

The Relationship of the Component Skills of Reading to IALS Performance: Tipping Points and Five Classes of Adult Literacy Learners¹

John Strucker

National Center for the Study of Adult Learning and Literacy

Kentaro Yamamoto and Irwin Kirsch

Educational Testing Service

NCSALL Reports #29

March 2007



National Center for the Study of Adult Learning and Literacy

Harvard Graduate School of Education

101 Nichols House, Appian Way

Cambridge, MA 02138

NCSALL Reports are funded by the Educational Research and Development Centers program, Award Number R309B960002, as administered by the Institute of Education Sciences (formerly Office of Educational Research and Improvement), U.S. Department of Education. However, the contents of *NCSALL Reports* do not necessarily represent the positions or policies of the Institute of Education Sciences, or the U.S. Department of Education, and you should not assume endorsement by the Federal Government.

¹ This study was designed and carried out by investigators from Educational Testing Service and the National Center for the Study of Adult Learning and Literacy, with the assistance of Statistics Canada and the Ordinate Corporation. Researchers from the Westat Corporation were responsible for sampling, interviewer training, and data collection.

CONTENTS

Tables and Figures	v
Acknowledgments	vii
Executive Summary	ix
Introduction	1
The Importance of IALS Level 3 Literacy	3
Research Goals	5
Theoretical Framework.....	7
Research Questions	9
Sample Size and Composition	11
Assessment Instruments	13
Research Findings	15
Conclusions.....	29
References.....	33
Assessments.....	37
Appendix A: Sampling (Westat Corporation)	39
Appendix B: Spelling Test.....	41
Appendix C: Towre Scoring	43

TABLES AND FIGURES

Table 1: Results of the Latent Class Analysis	xii
Table 2: Mean Proportion Correct of Each Component by IALS Prose Level.....	15
Table 3: Classes of Adult Readers	21
Figure 1: Proportions Correct by IALS Prose Proficiency.....	16
Figure 2: Standardized Mean Scores by Enrollment Type	18
Figure 3: TOWRE-B by Prose Proficiency by Place of Birth	19
Figure 4: Class 1 Strong Decoding and Vocabulary	22
Figure 5: Class 2 Weaker Decoding, Stronger Vocabulary	23
Figure 6: Class 3 Advanced ESL and Other Non-native Speakers of English	24
Figure 7: Class 4 Intermediate ESL	25
Figure 8: Class 5 ESL Low Intermediates and Reading Disabled Native Speakers of English	26

ACKNOWLEDGMENTS

This research was funded by the U.S. Department of Education, the Institute of Education Sciences and the Office of Adult and Vocational Education.

The authors would also like to thank the Educational Testing Service (ETS), the National Center for the Study of Adult Learning and Literacy, Ordinate Corporation, Statistics Canada, and Westat Corporation.

Although many talented people worked on this project, the following individuals deserve special mention for contributing their ideas and expertise: Jared Bernstein, Marilyn Binkley, John Comings, Rosalind Davidson, Julie Eastland, Stan Jones, Pat Montalvan, Scott Murray, and Ronald Pugsley.

Special thanks to our Study Advisory Committee: Mary E. Curtis, Phil Gough, and Bill Grabbe.

For reviewing and making many helpful suggestions on the draft of this paper, we thank Jane Ashby, Stan Jones, and Sally Shaywitz.

Finally, we would like to express our deep appreciation to the dozens of Westat interviewers and to the 1,034 adult participants, without whom this study could not have been carried out.

EXECUTIVE SUMMARY

Background

As its title indicates, this study's aim was to understand the relationship of the component skills of reading, such as word recognition, vocabulary, and spelling, to large-scale measures of literacy, such as the 1992 National Adult Literacy Survey (NALS) (Kirsch, Jungleblut, Jenkins, & Kolstad, 1993) and the closely related International Adult Literacy Survey (IALS) (Tuijnman, 2001). The NALS and IALS used real-world items such as advertisements, bus schedules, newspaper editorials, and product warranties to estimate the distribution of literacy skills across society, reporting that distribution in five levels, from Level 1, the least proficient, through Level 5, the most proficient.

The NALS found that 46% of the adults in the U.S. were in Level 1 and Level 2, with literacy proficiencies ranging from those at the beginning of Level 1 with very limited literacy to those at the upper end of Level 2 with approximately 9th grade literacy. Not surprisingly, the adults in Levels 1 and 2 tended to be less educated, to earn less, to participate less in civic activities, and to experience more health problems than adults in Levels 3, 4, and 5 (Kirsch et al., 1993). Many Level 1 and Level 2 adults would be eligible for adult basic education (ABE), adult secondary education (ASE), and English as a Second Language (ESL) classes. However, the NALS and IALS were not designed to provide information about their possible instructional needs.

This is where assessing component skills of reading can make a contribution. Although proficient readers experience reading as a seamless process, in order to understand the reading of less proficient readers, reading teachers and researchers deconstruct the reading process into its component skills. These include print skills such as phonics, accurate word reading, fluency, and spelling, and meaning skills such as oral language, vocabulary, and background knowledge. If teachers know learners' patterns of strengths and needs—also called “reading profiles”—they can design more focused, efficient instruction by addressing the underlying causes of poor reading comprehension.

How the Study Was Carried Out

A sample of 1,034 adults participated in the study. Nine hundred fifty were enrolled in ABE, ASE, or intermediate or above ESL classes² at adult literacy centers. An additional 84 participants made up a “household sample” of adults with at least a high school education. All participants received the IALS Prose Literacy Test and the IALS Background Questionnaire.

²Beginning ESL students were not included because they could not be reliably interviewed in English and we lacked the capacity to interview them in their native languages.

The participants were also assessed in the following components:

1. oral vocabulary
2. real word reading for speed and accuracy
3. pseudo-word reading for speed and accuracy
4. spelling
5. short-term memory

The components assessments were scored simply as “percent correct.” Generally speaking, the assessments were not overly difficult. For example, on the real word reading test for speed and accuracy, an average high school graduate would be expected to get 94% of the items correct, and the most challenging words on the oral vocabulary test were at just above high school levels.

Part 1 Results: “Tipping Points in the Component Skills”

When we plotted participants’ component scores against their IALS prose proficiencies, it was clear that adults in Levels 1, 2, 3, and above performed very differently on the various components (See Table 2, page 8).

Level 1 participants had the greatest difficulty with the print components: Their mean scores were well below 50% correct on pseudo-word reading and spelling, and somewhat stronger (65%) in real word reading. Neither the native English speakers nor the non-native speakers were very proficient at oral vocabulary, where they also averaged 50–65% correct. Conclusion: It isn’t just that they have trouble decoding words; they also don’t know the meanings of many basic words. In addition, among those in the below-Level 1 category, the mean score on the digit span test of short-term memory was also very low. This could be indicative of severe short term memory difficulties that could pose obstacles to learning phonics or acquiring new vocabulary.

Participants in Level 2 differed markedly from those in Level 1 on all components skills. Level 2 mean proportions correct for real word reading and vocabulary were both above .80. These are still below high school levels but, nevertheless, much closer to the mean scores of the Level 3 participants.

The figure on page 9 shows that word reading³ and vocabulary⁴ track each other closely, from IALS Level 1 all the way up through Level 3. Toward the upper reaches of

³ Referred to on the graph as “TOWRE A,” Test of Word Reading Efficiency A (Sight Word Efficiency Subtest).

⁴ Referred to on the graph as “PPVT,” Peabody Picture Vocabulary Test.

Level 2, real word reading and vocabulary are joined by spelling at about the 85–90% correct level. Pseudo-word reading,⁵ which is a more difficult task for any reader regardless of ability, parallels vocabulary and real word reading. But it does so at lower levels of overall proportion-correct.

Importantly, this figure also shows that the curves for real word reading and vocabulary climb until they reach the 85–90% correct level, but they are just beginning to flatten out as they move past 275 into level 3. This suggests that 85–90% proficiency in word reading and vocabulary are “tipping points” or thresholds that, once reached, can support a reader’s entry into Level 3 literacy. To put it another way, our analysis shed light on the important question, “How good do adults need to be in a few key print skills and meaning skills to attain Level 3 literacy?” This is an important question for adult literacy practitioners and policymakers for two main reasons: first, clinical evidence indicates that these skills are eminently teachable; and, second, as discussed above, attaining Level 3 literacy is strongly associated with a range of quality of life improvements.

The figures on pages 11 and 12 compare the components proficiencies of native speakers of English with non-native speakers of English, i.e., those who have learned or are learning English as a second language. The graphs show that in the Level 1 and Level 2 population, non-native speakers perform better than native speakers on the pseudo-word test, which is a measure of phonemic decoding ability. Difficulty with phonemic decoding is often a sign of dyslexia. Individuals with dyslexia and other learning disabilities are over-represented among the U.S.-born adult literacy population, presumably because their childhood reading problems were not sufficiently remediated during their K–12 years.

In contrast, non-native English speaking immigrants represent a more normal cross-section of readers. Therefore, only a small percentage of them would be expected to have reading disabilities. Moreover, many immigrants are already proficient decoders of other languages which have a similar syllable structure to English, such as Spanish. They are able to apply the principles of alphabetic decoding they have already mastered in their native languages to English.

Part 2 Results: Latent Class Analysis

Latent class analysis (LCA) is a probability-driven statistical method for producing clusters made up of members who share certain characteristics—in this case, adult readers with similar reading profiles. We created five latent classes based upon participants’ scores on vocabulary (PPVT), real word reading (TOWRE A), pseudo-word reading (TOWRE B), spelling, and short-term memory (digit span). Neither the

⁵ Referred to on the graph as “TOWRE B,” Test of Word Reading Efficiency B (Phonemic Decoding Efficiency Subtest).

participants' IALS scores nor their background characteristics were included in the LCA, thus enabling us to use those data to assess the validity of the five latent classes.

TABLE 1: RESULTS OF THE LATENT CLASS ANALYSIS.

Class	% of Sample	% Native English Speakers	% Non-native English Speakers	IALS Prose Literacy Levels		
				Level 1	Level 2	Level 3+
1	48 (n=493)	86	14	5	49	46
2	17 (n=175)	72	28	26	61	13
3	15 (n=154)	5	95	32	62	6
4	12 (n=123)	<1	99	68	29	3
5	9 (n=89)	31	69	83	16	1

From Table 1, it is immediately apparent that although the classes were created based on the above five components without reference to participants' IALS scores, the five classes differ markedly in their distributions across the three IALS Prose Levels. Note also that although no Background Questionnaire data on native language or place of birth were used in the LCA, the analysis nevertheless produced two classes—Class 3 and Class 4—which were made up of 95% and 99% non-native English speakers, and two classes—Class 1 and Class 2—where native English speakers predominate, though not as strongly, making up 86% and 72% respectively of those classes. This suggests that the five classes created by the LCA are valid—and potentially instructionally relevant—groups of participants.

Here we highlight briefly the main characteristics of the five latent classes.

Class 1: This class is the largest, at nearly 48% of the total sample and the most skilled in all components of reading. Nearly half of its members were at IALS Level 3, and 86% were native speakers of English. Class 1 also has the lowest age range, with 50% of its members aged 16–24. It includes 94% of the 84 participants in the “household sample.”

Class 2: About 17% of the sample, this class is nearly as strong in vocabulary as Class 1, but significantly weaker in the print skills of word reading, pseudo-word reading, and spelling. Their IALS breakdown is: 61% of its members at Level 2, 26% at Level 1, and only 13% at Level 3. Seventy-two percent are native English speakers, 28% non-native. Fifty percent of the native speakers reported difficulty with reading in the primary

grades. At least among the native speakers in this class, decoding difficulties are their main obstacles to better IALS performance.

Class 3: About 15% of the total sample, 95% of the class is made up of non-native speakers of English. Seventy-five percent are enrolled in ESL classes. Their IALS breakdown is: 32% at Level 1, 62% at Level 2, and 6% at Level 3. Their word reading and pseudo-word reading are second only to the strongest class, Class 1, but because they are not native English speakers, their vocabulary skills are substantially lower than for members of either Class 1 or Class 2. They can decode well, but do not yet know the meanings of enough English words.

Class 4: About 12% of the total sample, 99% of the members of this class are non-native speakers of English. Ninety-two percent are enrolled in ESL classes. Their IALS breakdown is: 68% at Level 1, 29% at Level 2, and only 3% at Level 3 or above. As expected of new learners of English, their print skills are in the 60–80% correct range, but their oral vocabulary is in the 30–60% correct range. Their decoding is developing, but they need to learn more English vocabulary.

Class 5: About 8.6% of the total sample, 63% of its members are non-native speakers of English, and 37% are native English speakers. Fifty-two percent of Class 5 were enrolled in ESL, 39% in ABE, and 9% in ASE classes. Eighty-three percent are at Level 1, with many at the lower end of Level 1, 16% are at Level 2, and only 1% at Level 3. Among the non-native speakers, many are just beginning to learn English. Interestingly, this was the only class in which a significant percentage (24%) of the non-native speakers reported difficulties with reading in the primary school grades.

Among the native English speakers, 65% reported difficulties with reading in the primary grades, with 64% reporting a learning disability. Because this class includes both non-native and native speakers of English, their vocabulary proficiencies varied, but their print skills were uniformly weak with 80% having proficiencies from <30% to 60%.

Conclusions

Implications of “Tipping Points” for Instruction

Word reading and vocabulary abilities at the 85% proficiency level represent “tipping points” that coincide with the onset of IALS Level 3 literacy skills—with all that Level 3 performance implies for improved quality of life opportunities. Knowing these “tipping points” makes it possible to identify those adult learners whose print and meaning skills are very close to those of Level 3 and above adult readers. These are people who might be very close to achieving levels of literacy that could change their lives dramatically—if they were given a burst of intensive, tightly focused instruction.

The Relationship of the Component Skills to Comprehension

This research indicates that the components of vocabulary and word recognition have the same relationship to the IALS real-world literacy assessment as they do to more traditional academic measures of reading comprehension that have been studied in the past (e.g., Perfetti, 1985; Gough and Tunmer, 1986).

The Importance of Rate as Well as Accuracy in Decoding

Even though the IALS Prose test is untimed, the TOWRE A, which demands fast as well as accurate real-word reading, is strongly related to IALS performance. It isn't just that faster reading enables one to finish timed tests; faster reading embodies the efficient processing of text that underlies good comprehension.

Establishing Reader Profiles

Latent class analysis of the PPVT, TOWRE A and B, our brief spelling assessment, and Digit Span shows that components proficiencies can be used to create meaningful classes or profiles of ABE, ASE, and ESL readers, with information from our background questionnaire providing external validity for the preliminary five-class solution we present.

Implications of Our Latent Class Analysis for Instruction

Ultimately, the technique of latent class analyses of adult reader profiles could be used by the adult education system to identify types of readers for instructional purposes, from beginners through GED levels. Simply knowing a reader's score on a reading comprehension test does not usually give teachers enough information to plan effective remedial teaching (Strucker, J., 1997). Establishing valid classes of adult readers will help adult literacy centers move away from "one-size-fits-all" approaches to reading instruction, toward more focused and differentiated instruction.

The Future of Adult Literacy Test Design

Of importance to practitioners and policymakers is the relatively quick administration of the components test in this study, which, on average, took less than 40 minutes. This means that it would be possible to design short, easy-to-administer batteries of components that could be given to large numbers of adults in literacy centers or in their communities.

Reading components such as word recognition and oral vocabulary are especially important for assessing literacy in developing societies where the majority of adults may be in IALS Level 1. Components tests can tell policymakers whether Level 1 adults in these societies have acquired the foundation skills to support higher levels of literacy.

We believe that this study of adults' component reading skills marks the beginning of the next phase in the development of large-scale adult literacy assessment. Tests like the NALS, IALS, and the recently released U.S. National Assessment of Adult Literacy (NAAL) (2005) have identified the gaps between society's least and most

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners: Executive Summary

proficient readers. Components assessments can help shift the focus to what we can do to narrow those gaps.

INTRODUCTION

The contemporary international approach to large-scale adult literacy assessment has its roots in the Young Adult Literacy Survey (YAL) that was carried out in the United States in 1985 (Kirsch & Jungeblut, 1986). That study featured a new framework for reading comprehension that focused on task characteristics as they contribute to item difficulty (Kirsch & Mosenthal, 1989). It also took advantage of recent advances in psychometrics to make accurate estimates of population proficiencies in literacy.⁶ These innovations formed the theoretical and practical foundations for the U.S. National Adult Literacy Survey (NALS) (Kirsch, Jungeblut, Jenkins, & Kolstadt, 1993) and later for the 22-country International Adult Literacy Survey (IALS) (Murray, Kirsch, & Jenkins, 1998); Tuijnman, 2001).

The YAL, NALS, and IALS were designed to measure the society-wide distribution of reading comprehension—the all-important end product of the reading process and ultimate reason why people read in the first place. The NALS and IALS showed that, even in developed countries, large numbers of adults are not proficient enough to participate fully in modern “information-based” economies, nor do they read well enough to take advantage of all of the cultural and educational opportunities that may be available to them. However, surveys like the IALS, which are focused on reading comprehension, can provide little information as to *why* certain adults do not perform well. This study attempted to answer this question by taking a closer look at adults’ proficiencies in two underlying foundations of reading: meaning vocabulary and word recognition (decoding). But, first, since the IALS was the starting point and anchor for this inquiry, we begin with some background on the IALS.

The IALS has been administered to large, scientifically designed samples of adult populations in 22 countries, using carefully matched translations in more than 15 different languages to allow for cross-country comparisons. The IALS assesses real-world literacy skills in three specific areas: prose literacy, document literacy, and quantitative literacy. It also includes an extensive background questionnaire covering income and employment, educational history, health, reading habits, networks of family and friendship, and civic participation. Similar to the earlier U.S. NALS (Kirsch et al., 1993), the IALS results for each country have been reported in five levels of literacy:

⁶ Among these advances were item response theory or IRT. IRT is based on a mathematically explicit relationship between a given unobservable hypothesized ability and observed performance on test items, i.e., the probability of answering an item correctly increases as the ability value increases pursuant to a certain mathematical form. This means that higher ability produces higher correct response probabilities on every item. However, this assumption may be violated if a particular skill interacts with certain types of items, resulting in locally non-increasing conditional probability on a subset of items, or if the ability being assessed is not continuous.

Level 1 comprises adults with few or no literacy skills up through and including those with early middle school skills;

Level 2 comprises adults with middle school through early high school literacy skills;

Level 3 comprises adults with literacy skills typical of high school graduates, extending upward to include people with some postsecondary education;

Levels 4 and 5 comprise adults with literacy skills typical of college and professional degree holders.

THE IMPORTANCE OF IALS LEVEL 3 LITERACY

Across all the countries that have administered the IALS, significant “quality of life shifts” occur between Level 2 and Level 3. Compared to adults in Levels 1 and 2, people in Level 3 report dramatic improvements in many aspects of life, including higher income and less unemployment, increased access to lifelong learning, greater amounts of personal reading for pleasure, and increased civic participation. In all countries, even those with universal access to health care, people at Level 3 or above also report better overall health than those in Levels 1 and 2.

Not surprisingly, most people in Level 3 or above report significantly more formal schooling than those in Levels 1 and 2. For example, the transition point between Levels 2 and 3 (scaled score 275 on the IALS) corresponds to the average proficiency of adults who have attained a high school degree or U.S. General Equivalency Diploma (GED), but who have not continued their education further (Kirsch et al., 1993). In addition, in those countries with significant immigration, many newcomers are present in Level 1 and Level 2, presumably because they are not yet proficient in the national languages of the host countries.

RESEARCH GOALS

Obviously, proficiency in the three literacy domains is not the only factor contributing to why people in Levels 1 and 2 earn less money or tend to vote less regularly than those in Levels 3 and above. But it is the factor for which adult literacy policymakers and adult literacy teachers are directly responsible, primarily through teaching. Therefore, our first goal was to compare Level 1 and Level 2 adults with those in Level 3 in the eminently *teachable* components of literacy: decoding, word recognition, and meaning vocabulary. With regard to these underlying component skills, how close are Level 1 and Level 2 adults to attaining Level 3 literacy?

Our second and related goal had to do with the assessment of adults' strengths and needs in reading. Could the brief and relatively inexpensive tests employed in this study be used to create meaningful reading profiles of Level 1 and 2 adults—profiles that could inform instructional decisions by policymakers at the societal level and by adult literacy teachers at the classroom level?

THEORETICAL FRAMEWORK

What is the relationship between the underlying components of reading and the end-product, reading comprehension? We subscribe to the proposition that up to 80% of a reader's performance in reading comprehension is predicted by her or his abilities in two general areas: *print components* (e.g., decoding accuracy and fluency) and *meaning components* (e.g., oral vocabulary) (see Carver & David, 2001; Chall, 1994; Gough & Tunmer, 1986; Perfetti, 1985; Curtis, 1980, for several slightly different versions of this theory.) Although proficient readers experience reading as a seamless process—almost as if the text were talking to them—reading teachers and researchers have found it useful to deconstruct the reading process into specific component skills. This is especially helpful when trying to understand the instructional needs of less proficient readers (Chall & Curtis, 1990; Strucker, 1995). The components approach holds promise for the field of adult literacy because there is considerable clinical evidence that focused teaching of key component skills can lead to accelerated growth in reading comprehension for children, adolescents, and adults (Chall, 1994; Curtis & Longo, 1999).

RESEARCH QUESTIONS

This study began with two research questions. First, can specific levels of proficiency or “tipping points” in the key components of reading among Level 1 and Level 2 adults be identified that might facilitate or prefigure the critical benchmark of Level 3 literacy performance?

The second question centered on whether tests in the components could be used to describe the reading strengths and needs of Level 1 and Level 2 adults. In short, could components skills be used to develop instructional profiles of Level 1 and 2 adults that would be informative for adult literacy teachers, administrators, and policymakers? (See also Strucker, 2002a, 2002b; Davidson & Strucker, 2002; and Snow & Strucker, 2000.)

SAMPLE SIZE AND COMPOSITION

The sample was made up of 950 adult learners from 5 U.S. states who were enrolled in Adult Basic Education (ABE), Adult Secondary Education (ASE), or English as a Second Language (ESL) classes.⁷ The enrolled adult learners were assessed and interviewed at their adult literacy centers by adult literacy teachers and program personnel who had received two days of training in administering the interview and test battery. A “household” group of 84 adults from similar ethnic and SES backgrounds who had completed high school or above were assessed and interviewed in their homes. All of the adult participants were paid for their time.

The study participants were not a representative sample of all enrollees in the U.S. adult education system or the five participating states. Instead, we employed a convenience sample that was designed to provide a sufficiently broad distribution of literacy skills to enable us to draw conclusions about interactions between the reading components of interest and IALS literacy proficiencies. We knew that adult literacy centers would be a good source for IALS Level 1 and Level 2 participants. In order to have more proficient readers with whom to compare them, we added the “household” sample of 84 adults, all of whom had attained high school or above levels of education.

In this report when we use the term “ESL students,” we mean only ESL students at “low intermediate ESL level” or higher. Beginning ESL learners were not included in our sample because we felt that they could not be reliably interviewed or tested solely in English, and we were unable to interview them in their various native languages.

⁷ U.S. adult literacy centers serve students age 16 and older who either lack a high school diploma and/or high school level skills. Centers also serve immigrants who wish to acquire English language and literacy skills by taking English as a Second Language (ESL) classes. Although class placement is not always exact, most adults enrolled in Adult Basic Education (ABE) programs have literacy skills below grade equivalent (GE) 6, while the skills of those in Adult Secondary Education (ASE) range between GE 6 and high school levels. ASE students are usually preparing for high school certification by passing the General Equivalency Diploma (GED) tests or by qualifying for various locally-administered alternate high school certificates. English-as-a-Second Language (ESL) enrollees are also called English for Speakers of Other Languages (ESOL) students. They are usually placed in five to six levels of English classes, ranging from beginners’ classes all the way to more advanced classes for those nearly proficient enough in English to transition to ABE, ASE, or to prepare for the Test of English as a Foreign Language (TOEFL). This latter test is required for entry into many U.S. colleges and universities. Placement of students in the various levels of ESL is usually based on teachers’ or programs’ brief initial assessments of students’ English speaking, listening, reading, and writing skills. It should be borne in mind that many students enrolled in ABE or ASE classes (over half in some areas of the U.S.) are not native language speakers of English. Many of these non-native English speakers are former ESL students who may possess adequate oral English skills, but still need to improve their English reading and writing. Others include so-called “generation 1.5” students who grew up primarily in the U.S. and attended U.S. schools, but who spoke a language other than English at home and whose parents were not fluent in English.

Study Sample Composition by Program Type

ABE 35% (n = 362)	ASE 27.4% (n = 283)	ESL 29.5% (n = 305)	“Household” 8.1% (n = 84)
-----------------------------	-------------------------------	-------------------------------	-------------------------------------

Despite these limitations in our sample, a comparison of our data with U.S. Department of Education Office of Vocational and Adult Education (OVAE, 2003) data on adult literacy learners for the academic year 2000–2001 indicates that study participants were generally comparable to the nationally enrolled adult literacy population with respect to gender, age, and representation of major U.S. ethnic groups:

	U.S. DOE OVAE Data	Study Sample
Male/Female	46.8% / 53.2%	41% / 59%
Age distribution		
<i>16–24</i>	40%	36.4%
<i>25–44</i>	44.5%	48.1%
<i>45–59</i>	11%	10.1%
<i>60 and older</i>	3.5%	5.3%
Ethnicity		
<i>American Indian or Alaska Native</i>	1.4%	5.4%
<i>Asian</i>	7%	3.9%
<i>Black or African- American</i>	20%	29.5%
<i>White</i>	30%	51.8%
<i>Hispanic</i>	40%	38.3% ⁸

⁸ Following U.S. Census Bureau procedures, Black, White, and Hispanic categories were not mutually exclusive for our sample, so the total for “Ethnicity” exceeds 100%

ASSESSMENT INSTRUMENTS

All participants received blocks of Prose and Document literacy items from the IALS and a modified version of the IALS background questionnaire. To the original IALS questionnaire, we added questions concerning the participants' possible childhood difficulties with reading, at what point any reading difficulties may have occurred, whether they considered themselves to be learning disabled, and whether they had received extra help in reading during their K–12 schooling. The prose and document literacy items were selected from the IALS to match up well with the expected ability distribution of participants in adult literacy programs, yet still link back to the original IALS scales (Yamamoto, 1997).

The participants were assessed in five components of reading that were selected based on the factor analysis of data from the Adult Reading Components Study (ARCS) (Davidson & Strucker, 2002; Strucker, 2002a).⁹ The five components assessed in this study were the following:

- **Receptive vocabulary:** a shortened version of the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 1997) that was created by Yamamoto.¹⁰ In this test the examiner pronounces a word and the participant chooses one of four pictures presented on an easel that best represents the meaning of the word.
- **Real-word reading for accuracy and speed:** Test of Word Reading Efficiency, sight word efficiency (TOWRE-A) (Torgesen, Wagner, & Rashotte, 1999). Participants are asked to read a list of 104 words as fast as possible without making a mistake, ranging from short familiar words such as *is* and *book* to longer, less familiar words such as *boisterous* and *transient*. Raw scores are based on the number of correct responses at 45 seconds and 60 seconds, respectively. To provide a rough idea of how difficult this test is, when it is given in a clinical setting, high school seniors at the 50th percentile would be expected to read about 90% of the words correctly within 45 seconds.

⁹ Strucker and Davidson's study assessed 976 ABE, ASE, and ESL students in 11 components of reading. They employed K-Means and Ward's methods of cluster analysis to create ten clusters or subtypes of adult literacy enrollees among the ABE/ASE learners and six clusters among Spanish-speaking ESL students.

¹⁰ Dr. Yamamoto began with the 955 individuals' item responses from the full PPVT in Strucker and Davidson's 2002 study. By deleting data from several of the easiest and several of the most difficult item sets and by skipping every other item among the remaining middle sets, it was found that 97% of the variance of the full PPVT for this sample could be captured. The short version of PPVT was used in this study with the permission of the publisher.

- **Pseudo-word reading for accuracy and speed:** Test of Word Reading Efficiency, phonemic decoding efficiency (TOWRE-B) (Torgesen et al., 1999). Participants are asked to read a list of 63 pseudo-words as if they were real English words as fast as possible without making a mistake, ranging from short pseudo-words such as *wum* to longer words such as *emulbatate*. Raw scores are based on the number of correct responses at 45 seconds and 60 seconds, respectively. To provide a rough idea of how difficult this test is, when it is given in a clinical setting, high school seniors at the 50th percentile would be expected to read about 84% of the pseudo-words correctly within 45 seconds.
- **Spelling:** a shortened version of a diagnostic spelling assessment published by Moats (1995). A total of 15 words were dictated, accompanied by short exemplar sentences. The words were chosen to tap some of the basic English syllable patterns and vowel spelling rules. (See Appendix 2.)
- **Short-term working memory:** the forward and backward Digit Span subtests from the Wechsler Adult Intelligence Survey III R (Wechsler, 1997). Increasingly longer strings of digits were pronounced on a digital recording at one-second intervals. Participants were first asked to repeat groups of digits in the order in which they were pronounced (digits forward) and then additional groups in reverse order (digits backward).¹¹

¹¹ Additional language assessments were administered using the Ordinate Corporation's PhonePass© software, including RAN Letters (rapid naming of the five letters *o*, *a*, *s*, *d*, and *p* repeated for 50 examples randomly on a page, rapid naming of all of the alphabet letters randomized on a page, sentence reading, sentence repetition, and short answer vocabulary questions.

RESEARCH FINDINGS

Research Findings Part 1: What Levels of Proficiency in Components Skills Among IALS Level 1 and 2 Readers Appear to Prefigure IALS Level 3 Performance?

Table 2 below shows the mean proportion correct for participants who were below IALS Level 1, at Level 1, at Level 2, and at Level 3 and above. Notice the Level 2 and Level 3+ means for TOWRE A and TOWRE B, the only two assessments for which there are age and grade norms. The Level 2 mean of .82 in TOWRE A real word reading translates to average performance at the 9th grade level, about what we would expect for participants in Level 2 Prose, which corresponds roughly to late middle school and early high school literacy. On the other hand, Level 2 participants' TOWRE B pseudo-word reading translates to the average performance at the 5th to 6th grade level. Consistent with previous research on adult basic education learners, the participants in our study were somewhat weaker on pseudo-word decoding than on real-word reading (Bruck, 1990; 1992; Pratt & Brady, 1988; Read & Ruyter, 1985).

By contrast, TOWRE A and B means for participants at IALS Level 3 and above were consistent with high school to post-high school performance. Level 3 Prose proficiency mirrors this range, ranging from solid high-school graduate up to postsecondary levels of ability.

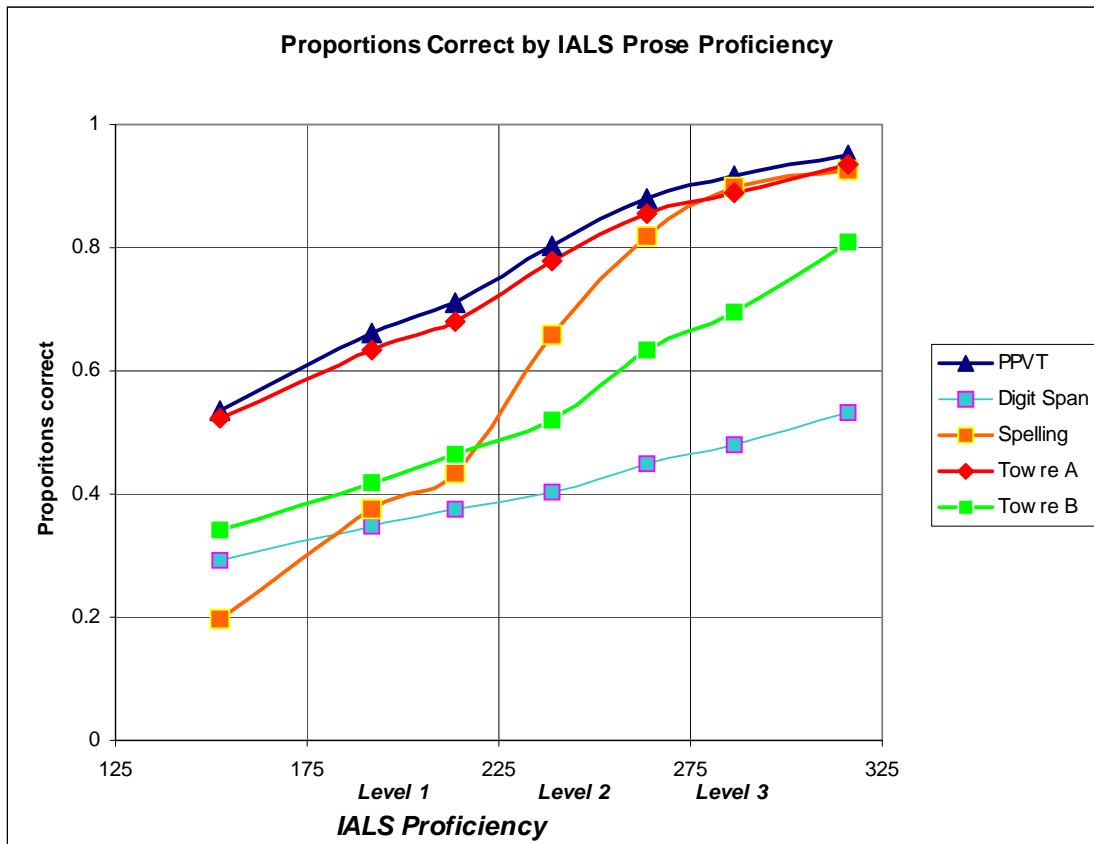
TABLE 2: MEAN PROPORTION CORRECT OF EACH COMPONENT BY IALS PROSE LEVEL

	< LEVEL 1	LEVEL 1	LEVEL 2	LEVEL 3 +
PPVT	.50	.65	.84	.95
TOWRE A	.50	.65	.82	.93
TOWRE B	.35	.43	.58	.75
Spelling	.20	.38	.75	.90
Digit Span	.30	.37	.40	.50

The graph in Figure 1 shows the relationship of abilities in the five components—receptive vocabulary (PPVT), real word recognition accuracy and fluency (TOWRE A), pseudo-word accuracy and fluency (TOWRE B), Spelling, and WAIS Digit Span—to performance on the IALS Prose Literacy assessment. The x-axis is divided into the familiar levels of IALS proficiency: 125 to 225 (Level 1), 225 to 275 (Level 2), and 275 to 325 (covering Levels 3 and above). The y-axis shows the mean level of proficiency given as a percentage correct by participants on each of the five components at the various IALS levels.

The proficiency in each component is expressed as the mean proportion correct, ranging from 0 (“no items correct”) to 1 (“all items correct”).¹² The actual proportions correct are obviously directly related to the difficulty of each assessment for the participants in the study. Notice, for example, that the line representing Digit Span has a very gradual slope and never approaches .8, even for the most proficient readers at Level 3 and above. This is because only a small percentage of human beings regardless of education or background can be expected to have working memories that are proficient at such a high level on this very challenging test.

FIGURE 1: PROPORTIONS CORRECT BY IALS PROSE PROFICIENCY



Let us look first at 275 on the x-axis, the dividing point between IALS Level 2 and Level 3. As we discussed earlier, we focused on this transition because of the marked improvements in quality of life that are associated with performance at Level 3 and above

¹² Using the “proportion correct” as a metric avoids some misleading inferences that are sometimes drawn from the use of grade-level equivalents for adults; for example, that an adult with a 4th grade equivalent score in reading is similar to a 4th grade child, or that the “cognitive distance” between grade equivalents 1 and 3 in reading is the same as the distance between grade equivalents 9 and 11 in reading.

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

in developed countries. Near the IALS 275 transition, three very important components are of note: PPVT vocabulary, TOWRE-A real-word reading, and spelling.

Just to the left of IALS score 275, those three components have crossed the .80 proportion correct line, at about 240 for PPVT vocabulary and TOWRE-A real word reading, respectively, and at about 260 for spelling. *This suggests a way to answer the important question: How proficient do readers need to be in these key components to support Level 3 and above reading?* This point (IALS 275 and .80–85 on the three components) may represent a minimum foundation of components skills needed to attain higher levels of performance. As we noted earlier, performance from IALS 275 and above seems to be associated with higher levels of education and more participation in lifelong learning activities (Kirsch et al., 1993).

At the beginning of Level 3 IALS performance (275 on the graph), TOWRE A real-word reading is at about the 90% correct level. It may be helpful to place 90% TOWRE proficiency in the context of the distribution of those skills in the population: a raw score of 90% of the items correct within 45 seconds corresponds to a standard score of 97, the 42nd percentile (Torgesen et al., 1999). This should be taken as a somewhat rough estimate, however, because the TOWRE norms end at age 24 and, as the chart on page 5 indicates, 60% of the participants in this study were age 25 and above. The TOWRE A's 104 items begin with very easy words (*is, up, cat, red, me, to, no*). At the 85–90% correct level (assuming one has read all words correctly to that point) the words include: *recession, understand, emphasis, confident, and intuition*. As a frame of reference, *recession, confident, and intuition* are relatively low-frequency words associated with somewhat academic language, while *understand* and *emphasis* are among the 2,000 most frequently used words in English, according to the Brown Corpus of Standard American English (Francis & Kucera, 1982).

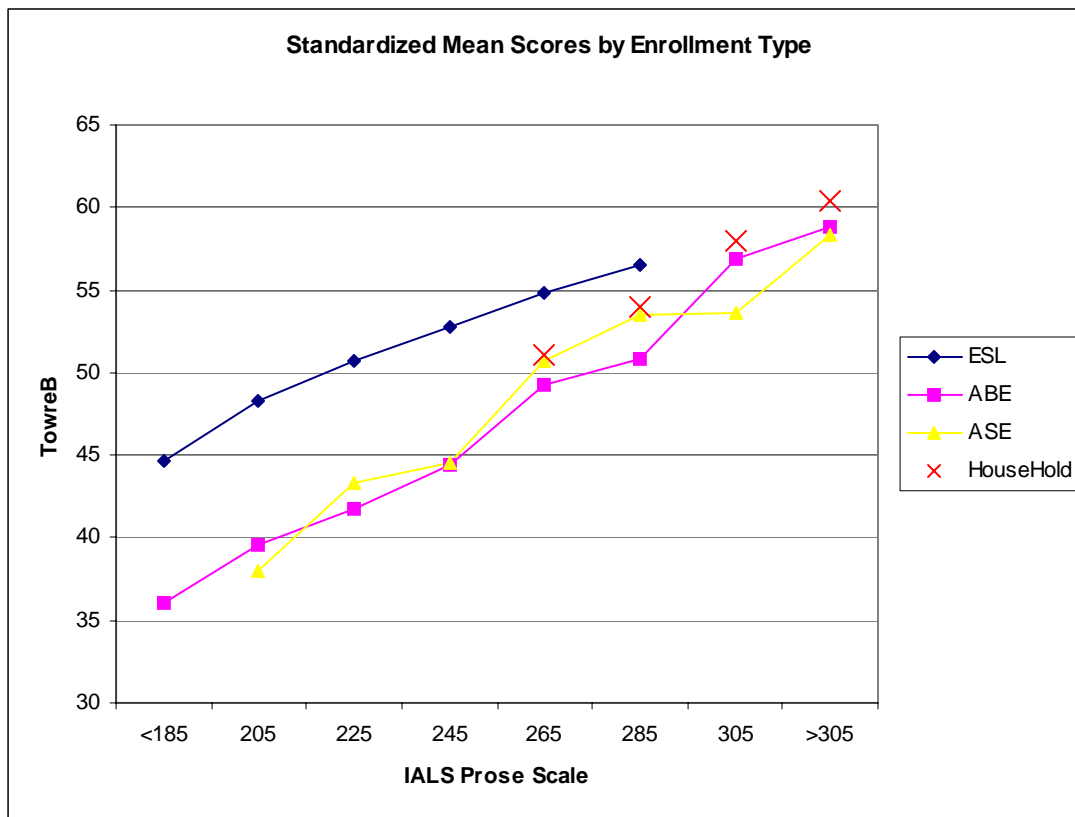
At the .85 and above proportion correct for PPVT, TOWRE-A, and spelling, the slopes of their lines also appear to begin to flatten out. This suggests that the reading processes of people .80–85 proportion correct on PPVT, TOWRE-A, and spelling are beginning to resemble those of more advanced IALS readers. In addition, from slightly above 275, TOWRE-B pseudo-word reading appears to be closing the gap with PPVT, TOWRE-A, and Spelling. In contrast, note that at lower IALS Levels—especially at 225 and below (IALS Level 1)—the graph shows a wider vertical separation of spelling from PPVT and TOWRE-A. This is consistent with a familiar definition of less proficient readers: their uneven development in key components undermines successful reading comprehension (Chall, 1994; Chall & Curtis, 1990).

We also note that the TOWRE-B (pseudo-word fluency and accuracy) line crosses the .80 level further to the right of PPVT, TOWRE-A, and spelling, at a point well above IALS 275. First, the TOWRE-B pseudo-word fluency and accuracy task is simply more difficult for the people in this sample than the other components. Moreover,

as Sabatini (2002) suggests, the ability to read English pseudo-words with speed and accuracy only tends to become highly developed primarily among very proficient readers. Because proficient readers read a great deal more than less proficient readers, Sabatini argues, they have more encounters with the English syllable spelling patterns from which the pseudo-words are created. As a result, he believes that proficient readers are able to make very quick and accurate real-time analogies between the real spelling patterns they have over-learned through extensive reading and the TOWRE-B pseudo-words that are based on them.

The graph in Figure 2 opposite shows another interesting pattern: at lower levels of IALS proficiency, the ESL students in our sample read English pseudo-words better than the ABE and ASE adult learners, and even better than a few members of the “household” group. The graph lines for ESL on the one hand and ABE, ASE, and “household” on the other hand are more widely separated for TOWRE-B at relatively low levels of IALS literacy (i.e., <250) than they are for higher levels (>250). Ultimately, the lines from all groups begin to merge with each other at higher levels of IALS literacy (>285).

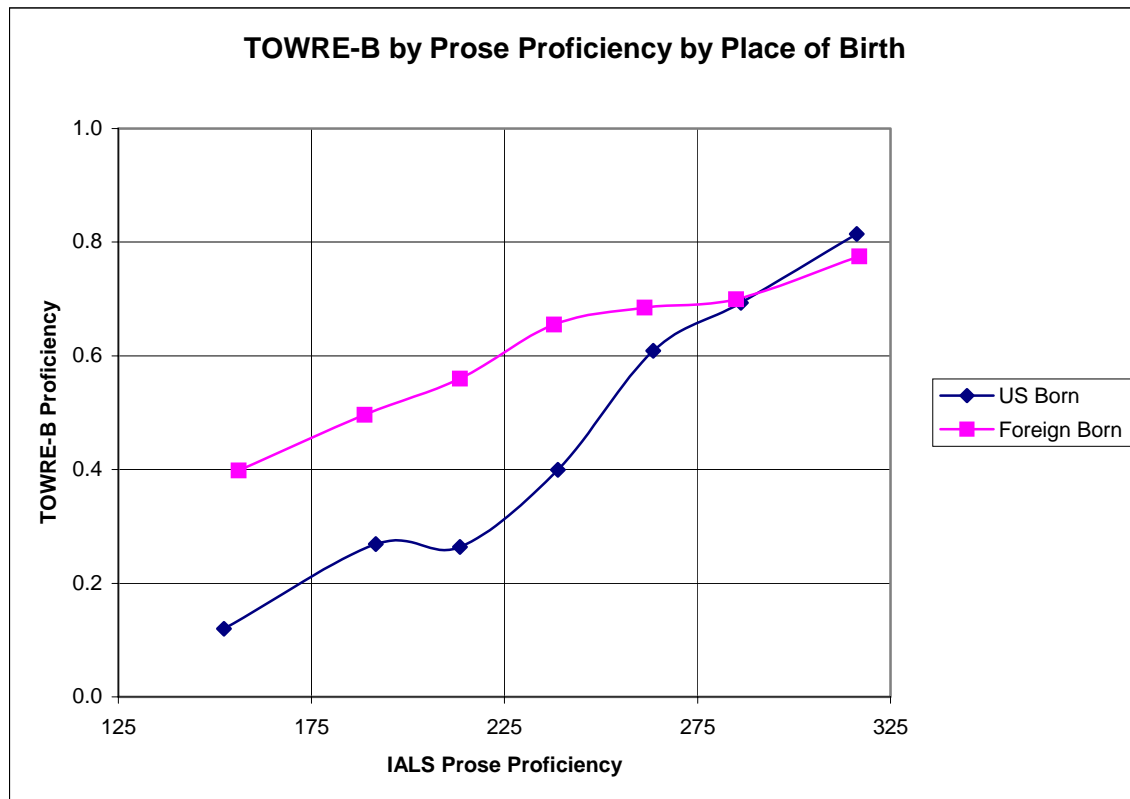
FIGURE 2: STANDARDIZED MEAN SCORES BY ENROLLMENT TYPE



The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

Figure 3 below offers more evidence of this trend. It indicates that this relative strength in pseudo-word reading is also apparent when all 1,034 participants are simply divided into the two large categories of “U.S.-born” vs. “Foreign-born.” Again, U.S.-born participants do not begin to catch up to foreign-born participants in TOWRE-B pseudo-word reading until above 285.

FIGURE 3: TOWRE-B BY PROSE PROFICIENCY BY PLACE OF BIRTH



Many reading researchers regard difficulty with reading pseudo-words as an indication of the core phonological deficit that is at the root of most reading disability (Torgesen & Burgess, 1998; Snow, Burns, & Griffin, 1998; Shaywitz, 1996; Lyon, 1995; Bruck, 1990, 1992; Pratt & Brady, 1988; Read & Ruyter, 1985). Accordingly, the difficulty with TOWRE-B pseudo-words manifested by native English-speaking participants below IALS 250 could reflect the presence of reading disabilities. Davidson and Strucker (2002) found that the proportion of ABE and ASE students reporting reading disabilities in their sample was over 50% in some cluster profiles, much higher than the 5–10% estimates for the overall population (Shaywitz, Escobar, Shaywitz, Fletcher, & Makuch, 1992).

Compared to native English-speaking ABE and ASE students, ESL students as a group may have more normally distributed phonological awareness skills and a relatively

lower incidence of phonologically based reading disabilities (Scholes, 1991). In addition, those who are already highly or even moderately literate in alphabetic native languages may be able to use the decoding abilities perfected in those languages to attack English pseudo-words (Davidson & Strucker, 2002; Strucker, 2002b; Carlo, 2001).

Yet at all levels of IALS performance, the non-native English speakers in our sample did not read the TOWRE-A real-words as well as the native speakers. While English pseudo-words by definition must adhere rigidly to English phonics rules (*baf*; *nifpate*), many common English real words are notorious for straying from those rules (*shoes*; *business*). Perhaps that explains why, at a given level of IALS ability, ESL students performed less well than ABE and ASE students on real-words and spelling: As relatively new readers and speakers of English, they have had less experience with the many English words that are “rule-breakers.”

We were somewhat surprised that our brief, rather easy 15-word spelling test tracked PPVT and TOWRE-A so closely near IALS 275. The following description of English spelling ability by Hodges (1982) offers some insight into why this occurred:

...learning to spell involves developing an understanding of the total framework of English orthography and of the interrelatedness among the phonological, morphological, and other language factors the orthography reflects.

In this light, English spelling involves many of the same abilities that are both required and highly developed by proficient readers. The good speller is usually proficient at word recognition (Read & Ruyter, 1985) and is also likely to make use of the semantic and syntactic influences on English spelling. Since English spelling requires both print skills and meaning skills, perhaps that is why it is often strongly related to reading comprehension performance.

Finally, we are struck by the relatively moderate difficulty level of the items on both the PPVT and TOWRE A that a reader must master to achieve the 80–85% proficiency associated with the transition from Level 2 to Level 3. For example, on the PPVT, the most difficult vocabulary items one would encounter in the 80–85% proficiency range include *syringe*, *ladle*, *abrasive*, *detonation*, *cultivating*, *oasis*, and *confiding*. Similarly, on the TOWRE A, the most difficult items to be pronounced correctly include *limousine*, *valentine*, *detective*, *recently*, *instruction*, and *transient*.

Research Findings Part 2: Can Performance on These Five Key Components of Reading Be Used to Describe Patterns of Strengths and Needs in Reading Among Adult Literacy Students?

To address this question, latent class analysis (LCA)¹³ of the test data was performed, based on students' proficiencies in the five components: real-word reading (TOWRE-A), pseudo-word reading (TOWRE-B), receptive vocabulary (PPVT), spelling, and Digit Span. The LCA produced five distinct classes of adult readers from our sample of 1,034 people, which are shown in Table 3 below. From this table, it is immediately apparent that although the classes were created based on the above five components without reference to participants' IALS scores, the five classes differ markedly in their distributions across the three IALS Prose Levels. Note also that although no Background Questionnaire data on native language or place of birth were used in the LCA, the analysis nevertheless produced two classes—Class 3 and Class 4—where 95% and 99% were non-native English speakers, and two classes—Class 1 and Class 2—where native English speakers predominate, though not as strongly, making up 86% and 72% respectively. This suggests that the five classes created by the LCA are valid—and potentially instructionally relevant—groups of participants. In the closer examination and discussion of each of the five classes that follows, we offer more evidence for the validity of this five-class model and the utility of the methodology we used.

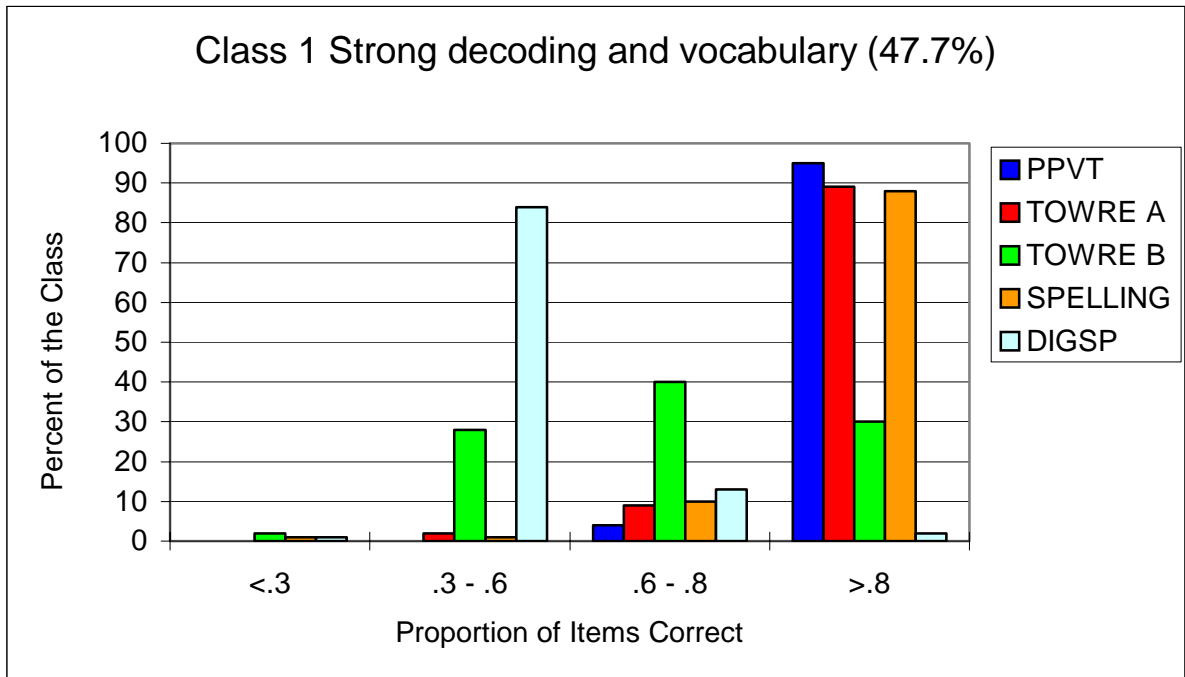
TABLE 3: CLASSES OF ADULT READERS

CLASS	% OF SAMPLE	% NATIVE ENGLISH SPEAKERS	% NON-NATIVE ENGLISH SPEAKERS	IALS PROSE LITERACY LEVELS %		
				LEVEL 1	LEVEL 2	LEVEL 3+
1	48 (n=493)	86	14	5	49	46
2	17 (n=175)	72	28	26	61	13
3	15 (n=154)	5	95	32	62	6
4	12 (n=123)	<1	99	68	29	3
5	9 (n=89)	31	69	83	16	1

¹³ Latent class analysis is a statistical tool for clustering subjects based on categorical variables. The analysis yields a probabilistic classification for each survey participant where the classes are represented by different tendencies to respond in a certain way. The central notion of the latent class model is that the mutually exclusive and together exhaustive sets of homogeneous groups/classes make up the population. Each class can be uniquely defined by a set of proficiency skills represented through a profile of conditional response probabilities. Within a class, samples are thought to be homogeneous, i.e., where having a propensity for a correct response to each item is shared among those samples in the class. In latent class analysis, the model parameters to be estimated are the conditional probabilities given a class and class sizes. (See Patterson, Dayton, & Graubard, 2002.)

On the Figures that follow (for Classes 1, 2, 3, 4, and 5), the x-axis is divided into four levels of proficiency according to the proportion of responses correct (<.3; .3–<.6; .6–<.8; and >.8). The y-axis shows the percentage of people from the class at each of these four levels of proficiency for each of the five components: PPVT, TOWRE-A, TOWRE-B, spelling, and WAIS Digit Span.

FIGURE 4: CLASS 1 STRONG DECODING AND VOCABULARY



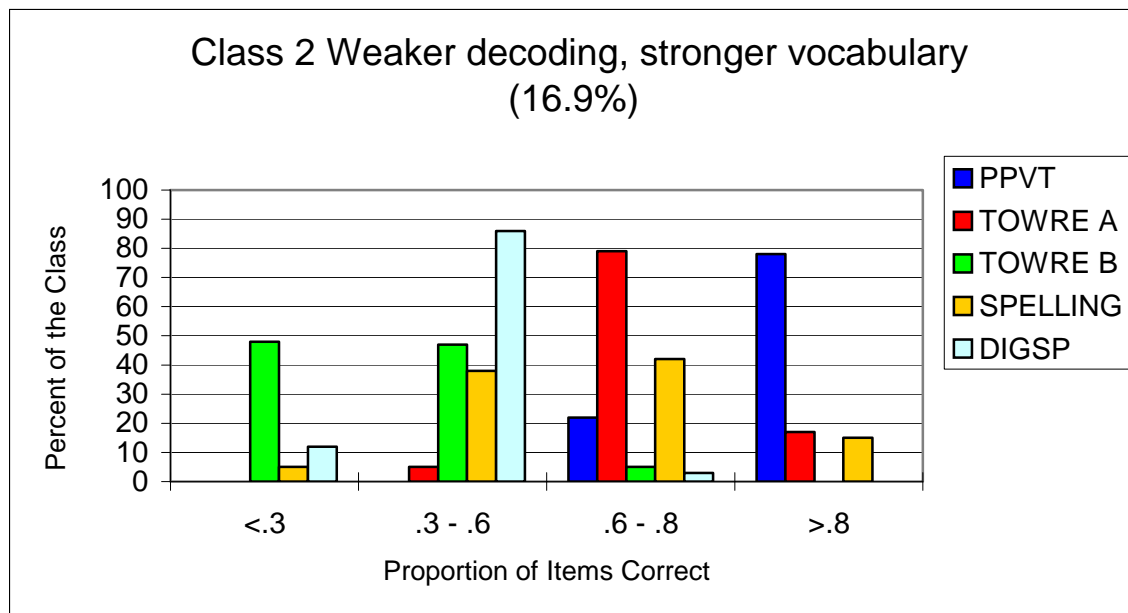
Class 1 is the most proficient group of readers in our sample, and by far the most numerous at 47.7%. (Please bear in mind, however, that since our sample was not designed to be representative, percentages across our five classes refer to our sample only. They do not correspond to actual percentages in the population enrolled in U.S. adult literacy classes, much less to the U.S. population as a whole.)

- The IALS literacy skills of this class are the strongest of any group in our sample, with only 5% at Level 1 (<225), 49% at Level 2 (225–275), and 46% at Level 3 and above (>275).
- Eighty-six percent of the members of this class are native speakers of English. Of the 14% who were non-native speakers of English, their English proficiency appears to be quite strong. Only 19% of the non-native speakers were enrolled in ESL classes, and 61% of them reported that they read English “very well,” 34% “well,” and only 5% “not well.”

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

- All participants in Class 1 were relatively proficient in all components of reading, with 80–90% of them showing $>.80$ proficiency in TOWRE-A real-word reading, PPVT receptive vocabulary, and spelling.
- Not surprisingly, this class included 94% of the 84 “household” participants, those who were not enrolled in adult literacy programs and who had high school or beyond levels of educational attainment.
- Interestingly, Class 1 was also the youngest class overall, with 50% in the 16–24 age cohort. Perhaps this is because, as adult literacy practitioners have reported to us, many of their most able learners are recent high school dropouts with near-high school level skills who enroll in ASE classes to prepare for their General Educational Development (GED) tests.

FIGURE 5: CLASS 2 WEAKER DECODING, STRONGER VOCABULARY



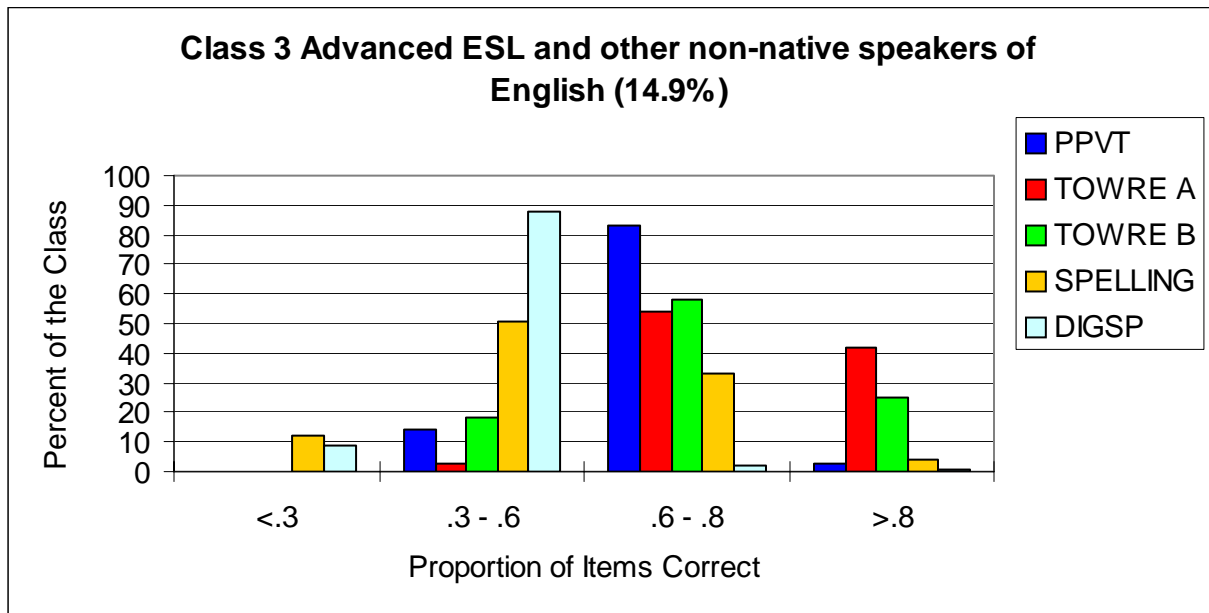
At 16.9 % of the sample, Class 2 is the second largest class in our sample.

- Twenty-six percent of this class scored at IALS Level 1, 61% at Level 2, and only 13% at Level 3 or above.
- They are comprised of 72% native speakers of English and 28% non-native speakers of English. Of the non-native English speakers, 60% were enrolled in ABE or ASE classes, and only about 40% were enrolled in ESL classes. This is not unusual. In many parts of the U.S., ABE and ASE classes include substantial numbers of non-native English speakers who have relatively strong English oral language skills, but wish to improve their English literacy and/or attain a U.S. high school certificate or General Educational Development (GED)

certificate. Of the 28% who were non-native speakers of English, 22% reported speaking English “very well,” 45% “well,” 32% “not well.” Twenty-six percent reported reading English “very well,” 44 % “well,” and 30% “not well.”

- The native English speakers in this Class 2 showed some signs of reading disability. First, their print skills were considerably weaker than their meaning skills: over 80% of the class possessed >.80 proficiency in oral vocabulary, but only 15% of this class performed real-word reading at >.80 proficiency level. Typical of readers with decoding difficulties, their pseudo-word reading and spelling were weaker still, distributed around the <.3 to .3-<.6 proficiency levels. Consistent with this, over 50% of the native speakers of English in Class 2 reported difficulty with reading in the primary grades. This is significant because early reading problems are often related to the “core phonological deficit” that defines a reading disability (Lyon, 1995; Snow, Burns, & Griffin, 1998; Torgesen & Burgess, 1998). In addition, 35% of them reported that they were learning disabled and had received various forms of extra help in reading when they were children.

FIGURE 6: CLASS 3 ADVANCED ESL AND OTHER NON-NATIVE SPEAKERS OF ENGLISH



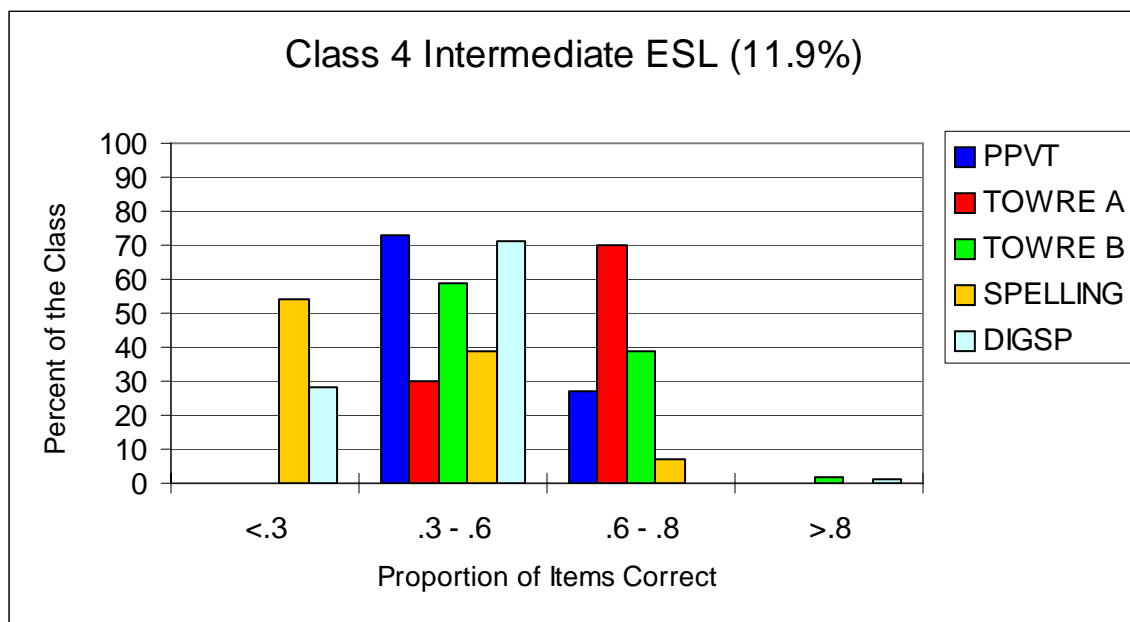
This class makes up 14.9% of the sample. Ninety-five percent are non-native speakers of English, of whom 75% were enrolled in ESL classes.

- Despite some strengths in print skills that are second only to those of respondents in Class 1, Class 3 members’ IALS scores are distributed much lower than the mostly native English speakers in Class 1: 32% were at Level 1 (<175-<225), 62% at Level 2 (225-275), and 6% at Level 3 (>275).

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

- Their proficiency in raw decoding ability (TOWRE B pseudo-words) was nearly that of participants in Class 1. However, their PPVT vocabulary is much weaker: 13% with .3–.6 proficiency, 82% with .6–.8 proficiency, and only 5% with >.8 proficiency. Of the non-native speakers of English, 6% reported that they read English “very well,” 70% “well,” and the remaining 24% “not well.” With regard to speaking English, 3% reported “very well,” 53% reported “well,” and 44% “not well.”
- On the question of how long they had been enrolled at their current adult education program, there was not much difference among the relatively “Advanced ESL” students in this group, the “Intermediate ESL” students in Class 4 below, and those in Class 5 below with the least developed English literacy skills. About 76% of learners in Classes 3 and 4 reported having been enrolled for less than one year, while 69% of those in Class 5 reported being enrolled for less than one year.

FIGURE 7: CLASS 4 INTERMEDIATE ESL

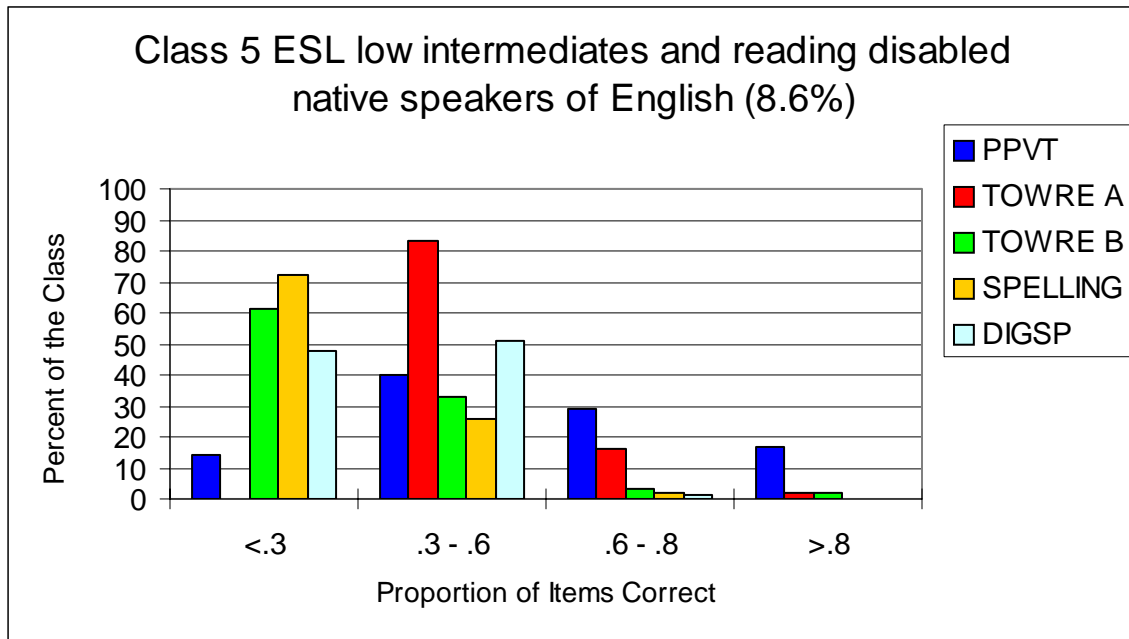


Class 4 makes up 11.9 % of the sample. Ninety-two percent of the members of this class were enrolled in ESL classes at the time they were tested, and over 99% are non-native speakers of English.

- Their IALS distribution is as follows: 68% are in Level 1 (<175 = 19%; 175–225 = 49%); 29% are in Level 2 (225–275) and only 3% are in Level 3 or above (>275).

- As evidence that their English skills are still developing, 75% of the members of this class have .3 to .6 proficiency in PPVT receptive vocabulary. Their real-word reading is somewhat stronger than their vocabulary, but it is not yet highly proficient, with 70% at the .6–.8 level.
- Note that this class includes the first significant percentage (19%) scoring <175 in IALS English literacy, a level at which participants are able to complete only the most rudimentary literacy tasks. It is also the first class in which a significant percentage (28%) performed at the <.30 proficiency in Digit Span. However, given that over 99% of them are not native speakers of English, this may not imply a difficulty with working memory so much as the inherent difficulty of attempting the digit span task in a foreign language for new learners of that language.
- When asked, “How well do you speak English?” 2% replied “very well,” 43% “well,” and 55% “not well.” With regard to reading, 2% replied “very well,” 59% “well,” and 39% “not well.”

FIGURE 8: CLASS 5 ESL LOW INTERMEDIATES AND READING DISABLED NATIVE SPEAKERS OF ENGLISH



At 8.6% this is the smallest class in our sample. (We remind the reader, however, that our inability to interview and test ESL “new beginners”—those with very limited English conversational ability—probably reduced the proportion of ESL membership at this level. Alternatively, had we been able to include them, it is possible that these ESL new beginners might have formed a separate sixth class. Sixty-three percent of Class 5

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

are non-native speakers of English, and 37% are native English speakers. Fifty-two percent of Class 5 were enrolled in ESL, 39% in ABE, and 9% in ASE.

- Lumping together non-native and native English speakers, 83% are in Level 1 (38% <175; 45 % 175–<225), 16% are in Level 2, and 1% in Level 3.
- Among the non-native English speakers, fully 92% are in IALS Level 1 (40% at <175; 52% at 175–225), 8% are in Level 2 (225–275), and none are in Level 3 or above (>275).
- Among the native English speakers in Class 5, 72% are in IALS Level 1 (33% at <175; 39% at 175–225), only 28 % are in Level 2 (225–275), and none are in Level 3 or above (>275).
- Among non-native English speakers, 4% reported speaking English “very well,” 40% “well,” 55% “not very well.” With regard to reading, none reported “very well,” 47% reported “well,” and 53% “not well.”
- Interestingly, this was the only class in which a significant percentage (24%) of the non-native speakers reported difficulties with reading in the primary school grades.
- Sixty-five percent of the native English speakers reported difficulties with reading in the primary grades, and 64% reported having a learning disability.
- Perhaps because this class includes significant numbers of both non-native and native speakers of English, their PPVT vocabulary proficiencies are somewhat widely distributed: 17% in the >.80 range, 29% in the .60–.80 range, 40% in the .30–<.60 range, and 13.5% in the <.30 range.
- However, their print skills are weaker and more tightly grouped, with 80–90% of Class 5 having TOWRE-A, TOWRE-B, and spelling proficiencies in the <.30 and .30–<.60 ranges. In addition, like the previous Class 4, Digit Span was somewhat weak: 48% of this class scored at the <.3 proficiency level on Digit Span, which translates into difficulty repeating digits longer than a series of four.

CONCLUSIONS

Implications of “Tipping Points” for Instruction

We have made a beginning at identifying “tipping points” in print and vocabulary abilities by noting that, at the .85 proficiency level, those abilities coincide with the onset of IALS Level 3 literacy skills, with all that Level 3 performance implies for improved quality of life opportunities. Our latent class analysis supported this finding when it created Class 1, which is made up of people distributed on either side of the IALS Levels 2 and 3 *and* whose key components skills in oral vocabulary and rapid, accurate word recognition were tightly arranged near or above the .80 proficiency level.

This methodology allows us to determine the levels of print skills (real-word recognition, pseudo-word recognition, and spelling) and meaning skills (receptive vocabulary) that are related to the transition from IALS Level 2 to IALS Level 3 real-world literacy. Knowing these “tipping points” makes it possible to identify those adult learners whose print and meaning skills are very close to those of Level 3 and above adult readers. These are intermediate adult readers, people who might be very near to achieving levels of literacy that could change their lives dramatically, if they were given a burst of intensive, tightly focused instruction.

At the present time, many adult literacy teachers in the U.S. tend to offer these intermediate and pre-GED adult readers instruction that is primarily organized around reading comprehension strategies, such as finding the main idea, using inferences, and detecting the sequence, and techniques for learning vocabulary through context. The teachers may be unaware of their students’ underlying needs in print and meaning skills, or they may believe that these component skills will develop naturally in the course of reading connected texts (Davidson & Strucker, 2002).

Our findings suggest that a different approach should be explored for these intermediate and pre-GED adults, such as the approach developed by Chall in the Harvard Adult Reading Laboratory (Chall, 1994) and later extended and adapted for adolescent group instruction at Boys and Girls Town in Nebraska by Curtis (Curtis & Longo, 1999). Instead of focusing primarily on comprehension itself, Chall and Curtis’ approach addresses the root causes of poor comprehension: lack of fluent, accurate word recognition and limited knowledge of word meanings. Direct instruction is provided in each of these areas, accompanied by extensive reading and discussion of complete texts at appropriate levels of challenge. If needed, instruction in comprehension strategies would take place only after students have acquired the necessary foundations of print and meaning skills.

These instructional approaches require that adult literacy teachers know how to give and interpret reading components assessments and how to plan effective instruction based on the results of those assessments. One implication of this for educational policymakers is that adult literacy programs should be staffed by teachers with extensive training in the areas of assessing and teaching reading.

Obviously, large-scale intervention studies are needed to establish which approaches work best for these “tipping point” students. Fortunately, several of the adult literacy studies currently underway and funded by National Institute of Child Health and Human Development and the Institute of Education Sciences are exploring this and other questions related to best practice in reading instruction for these adult intermediate readers.

The Relationship of the Component Skills to Comprehension

This research indicates that the components of vocabulary and word recognition have the same relationship to the IALS real-world literacy assessment that they have to more traditional academic measures of reading comprehension studied in the past (e.g., Perfetti, 1985; Gough and Tunmer, 1986). In short, performance on the IALS can be linked directly to levels of print and meaning skills. We think this is potentially good news for adult literacy practitioners because there is some clinical evidence (Chall, 1994; Curtis and Longo, 1999) that those component skills can be improved through focused teaching and that this in turn can lead to accelerated growth in comprehension.

The Importance of Rate As Well As Accuracy in Decoding

It is of interest that even though the IALS Prose test is essentially untimed, the TOWRE A, which demands fast as well as accurate real-word reading, is so strongly related to IALS performance. This means that it is not just that faster reading enables one to finish a timed comprehension test within the time limit, resulting in a higher score. Our finding offers support for the arguments made by Sabatini (2002), Carver and David, (2001), Adams (1994), and Perfetti (1985) that rate and accuracy in word recognition (decoding) are interrelated and that *both* rate and accuracy are critical for higher levels of reading comprehension. It also suggests that assessments of decoding are strengthened if, like the TOWRE-A and TOWRE-B, they include measures of rate as well as accuracy.

Establishing Reader Profiles

Latent class analysis of the PPVT, TOWRE-A and -B, our brief spelling assessment, and Digit Span shows that components proficiencies can be used to create meaningful classes or profiles of ABE, ASE, and ESL readers. Our background questionnaire data offer external validity for the preliminary five-class solution we present in this paper. The latent class analysis created, for example, Classes 2 and 5, which both contain

The Relationship of the Component Skills of Reading to IALS Performance: Tipping Points and Five Classes of Adult Literacy Learners

native English speakers with signs of reading disability based on TOWRE-A and -B and spelling. External validity is offered by the fact that the significant percentages of native speakers of English in both classes reported trouble with early reading and the presence of learning disabilities. Similarly, Classes 3 and 4 emerged with vocabulary skills that were markedly weaker than their word recognition skills. This fits the classic description of an adult foreign language learner. Indeed, those two classes are made up overwhelmingly of ESL enrollees and other non-native speakers of English. Across all five classes, non-native English speakers' self-reports of their English speaking and reading abilities were consistent with their components and IALS reading proficiencies, ranging from those in Class 1 who reported very strong English abilities to those in Class 5 who reported very limited English abilities.

Implications of Our Latent Class Analysis for Instruction

Ultimately, the technique of latent class analyses of adult reader profiles could be used by the adult education system to identify different types of readers for instructional purposes, from beginners through GED levels. University and hospital reading clinics have been using this reading profile approach for many years (Chall, 1994; Chall and Curtis, 1990). As our analysis suggests, patterns of strengths and needs in reading can vary quite a bit among adult readers. Simply knowing a reader's score on a reading comprehension test usually does not give a teacher enough information to plan efficient, effective remedial teaching (Strucker, 1997). Establishing rigorous and valid classes of adult readers will help adult literacy centers move away from "one-size-fits-all" approaches to reading instruction, toward more focused and differentiated instruction.

The Future of Adult Literacy Test Design

Of particular note to adult literacy practitioners and policymakers is the relatively quick administration time needed for the components tests that were analyzed in this study. On average it took less than 40 minutes to administer IALS, PPVT, TOWRE-A and -B, spelling, and Digit Span. (This excludes the time for the rather lengthy IALS questionnaire and for the four brief language and additional cognitive measures that were administered using Ordinate's PhonePass©.) This means that it would be possible to design short, easy-to-administer batteries of components that could be given to large numbers of adults in literacy centers or in their communities. Although the PPVT and TOWRE-A and -B were scored by humans in this study, if computer speech recognition could be employed to score tests such as these, the entire battery could be delivered and scored online.

Finally, we hope that this research will suggest to educational policymakers in the various IALS countries that reading components assessments can make an informative addition to their current IALS literacy batteries. Components assessments not only contribute a vital piece of the puzzle in explaining why some adults possess limited

literacy abilities; they can also be used to develop and test instructional approaches that might be effective for the various different profiles of adult literacy learners who are present in a given society.

In addition, reading components such as word recognition and oral vocabulary are likely to be especially important for assessing literacy in developing societies where the overwhelming majority of adults are in IALS Level 1. Only component tests can tell policymakers whether Level 1 adults in these societies have acquired or begun to acquire the basic foundations for higher levels of literacy.

We believe that this study of adults' component reading skills marks the beginning of the next phase in the development of large-scale adult literacy assessment, a development that began back in 1985 with the Young Adult Literacy Survey, and has continued through the NALS, IALS, and the recently released U.S. National Assessment of Adult Literacy (NAAL) (2005). In this new phase, large-scale assessment has begun to move beyond simply providing accurate and reliable descriptions of broad adult literacy proficiencies. It can now take on the task of providing practical knowledge about adults' strengths and needs in reading, knowledge that can be used to guide the development of effective educational interventions. Having successfully defined the gaps between society's least and most proficient readers, large-scale assessment can now focus on what needs to be done to narrow those gaps.

REFERENCES

- Adams, M. J. (1994). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Bruck, M. (1990). Word-recognition skills of adults with childhood diagnoses of dyslexia. *Developmental Psychology*, 26(3), 439–454.
- Bruck, M. (1992). Persistence of dyslexic's phonological awareness deficits. *Developmental Psychology*, 28(5), 874–886.
- Carlo, M. S. (2001). *Do reading skills transfer across languages? Examining the literature from a component process perspective on reading*. Office of Bilingual Education and Minority Language Affairs Report. Washington, DC: U.S. Office of Education.
- Carver, R. P. & David, A.H. (2001). Investigating reading achievement using a causal model. *Scientific Studies of Reading*, 5, 107–140.
- Chall, J. S. (1987). Developing literacy in children and adults. In Wagner, D. (Ed.), *The future of literacy in a changing world*. New York: Pergamon.
- Chall, J. S. (1994). Patterns of adult reading. *Learning Disabilities*, 5(1), 29–33.
- Chall, J. S. & Curtis, M. E. (1990). Diagnostic achievement testing in reading. In C. Reynolds & R. Kamphaus (Eds.), *Handbook of psychological and educational assessment of children: Vol. I*. New York: Guilford Press.
- Curtis, M. E. (1980). Development of the components of reading. *Journal of Educational Psychology*, 72, 656–669.
- Curtis, M. E. & Longo, A.M. (1999). *When adolescents can't read: Methods and materials that work*. Cambridge, MA: Brookline Books.
- Davidson, R. & Strucker, J. (2002). Patterns of word recognition errors among adult basic education native and non-native speakers of English. *Scientific Studies in Reading* 6(3).
- Dunn, L. M., & Dunn, L. M. (1997). *Peabody Picture Vocabulary Test* (3rd ed.). Circle Pines, MN: American Guidance Service.

- Francis, W. N., & Kucera, H. (1982). *Frequency analysis of English usage: Lexicon and grammar*. Boston: Houghton Mifflin.
- Gough, P. & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6–11.
- Hodges, R. E. (1982). Research update: On the development of spelling ability. *Language Arts*, 59 (March), 284–290.
- Kirsch I. S. & Jungeblut, A. (1986). *Literacy: Profiles of America's Young Adults*. Princeton, NJ: Educational Testing Service.
- Kirsch, I. & Mosenthal, P. (1989). Understanding documents: Building documents by combining simple lists. *Journal of Reading*, 33(2), 132–135.
- Kirsch, I., Jungeblut, A., Jenkins, L., & Kolstad, A. (Eds.). (1993). *Adult literacy in America: A first look at the National Adult Literacy Survey*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Lyon, G. R. (1995). Toward a definition of dyslexia. *Annals of Dyslexia*, V(45), 3–27.
- Moats, L. C. (1995). *Spelling development, disability, and instruction*. Timonium, MD: York Press.
- Murray, T. S., Kirsch, I., & Jenkins, L. (Eds.). (1998) *Adult literacy in the OECD countries: Technical report of the First International Adult Literacy Survey*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- National Assessment of Adult Literacy. (2005). Retrieved October 15, 2006, from <http://nces.ed.gov/naal/>
- Office of Vocational and Adult Education (OVAE). (2003). *Carl D. Perkins Vocational and Technical Education Act of 1998 report to Congress on state performance program year 2000–2001*. Washington, DC: Author.
- Patterson, B. H., Dayton, C. M., & Graubard, B.I. (2002). Latent class analysis in the analysis of complex survey data: Application to dietary data. *Journal of the American Statistical Association*, 97(459), 721–742.
- Perfetti, C. A. (1985). *Reading ability*. New York: Oxford University Press.

The Relationship of the Component Skills of Reading to IALS Performance:
Tipping Points and Five Classes of Adult Literacy Learners

- Pratt, A. C., & Brady, S. (1988). Relation of phonological awareness to reading disability in children and adults. *Journal of Educational Psychology*, 80(3), 319–323.
- Read, C., & Ruyter, L. (1985). Reading and spelling skills in adults of low literacy. *RASE*, 6(6), 43–52.
- Sabatini, J. P. (2002). Efficiency in word reading of adults: Ability group comparisons. *Scientific Studies of Reading*, 6(3), 267-298.
- Scholes, R. J. (1991). Phoneme deletion and literacy in native and non-native speakers of English. *Journal of Research in Reading*, 14, 130–140.
- Shaywitz, S., Escobar, M., Shaywitz, B., Fletcher, J., & Makuch, R. (1992). Evidence that dyslexia may represent the lower tail of a normal distribution of reading ability. *New England Journal of Medicine*, 326(3), 145–150.
- Shaywitz, S. (1996). Dyslexia. *Scientific American*, November, 98–104.
- Snow, C., Burns, S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: Academy Press.
- Snow, C. & Strucker, J. (2000). Lessons from preventing reading difficulties in young children for adult learning and literacy. In J. Comings, B. Garner, & C. Smith, (Eds.), *Annual review of adult learning and literacy*, Vol. 1. San Francisco: Jossey Bass.
- Strucker, J. (1995). *Patterns of reading in adult education*. Unpublished doctoral dissertation, Harvard Graduate School of Education, Cambridge, MA.
- Strucker, J. (1997). What silent reading tests alone can't tell you. *Focus on Basics*, 2(A), 13–17.
- Strucker, J. (2002a, April). *The Adult Reading Components Study (ARCS)*. Paper presented at the International Reading Association Pre-Conference Roundtable on Adult Literacy, San Francisco, CA.
- Strucker, J. (2002b, June). *Analysis of the Adult Reading Components Study (ARCS): Native Spanish speakers' ESOL clusters*. Paper presented at the International Dyslexia Association International Conference, Washington, DC.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C.A. (1999). *Test of Word Reading Efficiency*. Austin, TX: PRO-ED Publishing, Inc.

Torgesen, J. K. & Burgess, S.R. (1998). Consistency of reading-related phonological processes throughout early childhood. In J. Metsala & L. Ehri (Eds.), *Word recognition in beginning reading*. Hillsdale, NJ: Erlbaum.

Tuijnman, A. (2001). *Benchmarking Adult Literacy in North America: An International Comparative Study*. Ottawa: Statistics Canada.

Yamamoto, K. (1997). Scaling and linking. In T.S. Murray, I. S. Kirsch, & L. Jenkins (Eds.), *Adult Literacy in the OECD countries: Technical report of the First International Adult Literacy Survey*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

ASSESSMENTS

Peabody Picture Vocabulary Test III (PPVT-III). (1997). Dunn, L. M. & Dunn, L. M. Circle Pines, MN: American Guidance Service.

Test of Word Reading Efficiency (TOWRE). Torgesen, J. K., Wagner, R. K., & Rashotte, C.A. (1999). Austin, TX: PRO-ED, Inc.

Wechsler Adult Intelligence Survey III (WAIS-III) Digit Span. (1997). Wechsler, D. San Antonio, TX: The Psychological Corporation.

APPENDIX A: SAMPLING (WESTAT CORPORATION)

Target Adult Literacy Program Sample Size Requirements

Programs:	30
Sites:	45 (one or two sites per program)

Target number of students/Actual number interviewed by enrollment categories:

Adult Basic Education (ABE):	300/362
Adult Secondary Education (ASE)	300/283
English as a Second Language (ESL)	300/305
Household*	100/84

Sample selection procedures

An average of 30 participants were selected per site, based on lists provided by sites with the following limitations:

- Only learners who had completed 12 or more hours of instruction were included.
- No ESL Beginning Literacy students were included.

Because of the rapid student turnover that occurs in adult literacy programs, student lists had to be transmitted to Westat as quickly as possible, and as close as possible to the dates when interviews and assessments were to be conducted at each adult literacy program or site. Some sites had the capability of supplying full student lists electronically, while others could only provide hard copy lists.

Once the study was in the field and interviewing and testing had begun, enrollment lists had a tendency to become increasingly inaccurate over time as some students dropped out, new students were added, and (more rarely) changes were made in class schedules. Therefore, at a few sites where testing could not be completed within a few weeks, more accurate, more up-to-the-minute student lists were needed as earlier lists became out of date. In these cases, Westat researchers worked via telephone with administrators and classroom teachers to help them use their weekly classroom attendance lists to select students randomly for participation in the study.

* The “household” sample was made up of participants from Westat focus groups residing in the five states that were part of the adult literacy sample. All were at least high school graduates, and some had completed various amounts of postsecondary education. They were chosen to reflect the gender, age, and ethnic characteristics of the adult literacy sample, with the exception that nearly all were native speakers of English. Their role in this study was to provide examples of IALS Level 3 and above reading abilities for comparison with the learners from the adult literacy centers.

APPENDIX B: SPELLING TEST

Say to the learner:

Now we will do a short spelling test. I will dictate words for you. Please write them on this answer sheet in the blanks provided. [Hand the learner the Spelling Answer Sheet and a pencil. Point to blank number 1.]

I'll say each word I want you to spell, then I'll give you a sentence with the word in it, then I'll say the word once again. Remember, you only need to write the word itself, not the sentence. Please write or print clearly. If you aren't sure how to spell a word, spell it the best you can or leave that number blank. If you change your mind about the spelling of a word, cross it out and rewrite it on the same line. Any questions? Here we go. The first word is:

[You may repeat a word or sentence if asked by the learner.]

1. **dig** - You have to **dig** a hole to plant a tree. **dig**
[Check to that the learner has written a word—not the sentence—in blank number 1.]
2. **rope** - He tied a knot in the **rope**. **rope**
3. **stick** - A **stick** is a small piece of wood. **stick**
4. **coach** - The basketball team needs a **coach**. **coach**
5. **talked** - Yesterday I **talked** to my friend on the phone. **talked**
6. **spoil** - If you leave milk out, it will **spoil**. **spoil**
7. **tries** - She always **tries** to do a good job. **tries**
8. **switch** - The light **switch** is on the wall. **switch**
9. **scrape** - Be sure to **scrape** the mud off your shoes. **scrape**
10. **point** - The pencil had a very sharp **point**. **point**
11. **waving** - He was **waving** goodbye to us. **waving**
12. **lesson** - The teacher taught a math **lesson**. **lesson**
13. **distance** - She drives a long **distance** to get to work. **distance**
14. **confusion** - The broken traffic light caused a lot of **confusion**. **confusion**
15. **visible** - The stars are **visible** on clear nights. **visible**

Thank you.

APPENDIX C: TOWRE SCORING

TOWRE Scoring Guidelines*

Native English Speakers

1. If both scorers are undecided after listening three or more times as to whether a pronunciation is a reading miscue or an accent feature, count that pronunciation as correct. Any disagreements are referred to the third scorer.
2. Accept all regional pronunciations. Examples of acceptable regional pronunciations:
 - short i and short e similarities (*pen* pronounced as *pin*) (Southerners and African Americans)
 - /th/ pronounced as /t/ or /d/ such as “widout” for West Indians, Southerners, African Americans, white Chicagoans and New Yorkers.
 - red as “ret;” wood as “woot” (African Americans (AAs))
 - help as “hep” (Southerners and AAs)
 - “thayen” for then and similar vowel diphthongs (Southerners and AAs)
 - “tahm” for time (other long i words similar) (Southerners and AAs)
 - “leff” for left; “kine” for kind; “fass” for fast; unnerstan’ for understand; (other final consonant blends similar) (Southerners and AAs)
 - mornin’ for morning; finely for finally; “purty” for pretty; “chirren” for children (Southerners and AAs)
3. All syllables must be pronounced (except for words like *finely/finally* or “clapse”/collapse).
4. Stress must be on the correct syllable.
5. Except for regional differences, all vowels and consonants must be present and correct.

* Two graduate students and John Strucker scored 100 out of the 1,034 cases together to establish standards and training to .90-.95 reliability across the three scorers. The two graduate students scored the remaining 934 cases as follows: Each scorer scored all items herself and then scores were compared. The scorers attempted to resolve differences by re-playing the contested items until agreement was reached. Any items on which they could not reach agreement (< 5% of the total) were referred to Strucker for the tie-breaking vote. Strucker randomly sampled the cases at the end of each day to check for “scorer drift.”

Non-native Speakers of English

1. If both scorers are undecided after listening three or more times as to whether a pronunciation is a reading miscue or an accent feature, count that pronunciation as correct. Refer any disagreements to the third scorer.
2. Accept accent-related pronunciations and specific problems with notoriously difficult English sounds. Examples of acceptable pronunciation differences:
 - English /th/ can be /t/ or /d/
 - English /r/
 - /b/ and /v/ confusions or substitutions for Spanish speakers
 - /w/ and /v/ confusions or substitutions for all
 - initial /w/ for Spanish speakers (u-ood for *wood*)
 - ch/sh confusions for all, especially Spanish speakers (choose for *shoes*)
 - voiced /s/ and unvoiced /s/ confusions or substitutions (“bissness” for *business*)
 - nasalizing and/or confusing final m or n (Spanish speakers)
 - initial /st/ for Spanish speakers (“estop” for *stop*)
 - confusing or substituting short vowels – except that long and short vowel sounds may **not** be interchanged or substituted
 - All syllables must be pronounced (except for a few words like finely/*finally* or “clapse”/*collapse*)
 - Stress must be on the correct syllable
 - Except as noted above, all vowels and consonants must be present and correct



National Center for the Study of Adult Learning and Literacy

NCSALL's Mission

NCSALL's purpose is to improve practice in educational programs that serve adults with limited literacy and English language skills, and those without a high school diploma. NCSALL is meeting this purpose through basic and applied research, dissemination of research findings, and leadership within the field of adult learning and literacy.

NCSALL is a collaborative effort between the Harvard Graduate School of Education, World Education, The Center for Literacy Studies at The University of Tennessee, Rutgers University, and Portland State University. NCSALL is funded by the U.S. Department of Education through its Institute of Education Sciences (formerly Office of Educational Research and Improvement).

NCSALL's Research Projects

The goal of NCSALL's research is to provide information that is used to improve practice in programs that offer adult basic education, English for speakers of other languages, and adult secondary education services. In pursuit of this goal, NCSALL has undertaken research projects in four areas: (1) learner persistence, (2) instructional practice and the teaching/learning interaction, (3) professional development, and (4) assessment.

NCSALL's Dissemination Initiative

NCSALL's dissemination initiative focuses on ensuring that practitioners, administrators, policymakers, and scholars of adult education can access, understand, judge, and use research findings. NCSALL publishes *Focus on Basics*, a quarterly magazine for practitioners; *Focus on Policy*, a twice-yearly magazine for policymakers; *Review of Adult Learning and Literacy*, an annual scholarly review of major issues, current research, and best practices; and *NCSALL Reports* and *Occasional Papers*, periodic publications of research reports and articles. In addition, NCSALL sponsors the Connecting Practice, Policy, and Research Initiative, designed to help practitioners and policymakers apply findings from research in their instructional settings and programs.

For more about NCSALL, to download free copies of our publications, or to purchase bound copies, please visit our Web site at:

www.ncsall.net