

剑桥语言测试研究丛书

Components of L2 Reading

Linguistic and Processing
Factors in the Reading Test
Performances of Japanese
EFL Learners

二语阅读成分分析：

影响日本 EFL 学习者阅读测试表现的
语言学因素与处理能力因素研究

Toshihiko Shiotsu 著

剑桥语言测试研究丛书

Components of L2 Reading

Linguistic and Processing
Factors in the Reading Test
Performances of Japanese
EFL Learners

二语阅读成分分析：

影响日本 EFL 学习者阅读测试表现的
语言学因素与处理能力因素研究

Toshihiko Shiotsu 著

图书在版编目 (CIP) 数据

二语阅读成分分析：影响日本EFL学习者阅读测试表现的语言学因素
与处理能力因素研究 / (日) 盐津敏彦著.

—上海：上海外语教育出版社，2018

(剑桥语言测试研究丛书)

ISBN 978-7-5446-5414-2

I. ①二… II. ①盐… III. ①英语—阅读教学—教学研究 IV. ①H319.4

中国版本图书馆CIP数据核字 (2018) 第106283号

This is a reprint edition of the following title published by Cambridge University Press:

Components of L2 Reading: Linguistic and Processing Factors in the Reading Test Performances of Japanese EFL Learners
(ISBN: 9780521157278)

© Cambridge University Press 2010

This reprint edition for the People's Republic of China (excluding Hong Kong, Macau and Taiwan) is published by arrangement with the Press Syndicate of the University of Cambridge, Cambridge, United Kingdom.

© Cambridge University Press and Shanghai Foreign Language Education Press 2018

This reprint edition is authorized for sale in the People's Republic of China (excluding Hong Kong, Macau and Taiwan) only. Unauthorised export of this reprint edition is a violation of the Copyright Act. No part of this publication may be reproduced or distributed by any means, or stored in a database or retrieval system, without the prior written permission of Cambridge University Press and Shanghai Foreign Language Education Press.

本书版权由剑桥大学出版社和上海外语教育出版社有限公司共同所有。本书任何部分之文字及图片，未经出版者书面许可，不得用任何方式抄袭、节录或翻印。

此版本仅限中华人民共和国境内销售，不包括香港、澳门特别行政区及中国台湾。不得出口。

图字：09-2017-927号

出版发行：上海外语教育出版社

(上海外国语大学内) 邮编：200083

电 话：021-65425300 (总机)

电子邮箱：bookinfo@sfllep.com.cn

网 址：http://www.sfllep.com

责任编辑：苗 杨

印 刷：浙江临安曙光印务有限公司

开 本：635×965 1/16 印张 15.75 字数 327千字

版 次：2018年12月第1版 2018年12月第1次印刷

印 数：2 100册

书 号：ISBN 978-7-5446-5414-2 / G

定 价：50.00元

本版图书如有印装质量问题，可向本社调换

质量服务热线：4008-213-263 电子邮箱：editorial@sfllep.com

出版说明

语言测试作为语言教学的重要组成部分，一直是社会关注的焦点。近年来，我国学术界对语言测试研究的关注也在逐渐升温。国际上，学者们对语言测试的研究已经达到较高的水平，无论是从理论框架的形成到复杂数学模型的建构及其应用方面都取得了实质性的进展，而且在对有国际影响力的外语考试（如雅思、托福等）的信度、效度的研究方面也取得了不俗的成果，出版了不少优秀的著作。

英国剑桥大学出版社出版的“Studies in Language Testing”是其中较有影响力的系列之一。丛书由剑桥语言测评中心策划推出，从测试领域的各个研究视角入手，展示了该领域研究的设计、数据收集和数据分析等环节的基础理论与实践操作，反映了测试领域的最新研究动态。

外教社从中精选9种，引进出版。这些图书中，有对语言测试听说读写等方面的效度和质性研究，也有对测试反拨效应及其对教学影响的研究，还有对雅思考试和欧洲语言共同参考框架的分析思考。希望丛书的出版可以为我国语言测试研究领域的发展和创新提供具有借鉴意义的启示，打开更广阔的研究思路。

Components of L2 Reading

Linguistic and processing factors in the reading test performances of Japanese EFL learners

Toshihiko Shiotsu

For my parents, Masato and Kiyoko Shiotsu

Acknowledgements

The preparation of this volume and the doctoral research on which it is based were possible owing to support from a number of individuals to whom I would like to express my gratitude.

I am very grateful to Professor Cyril Weir for his dependable guidance on my PhD project as my supervisor at the University of Reading and for his patience and kind support throughout the preparation of this volume as a series editor. At Reading, I was also fortunate to have Professor Barry O'Sullivan as my final PhD supervisor, whose friendly and effective support enabled me to complete the thesis on schedule. Without Cyril and Barry's help and kind recommendations, this publication would not have been here. In addition, I benefited much from stimulating and critical advice at the planning stage of the project from my initial PhD supervisor Don Porter and from the constructive comments and criticisms on my thesis by Sandy Urquhart and Mike Garman at the viva voce examination.

This study would not have been possible without the participation of the hundreds of EFL students as test takers at universities and colleges in Japan, and I am grateful to each of them for their time and effort.

Many others contributed to what came to be this volume, whether through assisting with data collection/item validation, providing bibliographic assistance, sending their research instruments for my use, or helping with my PhD application. I wish to thank: Alan Tonkyn, Amos Paran, Amos van Gelderen, Bill Lee, Catherine Walter, Diane and Norbert Schmitt, Hisako Uematsu, Jeong-Won Lee, Jodes Romero, Junko Yamashita, Kenji and Fukiko Numoto, Margot Haynes, Mariko Osaka, Mayumi Shiotsu, Motoyoshi Nagata, Paddy Harben, Rob Schoonen, Rory Britto, Sachi Yamauchi, Shigenobu Takatsuka, Shizuka Tetsuhito, Shoichi Tanaka, Tadimitsu Kamimoto, Takeshi Furukawa, Toshihiro Shimizu, Yubun Suzuki, Yuichi Yamasaki, Yusuke Ando, and nine anonymous ELT experts.

I also extend my thanks to Nagasaki Wesleyan Junior College and Kurume University for their generous support on my PhD work and to everyone there who helped me obtain the study leaves that allowed me to concentrate on the project. I wish to acknowledge the Ishibashi Foundation too for partially funding the study.

For the production of this volume, Lynda Taylor has helped me to clarify and improve the details of my work and to co-ordinate the necessary

elements for this edition as the managing editor, and I have benefited much from her assistance.

Finally, my sincere *arigato* to my wife Mariko for all her help, patience, and cheers throughout the project.

The publishers are grateful to the copyright holders for permission to use the copyright materials reproduced in this book. Kansai University Press for Tables 92 and 93 from *New Horizons in Computerized Testing of Reading*, 2004; UCLES and Cambridge University Press for Table 41 from *An Investigation into the Comparability of Two Tests of English as a Foreign Language*, by Lyle Bachman, Fred Davidson, Katherine Ryan and Inn-Chull Choi, 1995.

Series Editors' note

Compared to the extensive research base on L1 reading available in cognitive psychology, L2 reading research in the Applied Linguistics field has lacked a solid empirical research base and as a result the predictability of L2 reading behaviour is seriously constrained. A more principled effort is needed to generate empirical evidence on the nature of L2 reading which draws on the rigorous investigation of the factors considered by cognitive psychologists to be significant for L1 reading comprehension.

This volume helps to establish such a research tradition. It makes good use of the methodology established in cognitively oriented L1 research and investigates whether those factors considered to influence reading comprehension skills among L1 readers do so among L2 readers. In the componential approach to modelling L1 reading ability a number of contributory factors have been empirically validated. However, research on their relative contribution either singly or in combination to explaining performance on second language reading tests is limited.

It emerges from Shiotsu's thorough overview of the L1 component skills literature that such variables as vocabulary knowledge, word recognition efficiency, phonological awareness, and working memory span account for a relatively larger amount of the variance in reading comprehension than do the others. Shiotsu investigates the contribution of these variables in L2 reading through theoretical and empirical scrutiny. In addition he looks at the importance of the L2-specific variable of grammar knowledge, whose relationship with L2 reading seems to merit more attention than it has been given so far in the reading research literature.

In Chapter 2 Shiotsu examines how reading has been researched and understood and details some of the knowledge and processing subskills which have been demonstrated to be important for reading abilities. The research questions below emerge from this review in relation to the Japanese context the author is working in:

- RQ1: To what extent do the linguistic knowledge areas and psycholinguistic and cognitive subskills – L2 vocabulary breadth, L2 word recognition efficiency, L2 working memory span, L2 syntactic knowledge, and language-independent metacognitive knowledge about the text and reading – account for the individual differences in L2 careful passage reading comprehension ability of Japanese EFL learners?

Components of L2 Reading

- RQ2: Are there any differences in the extent to which the linguistic knowledge areas and psycholinguistic and cognitive skills (listed in Q1) account for the individual differences in L2 careful passage reading comprehension ability of the Japanese EFL learners as a function of L2 reading ability level, e.g. between 'higher ability' and 'lower ability' subgroups of readers?
- RQ3: To what extent do the linguistic knowledge areas and psycholinguistic and cognitive subskills (listed in Q1) account for the individual differences in computer-based L2 sentence reading speed of Japanese EFL learners?
- RQ4: Are there any differences in the extent to which the linguistic knowledge areas and psycholinguistic and cognitive skills (listed in Q1) account for the individual differences in computer-based L2 sentence reading speed of Japanese EFL learners as a function of L2 reading ability level, e.g. between 'higher ability' and 'lower ability' subgroups of readers?

Chapter 3 considers the research methodology with an emphasis on the practicality and feasibility of the research variables and their instrumentation.

Chapters 4 and 5 describe a total of six preliminary studies which are used to assess the potential values of the initially selected variables for the subsequent main study and to evaluate the instruments and their content to make necessary refinements.

Chapter 6 reports on the nature of the main study providing detailed background and basic descriptive data. Chapters 7 and 8 report the main findings based on two different methods of analysis. A traditional method of analysis, conventional regression, is used to answer the research questions in Chapter 7, but in Chapter 8 Structural Equation Modelling is used to help consider the data from a slightly different perspective.

In Chapter 9 the research questions are revisited and the findings are discussed with reference to the existing research base reported in the literature review; the implications of the findings are critically evaluated, and recommendations for future research are made.

In contrast with previous findings in the literature in this field, this study offers support for the relative superiority of syntactic knowledge over vocabulary knowledge in predicting text reading comprehension test performance.

The volume offers the reader a valuable perspective on L2 reading ability, test score predictability, the potential effects of unequal instrument reliabilities in this research area, and test content validation. It provides rigorous empirical support for a number of the themes emerging from an earlier volume in the series – *Examining Reading* by Khalifa and Weir (2009). In particular it provides evidence for the view that linguistic comprehension is

best divided into careful text processing ability and the speed of comprehension. It makes a valuable contribution to the methodology of using test data to enhance our knowledge of reading proficiency. As such it testifies to the centrality of language testing for developing our understanding of language proficiency and offers serious lessons to second language acquisition (SLA) researchers in the rigorous use of complex statistical procedures.

Cyril J Weir and Michael Milanovic
Cambridge – November 2009

Abbreviations

AGFI	adjusted goodness-of-fit index
AMOS	Analysis of Moment Structures
ANOVA	analysis of variance
AWL	Academic Word List
CALL	computer-assisted language learning
CAT	computer-adaptive test/ing
CB	computer-based
CBT	computer-based test
CFA	confirmatory factor analysis
CFI	comparative fit index
CLA	Communicative Language Ability
COPS	Clustered Objective Probability Scoring
df	degree of freedom
DSL	Dutch as a second language
EAP	English for academic purposes
EFA	exploratory factor analysis
EFL	English as a foreign language
ELT	English language teaching
ESL	English as a second language
ETS	Educational Testing Service
FCE	First Certificate in English
GFI	goodness-of-fit index
IELTS	International English Language Testing System
L1	native language
L2	second language
LCD	liquid crystal display
Max	maximum
MC	multiple choice
MCQ	multiple-choice question
Min	minimum
MS	mean square
msec	millisecond
NFI	Bentler-Bonnet normed fit index
NS	native speaker
PB	paper-based
PBT	paper-based test

PCA	principal component analysis
RMSEA	root mean square error of approximation
RST	Reading Span Test
SA	short answer
SAQ	short-answer question
SD	standard deviation
SE	standard error
SEM	structural equation modelling
SFL	Spanish as a foreign language
SLA	second language acquisition
SPSS	Statistical Package for Social Sciences
SS	sum of squares
TEEP	Test of English for Educational Purposes
TOEFL	Test of English as a Foreign Language
VLT	Vocabulary Levels Test

Contents

Acknowledgements	vii
Series Editors' note	ix
Abbreviations	xii
1 Introduction	1
2 Literature review	4
3 Methodology	32
4 Preliminary studies: phase 1	55
5 Preliminary studies: phase 2	72
6 The main study: background data	97
7 Results and discussion 1: measured variables accounting for reading performance	118
8 Results and discussion 2: latent variables accounting for reading performance	139
9 General discussion and conclusion	154
Appendices	
Appendix 1 Test of passage reading comprehension: Classical item analysis (dichotomous scoring)	182
Appendix 2 Rasch analyses of the test of passage reading comprehension (data from preliminary study D and the main study combined): Persons-to-items map, model fit, and item difficulty estimates	184
Appendix 3 Test of passage reading comprehension: Classical item analysis (COPS)	187
Appendix 4 Test of computer-based sentence reading: Classical item analysis	189
Appendix 5 Test of syntactic knowledge: Classical item analysis (dichotomous scoring)	190

Components of L2 Reading

Appendix 6	Rasch analyses of the test of syntactic knowledge (data from preliminary study D and the main study combined): Persons-to-items map, model fit, and item difficulty estimates	191
Appendix 7	Test of syntactic knowledge: Classical item analysis (COPS)	195
Appendix 8	Test of vocabulary breadth: Classical item analysis	196
Appendix 9	Rasch analyses of the test of vocabulary breadth (data from preliminary study D and the main study combined): Persons-to-items map, model fit, and item difficulty estimates	198
Appendix 10	Measures of recognition latency: Classical item analysis	204
Appendix 11	Measure of language-independent metacognitive knowledge: Classical item analysis	208
Appendix 12	Rasch analyses of the measure of language-independent metacognitive knowledge about the text and reading: Persons-to-items map, model fit, and item difficulty estimates	209
Appendix 13	Summary of the significant predictors of reading comprehension performance across separate analyses when syntax raw score was used in place of COPS score	211
Appendix 14	SEM fit statistics and diagram for the model with the syntax raw score in place of the syntax COPS score	212
Appendix 15	Results of a post-hoc SEM analysis that explored the separability of lexical-semantic processing efficiency from computer-based visual processing/key-pressing efficiency	213
References		215
Author index		226
Subject index		229

1 Introduction

The practice of developing and testing second language (L2) reading must follow as clear an understanding of this skill as possible, and such an understanding must be a result of rigorous research, both theoretical and empirical. Comparisons have been made between applied linguistic research on L2 reading and cognitive psychological research on L1 reading, both of which directly or indirectly contribute to our understanding of the nature and development of reading. Compared to cognitive psychology's extensive and cumulative research base resulting from successions of empirical data collection and theory and model generation, not only for description but for explanation and prediction of reading behaviour, L2 reading research effort within the applied linguistics community has been said to suffer from lack of a solid empirical research base (Bernhardt 1991a) and a resultant relative weakness in generalizability and predictability of L2 reading behaviour. It is therefore imperative that more principled effort be made to accumulate empirical evidence on the nature of L2 reading. While L2 reading research has at times drawn insights from the L1 reading literature, the issues it has addressed and emphasised have tended to be distinct from the ones researched through typical cognitive psychological approaches.

Two questions which characterise L2 reading research have been whether L2 reading difficulty arises from incomplete L2 knowledge or insufficient L1 literacy (Alderson 1984) and whether there is a linguistic threshold level which the L2 reader must achieve in order for his or her L1 literacy skills to be positively transferred to the task of L2 reading comprehension (Clarke 1978). These questions obviously relate to the facts that most individuals learning to read in L2 do not have the kind of sophistication in linguistic competence shared by the majority of the native speakers of the target language and that these L2 readers already have varying levels of literacy skills in their own L1.

While these features specific to L2 reading must be sufficiently highlighted and reflected in L2 reading research designs (Alderson 1984, Koda 1994), effort also seems to be justified which examines the factors considered to be significant for L1 reading comprehension. The advantages of such an effort would be the availability of methodology established in L1 research and its extensive body of research evidence, which enables us to compare L2 reading

data with their L1 counterparts and to determine whether those factors considered to influence reading comprehension skills among L1 readers are also importantly related to those among L2 readers. This type of research has the potential of bringing closer the two fields of cognitive psychology and applied linguistics, since findings resulting from a common ground in terms of research design, variables, and instruments could be more easily compared or built into a common research base.

A review of L1 and L2 reading literature for methodological compatibility identifies one line of L1 reading research which has aimed to identify components of reading skills and possible sources of individual differences in reading abilities. It emerges from the overview of the L1 component skills literature that such variables as vocabulary knowledge, word recognition efficiency, phonological awareness, and working memory span account for a relatively larger amount of the variance in reading comprehension than do the others (Cunningham, Stanovich and Wilson 1990, Daneman 1991, Just and Carpenter 1992, Stanovich, Cunningham and Cramer 1984). It would seem most meaningful to subject such variables in L2 readers to theoretical and empirical scrutiny along with the L2-specific variable of grammar knowledge, whose relationship with L2 reading seems to deserve more attention than has been given so far (Urquhart and Weir 1998).

The present study initially surveys in Chapter 2 how reading has been researched and understood and details some of the knowledge areas and processing subskills which the researchers suggest as important for reading abilities. Discussions of these knowledge and skill areas will lead to the initial attempt to form a set of research questions for the present study.

Chapter 3 considers the research methodology that, if adequately employed, would answer the research questions initially posed. The emphasis in Chapter 3 will be on the practicality and feasibility of the research variables and their instrumentation. Taking account of the theoretical significance and the practicality constraints, revised research questions will be stated in this chapter.

Chapters 4 and 5 will describe a total of six preliminary studies to simultaneously evaluate the potential values of the initially selected variables for the subsequent main study and to evaluate the instruments and their content to make necessary refinements. The two chapters represent separate phases of the research programme each covering three studies.

Reports on the actual main study will begin in Chapter 6, which will present detailed background and basic descriptive data.

Chapters 7 and 8 will report on the main findings based on two different methods of analysis. The results of a series of multiple regression analyses to answer the research questions will be presented in Chapter 7, but an additional analysis which explores latent variables and helps consider the data from a slightly different perspective will be reported in Chapter 8.