Running title: academic writing in cognitive neuroscience for Chinese students

Practical tips of academic writing in cognitive neuroscience for Chinese young researchers

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**ABSTRACT**

Writing academic papers in English has always been a great challenge for Chinese young researchers in cognitive neuroscience. However, writing training is largely ignored in conventional graduate education in China, and there exist no useful resources for students to improve writing. In this paper, we aim to provide an array of fundamentals of academic writing and practical tips of which even students without profound English skills can take advantage. We argue that the barriers students face during academic writing mainly arise from insufficient practice and lack of feedback from advisors, rather than English skills *per se*. As long as receiving appropriate guidance and giving more practice, every student should be able to write accurately, independently, and confidently, to meet the needs in their academic activities. We organize the content into four sections. First, we analyze why English writing is generally difficult and especially challenging for Chinese students. Some language tools for writing are also introduced. Second, we introduce the formatting of the basic structure as the first step before filling in any content into a manuscript. Third, we detail the basic skills and common errors of making figures, figure caption, citation, equations in a manuscript. Forth, we further analyze how to better present information in each section, including introduction, methods, results, and discussions. All the tips here are designed as straightforward and easily executable as possible. We hope the collection of practical tips we offer here can effectively strengthen students’ confidence and alleviate anxiety when writing English papers. Provide a viable path to master writing skills by themselves.

Keywords: academic writing, cognitive neuroscience, practical tips, common grammar mistakes

**INTRODUCTION**

Writing papers is an essential task in academic career. However, the common language in academic is English and this imposes a great challenge for people whose native language is not English, such as Chinese students. Here, we will first explain why writing English papers is especially difficult for Chinese students. Then we will propose some general principles as a viable path that Chinese students can follow to master writing skills.

***Why writing academic paper in English is challenging to Chinese students?***

***The viable path for a new writer***

Given a paper consists of several parts, what should we learn to write first or what is the correct path for learning to write? I suggest a new writer learn to write each section follow the order of Methods, Results, Introduction, and then Discussion. This is because the method and the result parts are relatively easier to write because they aim to describe some pre-defined truth. No strong logic or storytelling ability is necessarily required. Introduction and discussion need more logic thinking, particularly the profound background knowledge. I suggest a new write first learn to write methods and results, then switch to introduction and discussion.

Below we propose some general ideas.

***How to write the introduction part?***

Introduction is the most important part of

**METHODS AND MATERIALS**

In this section, we will detail the common constituents of the method part in a psychophysical and a neuroimaging paper.

As long as the study is related to human or animal subjects, the first subsection must be ethics statement. Below is an example.

**Ethics statement**. All experimental protocols were approved by the institutional review board at the Peking University. All research was performed in accordance with relevant guidelines and regulations. Informed written consent was obtained from all participants.

**Psychophysical experiment**.

**MRI experiment.**

*Experimental procedures*.

*Data acquisition*.

*Data analysis*.

**RESULTS**

***Figure and figure caption examples***

Here we provide some examples of figures and figure captions, and explain them in details

*Example 1*.

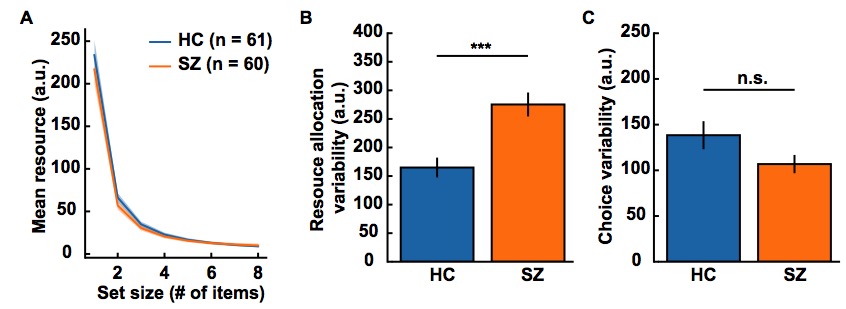


Figure 5. **Fitted parameters of the VP model**. ***A***. Resource decaying function. ***B*.** Resource allocation variability. ***C*.** Choice variability. No significant group differences are noted between two groups in resource decay functions (panel A), and choice variability (panel C). SZ have larger resource allocation variability than HC (panel B). The individual resource decay functions are computed by , where *N* is the set size,  and *a* are the estimated initial resources and the decaying exponent of one subject. The solid lines represent the averaged resource decay functions across subjects. The shaded areas in panel A and all error bars in panels B and C represent ±SEM across subjects. Significance symbol conventions are \*: p < 0.05; \*\*: p < 0.01; \*\*\*: p < 0.001; n.s.: non-significant.

*Example 2.*



Figure 5. **Schematic illustrations (A,C), predictions (B,D) and empirical results (E,F) for component- dependent and pattern-dependent VPL.** ***A.*** The component-dependent VPL takes place at the lowest level of motion processing, as indicated by the red rectangle. Here, training on a component stimulus should only transfer to the plaid stimulus that comprises the trained component. Moreover, training on a plaid stimulus should only transfer to its two constituent components. ***B.*** Learning effects as predicted by component-dependent learning in subplot A. ***C***,***D***. Illustrations of the pattern-dependent perceptual learning and its predicted learning effects, following conventions in subplots A and B. Here, plasticity involves the middle stage of motion processing. ***E.*** Duration thresholds at pre-/post-test across stimulus conditions in the component (left panel) and the plaid training (right panel), respectively. **F**. Learning effects quantified as percent of improvement (PI%) across stimulus conditions and training regimes. The overall pattern mimics the predictions in subplot D, indicating plasticity associated with the middle-level of motion analysis. For all subplots, error bars denote ± 1 SEM across subjects. Significance symbol conventions are \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; n.s.: non- significant. Same definitions of error bars and symbol conventions are kept for all figures in this paper.

***Citation examples***

*Example 1*. (underline in-text citation and link them to references in bibliography, you can set it in the Endnote plugin in Word)

Prior studies in neurophysiology have discovered that neurons that share similar tuning functions (i.e., a positive SC) also tend to have a weak positive NC, a pervasive phenomenon across several brain regions ([Lee et al., 1998](#_ENREF_23); [Constantinidis and Goldman-Rakic, 2002](#_ENREF_10); [Averbeck and Lee, 2003](#_ENREF_1); [Gutnisky and Dragoi, 2008](#_ENREF_16); [Smith and Kohn, 2008](#_ENREF_35); [Huang and Lisberger, 2009](#_ENREF_19); [Jermakowicz et al., 2009](#_ENREF_20); [Ecker et al., 2010](#_ENREF_14)).

*Example 2*. (author + year format)

For example, the seminal study by [Zohary et al. (1994)](#_ENREF_42) demonstrated that TCNCs limit the amount of information in a neural population as the noise is shared by neurons and cannot be simply averaged away.

***Statistics examples***

Here we provide some examples of reporting ANOVA results.

*Example 1*. A 2x2x2x8x2 ANOVA was performed with group (action/control) as a between-subject factor; test (pre/ post), run (first/second), external noise level (eight levels), and performance level (79.37% and 70.71%) as within-subject factors; and log signal contrast threshold as the dependent variable. No main effect of run was observed (F(1,24) = 1.41, p = 0.25, η2 = 0.06), nor did run interact with any other factor (all P > 0.05). Main effects of external noise level (F(7,168) = 414.22, p < 0.001, η2 = 0.95), performance level (F(1,24) = 297.34, p < 0.001, η2 = 0.93), and test (F(1,24) = 15.65, P = 0.0006, η2 = 0.40) were observed, indicating the expected effects of lower thresholds at low external noise levels and for the less demanding performance level, as well as at posttest. Crucially, a test (pre/post) × group (action/control) interaction was found (F(1,24) = 8.66, p = 0.007, η2 = 0.27), indicating larger improvement in contrast thresholds between pre- and posttest in action trainees than in control trainees. Finally, a weak group × external noise level interaction (F(7,168) = 2.35, p = 0.05, η2 = 0.09) indicated an overall ad- vantage throughout the whole experiment in the action group at low external noise levels. No other effects were observed (all p values > 0.05).

*Example 2*. Data were analyzed with a 3 × 2 × 2 MANCOVA with motion direction discrimination threshold as the dependent variable, with training group (control, AVG, MAT) and nystagmus as a between-subjects factor and eccentricity (12° and 25°) as a within-subjects factor, with age, acuity and pre-training thresholds included as covariates. The main effect of training group was statistically reliable (F(1,14)= 4.14, p = 0.039; η2 = 0.63). Pairwise comparisons revealed significantly better performance in the MAT group relative to the control group (p = 0.045, Bonferroni corrected), with no significant differences between AVG and control groups (p = 0.30) and between MAT and AVG groups (p = 0.43). The main effect of nystagmus was not significant (F(1,14) = 0.33, p = 0.58, η2 = 0.08). Also, we noted a strong interaction of training and eccentricity (F(1,12) = 9.34, p = 0.004; η2 = 0.94). Pairwise comparisons revealed no significant differences between control and experimental groups at near periphery (AVG, p = 0.82; MAT, p = 0.47) but significant differences at far periphery (AVG, p = 0.032; MAT, p = 0.002, Bonferroni corrected).

**DISCUSSION**

**ACKNOWLEDGMENTS**

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**AUTHOR CONTRIBUTIONS**

W.W. conceived, designed research, S.Z., performed research; S.Z., W.W. wrote the draft of the paper. S.Z., S.L., and W.W. edited the paper.

**CONFLICT OF INTEREST**

The authors declare no competing financial interests.

**SUPPLEMENTAL INFORMATION for**

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**Supplementary Note 6: Data Analysis in Study 2, Training Study**

**Supplementary Note 2: Procedures of Study 1, Cross-Sectional Study**

**Participants.**20 non-video game players and 20 habitual video game players (with 9 action video game players and 11 real-time strategy players as recent work indicates real-time strategy gaming may have similar impacts as action video game play ([Glass et al., 2013](#_ENREF_4); [Kim et al., 2015](#_ENREF_9))) were recruited from the University of Maryland student body, under a protocol approved by the Institutional Review Board. All had normal or corrected-to-normal vision, provided informed