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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, specific writing training is largely ignored in conventional graduate education in China, and there exist no useful resources for students to learn and master 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 Chinese 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. 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 “real meat” 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. This guideline can serve a viable starting point for Chinese students 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 mainstream 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?***

Writing English papers is notoriously difficulty for Chinese students. The wide-spread view is to attribute poor writing skills to poor English per se. Here we argue that this misconception is detrimental to students’ confidence and overall exaggerates the difficulty of writing. We think that the lack of practice and insufficient guidance (i.e., either external resources or feedback from advisors) are two key reasons that hinder students developing their writing skills.

First, the English writing skills depend on the amount of practice not English skills, especially the skills measured by some standard test (e.g., CET-4, TOFEL). In other words, a beginner without good English skills can grow up into a proficient writer through a large amount of training. And, even a native speaker has no idea how to write an academic paper without training or practice. If you really believe your poor English skills prevent you producing a good paper, ask yourself the question “can I write the same sufficiently good paper in Chinese”. I would say most Chinese students cannot write a good paper even if he/she is allowed to write in Chinese. A typical Chinese student usually write one or two papers during 5 year PhD education. This amount of writing practice is far from enough to become a mature writer. In my personal opinion, even a native speaker needs at least 5-10 formal publications to become an independent writer. As such, I hope a student who want to be a PI (or at least independent writer) should aims for 10 writing papers during PhD. But what if I cannot publish that many papers in my PhD? Find other writing opportunities (e.g., commentary, finding applications). This is I called “deliberate practice”.

Second, most advisors in China (even in US) do not give enough feedback to students to improve their writing, and there exists no practical guidance to help students when they write their first paper. I often hear that in many labs, there are too many papers drafted by students and waiting for revision but PIs have no time to deal with it. And most PI believe that it is even easier for them to write a paper completely compared with teaching a student how to write. If PIs keep writing from scratch all by themselves, students learn nothing and more burden will in turn be posed on PIs because students have no idea how to write. In my opinion, at least some formatting almost require no knowledge of English, and all students are able to do that. Teaching students how to do these basic steps can (1) reduce the burden of PIs, (2) enhance students’ confidence engage them in the writing process. On the other hand, there exists no practical guidelines for Chinese students to follow. There do exist many writing books for Chinese students. However, they are not specifically for cognitive neuroscience and the content are too “high-level”, not “down to earth”. Indeed, writing is complicated and a lot of things are not explicitly describable. But we argue that there are at least some components that every Chinese student can understand and execute. We will detail these standard steps in next section.

***The viable path for a new writer in cognitive neuroscience—******standardized writing***

We propose a new way for Chinese students thinking about English writing—standardized writing. The framework of standardized writing contains two major principles. First, learning logic or content should be preceded by learning formatting.

we make some firm rules as detailed as possible that every student can follow.

My past experience in writing papers with students tells me that the more explicit the requirements are, the more clearly the students know how to implement it. I can give a few examples here

1. You must add line numbers and page numbers to manuscripts.
2. You must use Arial font with 10 pt size or Times New Roman font with 12 pt size in main text. This means other font and size are unacceptable.

These rules are easily understandable and executable, and students just follow it. Someone may argue that this seems hilarious as no journal says only Arial and Times New Roman font are acceptable. Of course, there is nothing fundamentally wrong if one uses other font such as Calibe. However, I can still remember when I started to write. The problem is there are too less rather than too many constraints. I feel extremely higher uncertainty about what I should do and I hope someone can give me the more detailed more concrete details the better.

***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**.

Here we detailed how to write the behavioral part. The general principle of presentation order is from ‘small’ to ‘big’. We should first describe the task (stimulus presentation timing, conditions etc), then show the information of runs, sessions, and finally make a summary of how many trials each participant completed in each condition. Below is an example.

**MRI experiment.**

*Experimental procedures*. Here the

*Data acquisition*.

*Data analysis*.

**RESULTS**

In the results part, we will focus on three parts—figure and figure captions, citation format, and statistical report.

***Figure and figure caption examples***

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

*Example 1*.

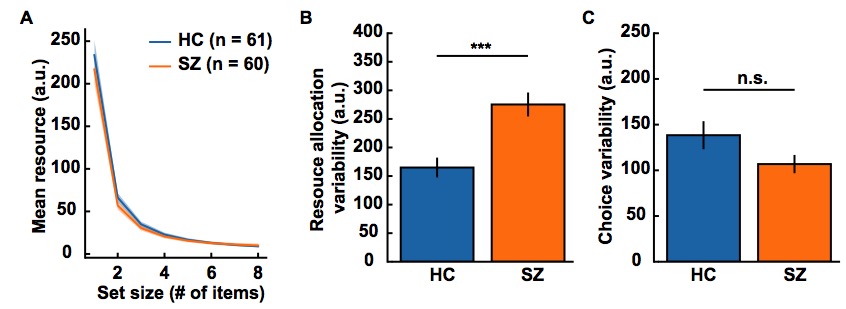


Figure 5. **Fitted parameters of the VP model**. ***A***. Resource decaying function. ***B*.** Resource allocation variability. ***C*.** Choice variability. No significant group differences are noted between two groups in resource decay functions (panel A), and choice variability (panel C). SZ have larger 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" \o "Zohary, 1994 #2) 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) = 1.412, p = 0.250, η2 = 0.061), 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) = 297.342, 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**

In this paper, we analyze the reason why Chinese students as a beginner feel lost when writing their first English paper, and provide a collection of practical tips for a beginner writer. In particular, we argue that the key reasons for the poor writing skills in Chinese students are insufficient amount of practice and the lack of guidance by advisors, rather than English skills per se. To circumvent these, we detail the necessary steps for a beginner to start a new manuscript. In particular, we emphasize that a beginner even without good English skills should learn the standard format of a manuscript.

**ACKNOWLEDGMENTS**

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**AUTHOR CONTRIBUTIONS**

R-Y.Z. conceived, designed research, S.Z., performed research; S.Z., W.W. and R-Y.Z. 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.

**References**

**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.