with nonlinguistic materials, respectively under the audiovisual crossmodal condition and visual/auditory unimodal conditions. Worse behavioral performance were found in dyslexics than that of the normal controls, in both the processing of linguistic as well as nonlinguistic stimuli in the crossmodal condition. Furthermore, the audiovisual deficits in Chinese DD were not stem from unimodal defect.

Keywords: developmental dyslexia, Chinese, audiovisual integration, linguistic and sensory processing

The Semantic Processing of Developmental Dyslexia Children in Picture-Word Interference Paradigm

Muwang Ye, Xin Li, Xu Zhang, Wen Wang, Xuejun Bai

Academy of Psychology and Behavior, Tianjin Normal University, Tianjin, China, 300387, bxuejun@126.com

In two experiments, developmental dyslexia children and normal children were instructed to ignore superimposed written distractor words while fulfilling the picture-name task. Experiment 1 showed that semantic processing of developmental dyslexia children was flawed. Experiment 2 showed that the semantic encoding of developmental dyslexia children was flawed, and this process was occurred in the 0ms SOA condition. The two experiments indicated that developmental dyslexia children were flawed on the semantic processing and this process was occurred in the early stages of speech production.

Keywords： developmental dyslexia, semantic processing, picture-word interference paradigm, competitive models of lexical selection

Character Complexity Effects in Reading and Visual Search

Lili Yu

University of Southampton, UK

Three experiments were conducted to examine how Chinese character complexity (i.e., number of strokes) influences different readers' eye-movement behaviors in different tasks. In Experiment 1 and 2, native English and native Chinese readers searched for specific low-, medium-, and high-complexity target characters in a multi-page text. In Experiment 3, Chinese readers read and comprehended the same text as

previous experiments. Complexity effect of fixated characters was observed across participants and tasks. However, there was a different pattern of target complexity effect between English and Chinese readers. The results may reflect the requirement of whatever visual processing in Chinese language.

Frequency and complexity effects of two-character words on eye movements of young and older Chinese readers

Chuanli Zang[1], Manman Zhang[1], Xuejun Bai[1], Guoli Yan[1], Kevin B. Paterson [2], Simon P. Liversedge[3]

[1] Tianjin Normal University, P.R. China

[2] University of Leicester, UK

[3] University of Southampton, UK

Abstract: How do visual and linguistic processing of text change with age? Research shows Chinese older adults make longer fixations than young adults, especially when they read visually-complex single-character words (Zang et al., 2015). Extending this work, we investigated whether older adults experienced greater difficulty while reading two-character words and whether such difficulty could spillover to the subsequent words. We monitored eye movements of young and older readers while reading sentences containing verb-noun pairs, and orthogonally manipulated frequency and visual complexity of a two-character verb which immediately preceded a two-character noun. Results showed that compared to the young adults, older adults fixated verbs for longer, and this effect spilled over to the noun when the preceding verb was complex. However the older adults skipped the verbs less often than young adults when these were less complex. The findings suggest older Chinese readers read cautiously to compensate for their difficulty processing text.

Keywords: word frequency, word complexity, Chinese reading, eye movements

Developmental difference in the relationship between visual rapid processing and Chinese reading fluency

Jing Zhao*, Menglian Liu, Hanlong Liu, Chenchen Huang

(Department of Psychology,Learning and Cognitive Key lab, Capital Normal University, Beijing ,China, 100037, conanzj@126.com)

Abstract: Our research explored the relationship between visual rapid temporal/simultaneous processing and Chinese reading fluency in different modes at different developmental stages. A part of this research has been finished. The current results exhibited that the visual rapid temporal processing might be more associated with oral reading fluency especially among beginning readers, and the visual rapid simultaneous processing might be more related to silent reading fluency for skilled readers. These findings revealed differences in the underlying mechanism between silent and oral reading fluency from the general perceptual level, which might bring enlightenment to the remediation of reading fluency deficit.

Keywords: Chinese reading fluency, silent reading, visual rapid temporal processing, visual rapid simultaneous processing, reading development

Impairment of covert inhibition of return in Chinese dyslexic children

Jing Zhao*, Yun Ding, & Zhiguo Wang

(Institute of Psychological Sciences, Hangzhou Normal University, Hangzhou, China, 311121, *zhaojing561@126.com)

Abstract: Studies of alphabetic scripts have shown that dyslexics have deficits in attentional orienting, a non-language deficit that hampers phonological processing. Using a spatial cueing task (Posner, 1980), the present study examined whether Chinese dyslexics also have such deficits. The results revealed a lack of inhibitory attentional mechanism in dyslexic children, but not in two groups of typically developing children, who were age- or reading ability-matched to the dyslexic children. We conclude that the deficit in attentional orienting is not restricted to dyslexics in alphabetic writing systems, and it may be a causal factor of reading difficulties.

Keywords: developmental dyslexia, Posner cueing task, eye movements, inhibition of return, visual attention