

Lexical Facility

Michael Harrington

Lexical Facility

Size, Recognition Speed and
Consistency as Dimensions of Second
Language Vocabulary Knowledge

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This book is dedicated in loving memory to my parents, Frank and Dolores.

Front Cover

The image on the front cover is a stylized representation of what is known as ‘Zipf’s law’, which states that the frequency with which a word is used is inversely proportional to its rank in a frequency table. The vertical y -axis represents the frequency with which a word is used, and its rank order is set out along the horizontal x -axis. The sloping function shows that a small number of words account for the majority of uses. The approach set out in this book assumes that frequency rank is a strong predictor of vocabulary learning.

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Contents

Part 1 Introduction	1
References	2
1 Size as a Dimension of L2 Vocabulary Skill	3
1.1 Introduction	3
1.2 Estimating Vocabulary Size	5
1.3 Vocabulary Size as a Dimension of Learners’ Vocabulary Knowledge	13
1.4 Conclusions	21
References	22
2 Measuring Recognition Vocabulary Size	25
2.1 Introduction	25
2.2 Approaches to Measuring Recognition Vocabulary Size	26
2.3 Uses of the Vocabulary Size Tests	34
2.4 Conclusions	39
References	40

3	L2 Word Recognition Skill and Its Measurement	45
3.1	Introduction	45
3.2	Word Recognition Skill and Text Comprehension	46
3.3	Word Recognition Skill and L2 Text Comprehension	49
3.4	The LDT as a Measure of Word Recognition Skill	51
3.5	LDT Performance as a Window on Word Knowledge	57
3.6	Using the LDT Format to Measure L2 Word Recognition Skill	60
3.7	Conclusions	61
	References	61
4	Lexical Facility: Bringing Size and Speed Together	67
4.1	Introduction	67
4.2	Defining Lexical Facility	68
4.3	Lexical Facility as a Vocabulary Skill Construct	73
4.4	Lexical Facility as a Measurement Construct	76
4.5	Bringing Size and Speed Together	79
4.6	Recognition Vocabulary Size and Speed as a Vocabulary Measure	83
4.7	Establishing Lexical Facility: The Research Program	86
4.8	Conclusions	88
	References	89
5	Measuring Lexical Facility: The Timed Yes/No Test	95
5.1	Introduction	95
5.2	The Timed Yes/No Test	96
5.3	Scoring the Timed Yes/No Test	99
5.4	Administering the Test	109
5.5	The Timed Yes/No Test as an L2 Vocabulary Task	112
5.6	Lexical Facility in English	115
5.7	Conclusions	116
	References	117

Part 2 Introduction	121
1.1 Overview	121
1.2 Aims of the Empirical Research	122
1.3 An Overview of Methods Used	122
References	129
6 Lexical Facility as an Index of L2 Proficiency	131
6.1 Introduction	131
6.2 Study 1: Lexical Facility as an Index of English Proficiency	132
6.3 Study 1 Results	136
6.4 Sensitivity of the Lexical Facility Measures to Frequency Levels	146
6.5 Discriminating Between Frequency Levels	148
6.6 Findings for Study 1	151
6.7 Conclusions	152
References	153
7 Lexical Facility and Academic English Proficiency	157
7.1 Introduction	157
7.2 Study 2: Lexical Facility and University English Entry Standards	158
7.3 Study 2 Results	161
7.4 Study 2 Findings	180
7.5 Conclusions	183
References	185
8 Lexical Facility and IELTS Performance	187
8.1 Introduction	187
8.2 Study 3: Lexical Facility and IELTS Performance	188
8.3 Study 3 Results	190

8.4	Findings for Study 3 IELTS Band-Scores	201
8.5	Conclusions	201
	References	203
9	Lexical Facility and Language Program Placement	205
9.1	Introduction	205
9.2	Study 4: Sydney Language School Placement Study	207
9.3	Study 4 Results	209
9.4	Findings for Study 4 Sydney Language Program Placement	216
9.5	Study 5: Singapore Language Program Study	217
9.6	Study 5 Results	218
9.7	Findings for Study 5 Singapore Language Program Levels	223
9.8	Conclusions	224
	References	225
10	Lexical Facility and Academic Performance in English	227
10.1	Introduction	227
10.2	Study 6: Lexical Facility Measures and Academic English Grades	228
10.3	Study 6 Results	230
10.4	Findings for Study 6 Lexical Facility and Academic English Grades	235
10.5	Study 7: Lexical Facility and GPA	235
10.6	Findings for Study 7 Lexical Facility and GPA	236
10.7	Other GPA Studies	236
10.8	Conclusions	239
	References	240

11	The Effect of Lexical Facility	241
11.1	Introduction	241
11.2	Sensitivity of Lexical Facility Measures by Performance Domain	242
11.3	Key Findings	252
11.4	Conclusions	257
	References	258
12	The Future of Lexical Facility	261
12.1	Introduction	261
12.2	The Case for Lexical Facility	262
12.3	Measuring Lexical Facility: The Timed Yes/No Test and Alternatives	266
12.4	The Next Step in Lexical Facility Research	274
12.5	Uses of Lexical Facility in Vocabulary Assessment and Instruction	276
12.6	Conclusions	278
	References	279
	References	283
	Index	303

List of Figures

Fig. 1.1	Elements of vocabulary knowledge tapped by vocabulary size tests	7
Fig. 1.2	A frequentist model of vocabulary learning	15
Fig. 1.3	Cumulative percentage of text coverage and corresponding frequency bands	18
Fig. 1.4	Text coverage as the number of unfamiliar words and the number of lines of text per unfamiliar word	18
Fig. 1.5	A sample reading text with 80% text coverage	19
Fig. 1.6	Text comprehension percentage as a function of vocabulary coverage (Schmitt et al. 2011, p. 34)	20
Fig. 2.1	Instructions and example item for Vocabulary Levels Test (Adapted from Nation 2013, p. 543)	27
Fig. 2.2	Sample item from Nation's Vocabulary Size Test	28
Fig. 2.3	A simple checklist version of the original Yes/No Test	31
Fig. 2.4	Comparison of VLT and Yes/No Test Performance (Mochida and Harrington 2006)	33
Fig. 3.1	Word recognition in the construction–integration model of text comprehension (figure adapted from Perfetti and Stafura (2014, p. 33))	47
Fig. 3.2	A schematic diagram of the lexical decision task	54
Fig. 5.1	Yes/No Test response types	99
Fig. 5.2	Four Yes/No Test scoring formulas	101
Fig. 5.3	Composite measure formulas	108

xviii **List of Figures**

Fig. 5.4	Elements of the instruction set for the Timed Yes/No Test	111
Fig. 6.1	Lexical facility measures by English proficiency levels	140
Fig. 6.2	Median proportion of hits and 95% confidence intervals for lexical facility measures by frequency levels and groups	149
Fig. 6.3	Median individual mnRT and 95% confidence intervals for lexical facility measures by frequency levels and groups	150
Fig. 6.4	Median coefficient of variation (CV) and 95% confidence intervals for lexical facility measures by frequency levels and groups	150
Fig. 7.1	University entry standard study. Mean proportion of hits by frequency levels for written and spoken test results	179
Fig. 7.2	University entry standard study. Mean response times by frequency levels for written and spoken test results	180
Fig. 7.3	University entry standard study. Mean CV ratio by frequency levels for written and spoken test results	181
Fig. 8.1	Combined IELTS dataset: Timed Yes/No Test scores by IELTS overall band scores	194
Fig. 9.1	Sydney language program study. Comparison of VKsize and mnRT scores with program placement grammar and listening scores across four placement levels	213
Fig. 9.2	Singapore language program levels. Standardized scores for the lexical facility measures (VKsize, mnRT, and CV) for the VLT and BNC test versions	219
Fig. 9.3	Singapore language program study. Standardized scores for the lexical facility measures (VKsize, mnRT, and CV) for the combined test by level	221
Fig. 10.1	Oman university GPA study. Standardized VKsize, mnRT, and CV scores by faculty	238

List of Tables

Table 1.1	Vocabulary size expressed in word families and text coverage (written and spoken) across nine corpora (Nation 2006, p. 79)	17
Table 3.1	A meta-analysis of factors affecting L2 reading skill (Jeon and Yamashita 2014)	50
Table 6.1	Bivariate correlations and 95% confidence intervals (within square brackets) for the three lexical facility measures (VKsize, mnRT, and CV) and two composite scores (VKsize_mnRT and VKsize_mnRT_CV)	138
Table 6.2	Proficiency-level study. Means, standard deviations, and confidence intervals for false-alarm rates and the lexical facility measures, individual and composite, for the three proficiency levels	139
Table 6.3	Proficiency-level study. One-way ANOVAs for individual and composite lexical facility measures as discriminators of English proficiency levels	143
Table 6.4	Proficiency-level study. Post hoc comparisons for individual and composite measures, VKsize, mnRT, CV VKsize_mnRT, and VKsize_mnRT_CV	143
Table 6.5	Proficiency-level study. Medians, interquartile ranges, and 95% confidence intervals for the hits, mean response time (in milliseconds), and mean proportion coefficient of variation by frequency levels and groups	147

Table 6.6	Frequency-level analysis. Comparing sensitivity of hits (correct responses to words), mean RT, and CV to frequency band differences using the omnibus Friedman test and the follow-up Wilcoxon signed-rank test	149
Table 7.1	University entry standard study: written and spoken test results. Pearson's correlations for the three individual measures (VKsize score, mnRT, and CV) and the two composite scores (VKsize_mnRT and VKsize_mnRT_CV)	163
Table 7.2	University entry standard study: written and spoken test results. Means (M), standard deviations (SD), and confidence intervals (95% CI) for the lexical facility measures for the five English proficiency standard groups	165
Table 7.3	University entry standard study: written and spoken test results. Means (M), standard deviations (SD) and confidence intervals (CI) for the composite scores VKsize_mnRT and VKsize_mnRT_CV for the five English entry standard groups	166
Table 7.4	Entry standard study. One-way ANOVA for individual and composite lexical facility measures as discriminators of English proficiency groups	172
Table 7.5	University entry standard group. Significant pairwise comparisons for the VKsize measure for written and spoken test results	173
Table 7.6	University entry standard study. Significant pairwise comparisons for the mnRT and CV measures for written and spoken test results	174
Table 7.7	University entry standard study. Significant pairwise comparisons for composite VKsize_mnRT and VKsize_mnRT_CV measures for written and spoken test results	175
Table 8.1	IELTS study data set. Years 1–3 means and standard deviations, within brackets, for the VKsize, mnRT, and CV measures by IELTS overall band score	191
Table 8.2	IELTS band-score study. Means, standard deviations, and confidence intervals (CI) for the lexical facility measures, individual and composite, for IELTS overall band scores	192
Table 8.3	IELTS study. IELTS band-score study. Bivariate correlations with bootstrapped confidence intervals for IELTS band scores and lexical facility measures	193

Table 8.4	IELTS band-score study. One-way ANOVAs for individual and composite lexical facility measures as discriminators of IELTS overall band scores	196
Table 8.5	IELTS study. Bandwise significant post hoc comparisons for VKsize, mnRT, and CV	197
Table 8.6	IELTS band-score study. IELTS bandwise post hoc comparisons for the VKsize_mnRT and VKsize_mnRT_CV measures	198
Table 8.7	IELTS band-score study. Model summary (R^2 and ΔR^2) for hierarchical regression analysis with proficiency level as criterion and VKsize, mnRT, and CV as predictor variables on written and spoken tests with complete and false-alarm-trimmed (20 and 10%) data sets	200
Table 9.1	Sydney language program study. Bivariate Pearson's correlations for lexical facility measures, and listening and grammar test scores	210
Table 9.2	Sydney language program study. Means, standard deviations, and 95% confidence intervals for the lexical facility measures at the four placement levels	211
Table 9.3	Sydney language program study. One-way ANOVAs for individual and composite lexical facility measures and placement test scores as discriminators of placement levels	214
Table 9.4	Sydney language program study. Significant post hoc pairwise comparisons of the lexical facility measures and listening test	215
Table 9.5	Singapore language program study. Means, standard deviations, and confidence intervals for the lexical facility measures for the four Singapore language program levels	220
Table 9.6	Singapore language program study. One-way ANOVAs for individual and composite lexical facility measures as discriminators of program levels	222
Table 9.7	Singapore language program study. Significant post hoc comparisons for the lexical facility measures for the four placement levels	223
Table 10.1	Australian university foundation-year study. Means, standard deviations, and confidence intervals (CI) for the individual and composite lexical facility measures, and median and range values for academic grades and GPAs for entry and exit groups	231

xxii **List of Tables**

Table 10.2	Bivariate correlations between lexical facility measures and academic English performance measures for entry and exit groups	232
Table 10.3	Australian university foundation-year study. Model summary of hierarchical regression analyses for entry and exit groups using EAP grade percentage as criterion and VKsize, mnRT, and CV as ordered predictor variables	234
Table 11.1	Summary of means (<i>M</i>) and standard deviations (<i>SD</i>) for VKsize, hits, mnRT, and CV measures for Studies 1–5	242
Table 11.2	Summary of lexical facility measures' effect sizes for individual and composite measures	244

Introduction

Two bedrocks of fluent second language (L2) performance are an adequate stock of words and the ability to access those words quickly. Separately, the two have been shown to be reliable and sensitive correlates of L2 proficiency both across and within user levels. The two are examined here jointly as a property of L2 vocabulary skill called *lexical facility*. The book first makes the conceptual case for combining the two dimensions and then provides empirical evidence for the sensitivity of the combined measures to differences in proficiency and performance in common domains of academic English. The main focus is on lexical facility in written English, though some spoken language data are also presented.

Scope of the Book

The term *lexical facility* reflects how many words a learner knows and how fast these words can be recognized. The term *lexical* is used to denote the word-level focus, and the term *facility* the relative ease of accessing that knowledge. A sizeable literature exists that relates vocabulary size to L2 performance. Researchers, including Bhatia Laufer, Paul Meara, Paul Nation, and Norbert Schmitt, have sought to identify the kind and number of words an individual needs to function in various L2 domains, with

a particular interest in the vocabulary size needed for fluent performance and its assessment in domains of academic English. A foundation of vocabulary size research is the use of word frequency statistics as an index for estimating an individual user's vocabulary size. The resulting estimates are then related to performance in various domains (e.g., Laufer and Nation 1995). The vocabulary size research literature is the point of departure for the lexical facility approach presented in the book.

A smaller body of research has also examined how L2 word processing skill develops. Norman Segalowitz, Jan Hulstijn, and colleagues have investigated the role that word recognition speed and consistency play in fluent L2 performance, and in particular the development of automaticity. "Word recognition speed is expressed throughout this book as the mean recognition time (mnRT) it takes an individual to recognize a set of words presented separately." Faster recognition times have been shown to reliably correlate with better performance both within and between users. In addition to the relative speed with which words are recognized, the overall consistency of recognition speed is also of interest. Word recognition consistency is captured in the coefficient of variation (CV), which is the ratio of the standard deviation of the mnRT to the mnRT itself ($SD_{mnRT}/mnRT$). Segalowitz has proposed that the interaction of the mnRT and the CV over the course of proficiency development can serve as an indicator of automatization (Segalowitz and Segalowitz 1993). In the lexical facility account, the CV is examined as an index of proficiency by itself and in combination with the size and mnRT measures. As a measure of response variability, the CV is examined as a window on vocabulary skill development, as opposed to mere 'noise' that might otherwise obscure experimental effects of interest. The interest in variability as a characteristic of performance in its own right is attracting increasing attention in cognitive science (Balota and Yap 2011; Hird and Kirsner 2010).

The two research areas differ in goals and method, but are in accord that quantitative measures of vocabulary size and processing skill are important indicators of L2 proficiency. Proficient learners have bigger vocabularies and can access that knowledge more efficiently than their less proficient counterparts. The book explores how the empirically established—and intuitive—relationship between proficiency, and vocabulary size and processing skill is manifested in various domains of academic English.

The book is the first to investigate the value of treating vocabulary size and processing skill (recognition speed and consistency) as a unitary construct. The main empirical concern is the extent to which combined measures of vocabulary size and processing skill are more sensitive to performance differences than size alone. Sensitivity is reflected in how reliably (as reflected in statistical significance) the measures discriminate between levels in a given domain, and the magnitude of this difference as reflected in the effect size. Evidence for the efficacy of a composite measure combining static knowledge (size) and dynamic processing skill (speed and consistency)—that is, for lexical facility—has clear implications for L2 vocabulary research, testing, and assessment.

Lexical facility is a quantitative entity that captures a crucial facet of lower-level L2 vocabulary knowledge skill. It is approached as a trait, that is, as a user-internal, context-free property of L2 vocabulary knowledge that is developed as a result of experience with the language and is available for use across contexts (Read and Chapelle 2001).

Research Goals

This book has three goals. The first is to make the theoretical case for lexical facility. The validity of the construct is established in the first four chapters by first examining the crucial roles that vocabulary size (Chaps. 1 and 2) and word recognition skill (Chap. 3) play in L2 performance. The rationale for characterizing size and processing skill jointly as an L2 vocabulary construct, that is, for lexical facility, is then set out in Chap. 4. This chapter discusses key theoretical and methodological issues that arise from the proposal. Primary among these is the attempt to treat size and speed as parts of a unitary construct. Standard practice in the psychometric tradition has long been to treat the two as separate dimensions. Human performance has been characterized either as knowledge (also called *power*) or speed, the relative importance of each dependent on the kind of performance being measured. Knowledge is seen as the critical attribute of higher-level cognitive tasks such as educational testing, while speed is paramount for mechanical tasks such as typing. The lexical facility account proposes that size (knowledge) and processing skill (speed

and consistency) can be productively considered together as indices of L2 vocabulary proficiency. As a result, the proposal has implications for the broader incorporation of temporal measures in models of L2 learning and use.

The second and third goals concern the empirical case for the construct. The second goal is to assess the reliability and validity of an instrument to measure lexical facility, the Timed Yes/No Test. In Part 2, seven studies are presented that examine the sensitivity of the vocabulary size and processing skill measures (size and consistency), individually and in combination, to variability in proficiency and performance in various academic English domains. All seven studies measure lexical facility using the Timed Yes/No Test. The instrument is an online measure of recognition vocabulary knowledge based on the lexical decision task, a measure of lexical access widely used in cognitive psychology. Chapter 5 describes the Timed Yes/No Test and provides a rationale for its use. The use of speed and consistency as measures of proficiency raises methodological and technical issues. These are identified, and the implications for bringing time as a performance measure out of the laboratory and into classroom and testing contexts are discussed.

The third goal is to demonstrate the sensitivity of the lexical facility measures to proficiency and performance differences in academic English. Chapter 6 establishes the sensitivity of the size, speed, and consistency measures to differences in proficiency levels in university-age users. The chapter also demonstrates the validity of word frequency statistics to index individual vocabulary knowledge. In Chap. 7, the sensitivity of the measures to group differences in English entry standards used in an Australian university is examined. Written and spoken versions of the test are administered to evaluate differences in test performance due to language mode. Chapter 8 investigates the measures as predictors of performance by preuniversity students on one specific English entry standard, the International English Language Testing System (IELTS) test. Performance on the lexical facility measures is compared with placement

testing outcomes in language schools in Sydney and Singapore in Chap. 9. The last chapter, Chap. 10, investigates the measures as predictors of academic English grades and grade point average (GPA) in a university preparation program in Australia. Also discussed are findings from other studies that have addressed the same issues. Chapter 11 presents a summary of the findings from all the studies. The data reported in the various studies are drawn from published and unpublished research by the author and colleagues. Chapter 12 completes the book by considering the future of the lexical facility proposal in light of the findings.

In summary, this book attempts to establish lexical facility as a quantitative measure of L2 vocabulary proficiency that can serve as a context-independent index sensitive to learner performance in specific academic English settings. The studies in Part 2 aim to

1. *compare the three measures of lexical facility (vocabulary knowledge, mean recognition time, and recognition time consistency) as stable indices of L2 vocabulary skill;*
2. *evaluate the sensitivity of the three measures individually and as composites to differences in a range of academic English domains; and, in doing so,*
3. *establish the degree to which the composite measures combining size with processing skill (recognition speed and consistency) provide a more sensitive indicator of L2 proficiency and performance differences than vocabulary size alone.*

The book is in two parts. Part 1 presents the theoretical foundation and motivation for the lexical facility proposal. Part 2 reports on a set of studies that provide empirical evidence for lexical facility and concludes with a chapter that considers the place of lexical facility in the modeling and measurement of L2 vocabulary.

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