

Abstract of thesis entitled:

The Role of Spatial Frequency in Reading Chinese and English Sentences

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This study aimed to examine whether spatial frequency would exert different influences on Chinese and English sentence reading of bilingual participants, and to see whether such influence would be modulated by language proficiency.

In this study 80 pairs of sentences translated into Chinese and English were used as the materials. Each sentence was presented in the normal condition and the conditions with spatial frequency narrowed to a specific band (one octave wide band with 2.2, 3.5, 4.9, 6.7, 8.7, 11.1, and 13.7 cycle per degree (cpd) as central frequency). Participants were asked to read the sentences in an ordinary way and answered the comprehension questions followed. Six native English speakers were recruited to verify the material and design, while 33 Hong Kong local students were recruited as the bilingual participants to test the effect of narrowed spatial frequency on English and Chinese reading. Eye-tracking technique was used for data collection.

Results showed that for bilingual participants, both English and Chinese reading was impaired when spatial frequency was narrowed. English reading could recover to a relatively high level at 3.5cpd, then smoothly approached to the normal rate until reaching 6.7cpd, then dropped smoothly from 6.7cpd until reaching 11.1cpd, followed by a sharp drop at 13.7cpd. Chinese reading kept recovering to the normal rate until reaching 8.7cpd, then dropped down from 8.7cpd until reaching 13.7cpd.

To conclude, as found by previous studies on English, spatial frequency also

played a role in Chinese sentence reading. Moreover, the patterns of the effect of spatial frequency on English and Chinese reading of bilinguals are different from each other. Specifically, Chinese reading relied more on high spatial frequency content while English reading could maintain on high level in a wide range of spatial frequency band.

论文摘要：空间频率在中英文句子阅读中的作用

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本文报告了一个实验，旨在探讨空间频率对双语读者中文和英文句子阅读是否会造成影响，这种影响在中文和英文句子阅读上是否会存在不同模式，以及这种影响是否会受到语言熟练度的中介。

实验采用 80 个英文句子以及与之相对应的 80 个中文句子作为材料。句子会以正常状态和 7 种带通滤镜（一个八度频宽，分别以 2.2, 3.5, 4.9, 6.7, 8.7, 11.1, 13.7 周每度 (cpd) 作为中心频率）滤过的状态呈现。被试需要尽可能的以正常状态阅读句子并回答阅读理解问题。实验招募 6 名英语母语被试以确认实验设计与材料的效度；招募作为双语被试的 33 名香港本地学生以验证空间频率对中英文句子阅读造成的影响。实验采用眼动追踪技术记录被试在阅读任务中的表现。

基于双语被试的实验结果表明，当句子以带通滤镜滤过的状态呈现时，中英文阅读表现都会受到损伤。其中英文阅读在 3.5cpd 时便会恢复到比较高的水平，此后平缓升高直到 6.7cpd，自 6.7cpd 开始平缓下降直到 11.1cpd，在 13.7cpd 处快速下降；中文阅读直到 8.7cpd 之前都保持明显恢复势头，在 8.7cpd 之后开始下降，直到 13.7cpd。

综上所述，文句子阅读会受到空间频率的影响。并且空间频率对双语被试中英文句子阅读的影响存在不同。具体来说，中文阅读会更依赖高空间频率信息，而英文阅读在很广的频带上都能保持较高的水平。