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## **Reading, Writing and Digitizing: A Meta-Analysis of Reading Research**

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### **ABSTRACT**

*Recent research on reading comes from a variety of different kinds of studies all of which report the same bleak picture of college students' and adults' reading abilities. Researchers, theorists and faculty members can benefit from this detailed review of the various types of studies. These include large scale direct tests of reading ability in the United States and elsewhere around the world, direct tests and surveys of college students in the United States, as well as surveys of the population at large, self-report data, and a range of other approaches that have been used. The findings show that students and adults do not read as well as they could or should, and suggest that intensive and extensive work on reading can be useful for both students and adults.*

### **INTRODUCTION**

It is commonplace now in the national media to see reports on the decline of reading skills based on a variety of recent studies of this topic. Among the most current are the National Endowment for the Arts report called *To Read or Not to Read: A Question of National Consequence* and the first of a series of articles beginning July 28, 2008 in the *New York Times* on the future of reading called "Literacy Debate: Online, R U Really Reading?" (Rich, 2008, p. 1). In addition, there are major national studies of reading ability in the population at large commissioned by the US Congress and conducted by the Department of Education, a similar international study of literacy in the nations of the developed world, and one other by the Pew Research Center on the reading abilities of college students at the end of their academic career. Virtually all of these studies report the same basic finding: both the quantity and quality of adult reading abilities are in decline; a detailed analysis of recent quantitative and qualitative studies of adult reading suggests that novice readers can move toward expert status through both intensive and extensive work on reading.

The consistency of the findings warrants careful study for at least three key reasons. First, there are methodological differences such that each study has some key weaknesses and the studies differ from one another in terms of whether they entail direct tests of reading performance, self-report data, verbal protocol analysis, or some other strategy. Second, careful study is also in order to examine the ways in which the studies either consider or fail to attend to sociolinguistic factors such as age, gender, ethnicity and socio-economic status that may affect

the results. Finally, close examination is needed because these studies look at different ways of reading different kinds of materials, ignore digital texts, and treat reading in print and online the same. Thus, a detailed review of all of the findings will provide a more complete picture of what has been studied and how it has been studied.

At the outset then, it appeared that this detailed review could and should take the form of a meta-analysis to clarify the full impact of major studies over the last fifteen years. This analytic technique has been defined by evaluation scholars Lipsey and Wilson (2001) as “a form of survey research in which research reports, rather than people, are surveyed” (p. 1) under a very specific set of circumstances. Key requirements include that meta-analysis can only be used on empirical studies with quantitative findings that are usually presented in formal research reports, such as those published in scholarly journals (pp. 1-2). The two key principles of meta-analysis, according to these scholars are that “the findings must (a) be conceptually comparable, that is, deal with the same constructs and relationships and (b) be configured in similar statistical forms” (p. 2). Given these requirements, even a cursory review of the recent studies of adult reading shows that a true meta-analysis cannot be used for the work that has been done. Although a small number of the dozen studies to be reviewed here entail direct tests of reading activity, a majority do not entail this kind of testing. Moreover, while all these studies deal with adult reading, they do not deal with the same constructs and relationships. Each one presents a different idea about reading and, in addition, their findings are not similar, statistically speaking. However, the general idea of meta-analysis, that is, of comparing and compiling the findings of an assortment of studies on the same problem, will be useful even though the variation in the types of studies done and the results obtained precludes formal meta-analysis as a strategy.

The studies to be reviewed here fall into three broad categories already mentioned: direct tests of reading ability including comprehension and use of information gained through reading, self-report data on time spent reading various kinds of material, and protocol analysis including other strategies that attempt to examine reading behavior. Each category has its own strengths and weaknesses. While direct tests of reading ability appear to afford the strongest direct evidence of the status of reading, the studies reviewed here look only at relatively brief passages of continuous prose text, mostly non-fiction; none of the studies examine reading of online texts, continuous or otherwise, and there is limited examination of the reading of extended texts of any kind, fiction or other literature as distinct from non-fiction.

A further issue to be considered when looking at the results of direct tests is exactly what kind of material participants read and respond to for the measurement. In the national and international studies, prose and document literacy are defined specifically and neither addresses extended non-fiction prose. For example, in the original national study in the US, the National Adult Literacy Survey, or NALS (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993), prose literacy is defined this way:

The knowledge and skills needed to understand and use information from texts that include editorials, news stories, poems and fiction; for example, finding a piece of information in a newspaper article, interpreting instructions from a warranty, inferring a theme from a poem, or contrasting views expressed in an editorial. (p. 3)

The passages are generally quite brief and thus, the resulting scores reveal little about participants' ability to read extended prose texts. Document literacy does not address this problem, as it is defined this way:

The knowledge and skills required to locate and use information contained in materials that include job applications, payroll forms, transportation schedules, maps, tables, and graphs; for example, locating a particular intersection on a street map, using a schedule to choose the appropriate bus, or entering information on an application form (Kirsch et al., 1993, p. 3).

Thus, when participants in these studies are tested on prose and document literacy, their ability to understand information from extended non-fiction prose texts, and to analyze, synthesize, and evaluate that information is not being tested directly. As the studies are reviewed, it will be important to keep these limitations in mind.

There are a number of other strengths and weaknesses to keep in mind in examining these various studies. While studies of self-report data afford evidence about the time spent in buying and/or reading texts of different types, the ability to analyze, synthesize, evaluate, and apply information from these texts is not measured in this kind of research, as is true of the direct tests. Verbal protocols of various kinds give a picture of reading as it unfolds, but do not capture the essence of silent reading which is, by definition, silent. It is difficult to know exactly what the research reveals when the normal silent reading process is disrupted by a verbal protocol requirement. And among those who are trying to expand or enhance adult reading behavior such as librarians and community educators who lead community-wide reading programs (where all members of a community are invited to read a common book and then gather for author talks, group discussions, and related activities), there is very little assessment of the impact of these activities on adult reading at large. All the studies, then, have their strengths and weaknesses. The following detailed analyses of large-scale quantitative studies, along with self-report survey data of various kinds and alternative approaches such as protocol analysis, taken together, show that reading is in a serious decline among adults, not only in terms of how much time they are spending engaged in reading, but also in terms of how well they are able to comprehend, analyze, synthesize, evaluate, and use information obtained through reading. Findings concerning expert readers shed light on the approaches needed to address the overall decline in reading quantity and quality among adults.

## **CATEGORY 1: DIRECT TESTS OF READING**

### **Studies of Adult Literacy in the United States**

The first two studies are national studies of adult literacy in the United States: the National Adult Literacy Survey (NALS) reported in 1993 (Kirsch et al., 1993) and the National Assessment of Adult Literacy (NAAL) conducted in 2003 (US Department of Education, 2006). These two studies were commissioned by Congress to investigate the state of reading skills among American adults nationwide. The surveys were designed and conducted by researchers from Educational Testing Service, the organization that offers the Scholastic Assessment Test (SAT) to high school students applying to college. The surveys have some flaws, but were designed to sample the population at large as described by the national census. Both studies entail a substantial sample of US adults who were asked to perform a series of increasingly complex tasks to measure prose, document and quantitative literacy. The results provide a

picture of the overall weaknesses in Americans' reading abilities. Less than half of the population functions at the highest levels of literacy, as measured by these surveys.

NALS was done in response to a request from the US Congress to the Department of Education to "explore the literacy skills of adults" in the US (Kirsch et al., 1993, p. ix), in response to prior national reports and concerns about literacy. The Educational Testing Service was awarded a contract to design and conduct the survey. NALS involved 13,600 people ages sixteen and over, randomly chosen to represent the population as a whole, plus one thousand people in each of twelve states that volunteered to collect additional data to give state level results, in addition to eleven hundred prison inmates (from state and federal prisons). Each participant spent about an hour answering demographic questions and completing a literacy booklet of tasks in prose, document, and quantitative literacy. The survey was done between January and August 1992 by household interviews. Subjects were paid \$20.

NALS used eighty new field-tested assessment tasks plus eighty-five from prior surveys done in 1985 and 1989. The 165 tasks were put in sections each taking fifteen minutes, and then into booklets taking about forty-five minutes each. Each subject completed one booklet. Subjects answered demographic questions for about twenty minutes in English or Spanish on topics such as personal background, including language, education, work experience, income and activities such as television, reading, and voting (Kirsch et al., 1993, p. 7).

Results overall show that between 40 and 50% of subjects are at the two lowest levels of literacy (Levels 1 and 2) on all three scales (prose, document and quantitative). Results vary by age, gender, race, income level, and so forth. Approximately 20% of the sample is at the two highest levels in the survey, on all scales. The number of subjects who speak English as a second language is a key issue, as is the educational level of subjects. Table 1 summarizes the results. Levels 1 and 2 are at the low end of the scale; those at the high end have the strongest literacy skills according to this test.

**Table 1.** Percentages at Each Literacy Level (Kirsch et al., 1993, p. 17)

Level	Prose	Document	Quantitative
1	21	23	22
2	27	28	25
3	32	31	31
4	17	15	17
5	3	3	4

The second national study, the National Assessment of Adult Literacy (NAAL) was done to follow up on the findings of NALS in 1993 to see what changes had occurred in the ten years following the first study. This study used some of the same questions as in 1993 study along with some newly constructed and tested items to see the literacy skill levels of adults in the US. To conduct the study, a survey was taken of a sample of 19,714 adults ages sixteen and older in households and prisons. The samples represent the respective populations as a whole. No state samples were taken. Materials to be read were in English only (US Department of Education, 2006, p. 18). Subjects were permitted to use a calculator in this survey (not in 1993). Each subject completed one booklet containing seven screening tasks and then three blocks of tasks. Each subject also completed background questions in writing, or orally in Spanish or English, providing demographic data. The survey was done from May 2003 to February 2004 in

households and from March 2004 through July 2004 in prisons; results were presented in a written report published in 2006.

Several changes were made from the 1993 survey to improve the study. First, a set of screening tasks was used to determine which booklet a particular subject would get for the survey. Second, procedures were changed to increase the number of Spanish speakers, with the initial interview conducted in either English or Spanish. Third, “[a] nonresponse bias adjustment was performed to reduce the bias due to respondent refusal” (p. 18). Finally, the scores from 1992 were re-analyzed and adjusted to reflect four levels (below basic, basic, intermediate, and proficient) of literacy so that the results from 1992 and 2003 could be compared fairly (p. 2). One hundred and fifty-two total tasks were used, including 65 from 1993 NALS and 87 new ones. The survey was conducted through household interviews with sample participants and prison interviews with those in prison. Results show some key changes from 1992 to 2003, as noted in the report:

The percentage of adults (people age 16 or older living in households or prisons) with Below Basic document literacy decreased 2 percentage points between 1992 and 2003 and the percentage of adults with Below Basic quantitative literacy decreased by 4 percentage points. The percentage of adults with Basic literacy did not change significantly between 1992 and 2003 on any of the three scales. The percentage of adults with Intermediate document literacy increased by 4 percentage points and the percentage of adults with intermediate quantitative literacy increased by 3 percentage points. The percentage of adults with Proficient prose and document literacy decreased 2 percentage points between 1992 and 2003. (US Department of Education, 2006, p. 4)

Proficient levels of prose and document literacy both declined, and are respectively 15 and 13 percent as shown in Table 2 that includes the rescaled results from 1992 and the results from 2003.

**Table 2.** Percentages at Each Level with 1992 Scores Rescaled  
(US Department of Education, 2006, p. 4)

<b>1992</b>			
	<b>Prose</b>	<b>Document</b>	<b>Quantitative</b>
Below Basic	14	14	26
Basic	28	22	32
Intermediate	43	49	30
Proficient	15	15	13

  

<b>2003</b>			
	<b>Prose</b>	<b>Document</b>	<b>Quantitative</b>
Below Basic	14	12	22
Basic	29	22	33
Intermediate	44	53	33
Proficient	13	13	13

While a decline of two percentage points in the overall scores may not seem very large, it is important to note that these declines are statistically significant according to the report (p. 4). Thus, these changes reflect declines that warrant close attention.

Taken together, NALS and NAAL give some sense of what is happening to some kinds of adult literacy in the United States. Because demographic data was collected on all subjects and because the non-respondent bias adjustment was included, the findings appear valid and reliable. Both full reports present the findings on subjects sorted by such groupings as gender, age, race/ethnicity, educational achievement, and so forth. There are a number of critical issues to be raised, however, about these findings. First, there is the matter of the kinds of tasks involved in the study. All the tasks given to subjects entailed printed material; no online reading of websites was included. None involved sustained reading of non-fiction prose or fiction (such as a novel or other kind of book-length text).

In addition, I have noted elsewhere (Horning, 2007) that,

George Demetron, director of basic literacy programming for the Literacy Volunteers of Greater Hartford, who has been working in the area of adult literacy since 1987, has reviewed the issues relevant to literacy and illiteracy from a community perspective. In *Conflicting Paradigms in Adult Literacy Education* he explores the political implications of various aspects of adult literacy, adult basic education and second language learning. In this context, he claims that literacy is ‘a metaphor for knowledge that includes the skills of reading and writing, but is defined by the symbols and sign systems operative in a given sociocultural setting’ (2005, p. 267). Reviewing the development of standards for adult literacy, Demetron describes the widespread disagreement and difficulties over the definition and setting of standards for adult literacy programs. (p. 130)

The definition used by both NALS and NAAL is essentially the same and has a key limitation. The US surveys (and the similar international studies to be discussed next) define literacy as being able to locate (find by matching), cycle (match at multiple points), integrate (compare and contrast at multiple points), and generate (write based on information processing, inferences and background knowledge), using both reading and writing skills. The definition is designed with printed texts in mind and does not address visual literacy skills in our increasingly digital and visually-based world of texts. Is it fair or appropriate to assume that just because prose and document literacy as measured in these surveys has declined significantly, that visual or digital abilities have also declined? These skills have not been measured at all in these surveys. Consequently, a note of serious caution is in order.

### **International Studies of Adults and Young People Nearing the End of School**

Following the general plan of the US studies of literacy in the adult population at large, the Organisation for Economic Co-operation and Development (OECD), a group of the thirty countries that produce half of the world’s GDP did a similar investigation. Then, a subgroup, the Programme for International Student Assessment (PISA), has looked at the literacy levels of fifteen-year old students in a survey done every three years since 2000 as well. The resulting reports of the International Adult Literacy Survey (IALS) and PISA provide a comparison picture of prose and document literacy in these most advanced countries in the world. Turning first to the OECD report, released in various reports in 1997 and 1998 (OECD, 1997; Murray, Kirsch, & Jenkins, 1998), the goal was to make observations about the connection of literacy to economic success, about the levels of literacy skills at the lower levels and overall in different countries.

There were three rounds of data collection, only two of which have been reported publicly thus far. The initial study was of adults 16-65 in Canada, France, Germany, the Netherlands, Poland, Sweden, Switzerland, and the US. France later dropped out and Ireland joined, so there are results for eight countries (Murray et al., 1998). *Literacy Skills* (OECD, 1997) reports results for twelve countries: Australia, Belgium, Canada, Germany, Ireland, the Netherlands, New Zealand, Poland, Sweden, Switzerland, the UK (Great Britain and Northern Ireland), and the United States. The surveys were conducted following the same essential procedures described for NALS and NAAL. Care was taken with both translation of materials from one language to another and with validation of scoring procedures. The tasks in prose and document literacy were defined in the same way as the tasks in NALS and NAAL in the United States surveys: locating, integrating and generating in prose literacy tasks and those three plus cycling (OECD, 1997, pp. 111, 117) for document literacy.

The overall results show that other than Sweden, no country has more than 22% of its population at Levels 4 and 5 in prose literacy, and no country other than Sweden has more than 25% of its population at Levels 4 and 5 in document literacy. For the US, scores are at 21.1% for Levels 4 and 5 in prose and 19% in document literacy (OECD, 1997, p. 151). These are cumulative results for adults age 16-65. The report goes on to correlate results by age, education level, parent education, socio-economic status, gender, income, employment, race, volunteer activity, literacy activities at home and at work (book reading, letter writing, etc.), and participation in continuing education at work or elsewhere (OECD, 1997, pp. 151-191).

There are eight key findings from the original study (OECD, 1997):

1. There are major differences within and across countries in literacy;
2. Literacy is connected to overall economic well-being;
3. Quantitative literacy has the strongest connection to income;
4. Literacy and occupation are related—some need more than others;
5. Literacy and educational achievement are not perfectly related, such that the data show some people have high educational attainment and low literacy levels and others have low educational attainment but high literacy levels;
6. Low literacy skills are common and adult education typically does not reach those with low skills;
7. Low skill adults do not think their lack of skill is a problem as they do not need the skills at work;
8. Finally, the data show that literacy is like exercise—adults need to keep working at it to improve. (pp.17-18)

Further, the *Literacy Skills* report (OECD, 1997, pp. 18-19) shows first that literacy and wages are connected almost everywhere, but that educational achievement (how much school) is not a reliable measure. It is important to keep in mind here that not all jobs draw on educational experience in the same ways. A second point is that literacy makes a bigger difference economically in more open societies such as Canada and the US. Third, while literacy can be improved in lower class groups, this outcome has not been achieved consistently in all countries.

In addition to the OECD study of adults, the Programme for International Student Assessment, a subgroup of OECD, examined the literacy status of high school students (age 15) to answer the question: How well are 15-year olds “prepared to meet the challenges of today’s knowledge societies?” (OECD, PISA, 2004, p. 20). This group uses the following as its definition of reading and literacy: “...the capacity of students to apply knowledge and skills and to analyze, reason and communicate effectively as they pose, solve and interpret problems in a

variety of situations” (p. 23). The PISA study specifically sees literacy as a continuum, not all or nothing, and its acquisition “is a lifelong process” (p. 23). Reading, then, is “the capacity to understand, use and reflect on written texts in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate in society” (p. 26). Finally, “[m]uch more than decoding and literal comprehension, reading involves understanding and reflection, and the ability to use reading to fulfill one’s goals in life” (p. 26).

The PISA study is done every three years, so most recently in 2006. In 2003, the research was conducted in forty-one countries, including all thirty OECD countries and eleven others (p. 21). It excludes students not in some kind of school. However, it includes over a quarter million students “representing 23 million 15-year olds in the schools of the forty-one participating countries” (p. 24) using scientific sampling methods (p. 24). These students represent countries that produce most of the world’s gross domestic product. Thus, the PISA study surveys the literacy levels of a large sample of students in the most developed countries on the planet.

Students who complete the PISA assessment provide data relevant to their “subject-specific knowledge [and] cross curricular competencies... [including] problem-solving abilities” (OECD, PISA, 2004, p. 24). The tasks involved units of questions based on a passage or graphic, generally focused on real-world problems. Samples of the tasks can be found at the study’s website at [www.pisa.oecd.org](http://www.pisa.oecd.org) (see full results document on right side of site homepage, p. 276). In terms of content, students were given continuous kinds of prose, including narration, argumentation, and non-continuous texts like graphs and forms. They were asked to perform tasks that entailed retrieval, interpretation, reflection, and evaluation. The study did not examine basic reading skills since the goal in PISA was not to look at learning to read. The texts used included private letters, public materials like government documents, and work related reports or school textbook reading. It should be clear that the PISA report presents a broad picture of student reading abilities with brief passages of prose.

The procedure by which the data was collected was through two hours of paper and pencil testing, including both multiple-choice and open-ended questions (p. 24). Students also completed a questionnaire (thirty minutes) on background, learning habits, learning environment, engagement, and motivation. Principals in schools where students completed the PISA survey did a questionnaire on demographics and learning environment. The tests were scored using a holistic method for the open-ended answers with multiple raters and a separate sample scored by independent expert readers for consistency (p. 25).

The PISA study reports results at five levels of proficiency (p. 273). Each level assumes proficiency at tasks at the levels below. Only about a third (36%) of students in all the OECD countries reach Levels 4 and 5 (p. 274). As the report’s writers point out, “[g]iven that high average performance at age 15 is predictive of a highly skilled future workforce, countries with high average performance will have a considerable economic and social advantage” (p. 280). American students perform around the OECD average, and showed no change from 2000 to 2003, not a particularly good sign. Overall 8% of students in the whole assessment achieved the highest level of proficiency in reading (p. 298). And at the other end of the scale, overall, 19% of students are below or at Level 1, the lowest levels of performance (p. 298). As with other measures of reading ability among students and adults, the overall reading ability in the population at large in the US and elsewhere is not as strong as it could be or should be.

The results of PISA 2006 (OECD, 2007), when the survey focused on science abilities of students, shows that reading abilities remained flat on average across all countries in the study, despite the fact that many countries spent more money on reading (p. 48). Only 8.6% of students

were proficient at the highest level of literacy on the 2006 survey (p. 46). In virtually all countries, the vast majority of students (73%) were able to perform at Level 2 or above (p. 49). The overall picture does not reveal a strong or increasing level of reading ability for all students in all countries in this survey. It should be clear that most students near the end of their public school experience are not fully proficient readers as measured by this kind of survey. There is clearly a great deal of work to be done to help students in the US and elsewhere become strong readers of extended prose texts.

The last of the international studies to be reported here is a newer survey of adult literacy skills that included some different measures in addition to prose and document literacy. In *Learning a Living: First Results of the Adult Literacy and Life Skills Survey* (hereafter ALL, 2005), the OECD undertook a survey of seven countries in terms of prose and document literacy plus numeracy and problem-solving skills. The numeracy measure entails mathematical abilities more broadly defined than the earlier quantitative literacy, and the problem-solving measure brings in a whole new area not previously studied in any of these large-scale surveys. The ALL study had four major goals: to (1) show adult skill gain and loss; (2) offer a comparison of numeracy skills among adults in the countries studied; (3) compare problem-solving skills among adults in the countries studied; and (4) explore, through a background questionnaire, the skills adults have and how they play out in life, and to collect information by indirect measures on ICT skills (*Learning*, 2005, pp. 25-26). Seven countries (Bermuda, Canada, Italy, Norway, Nuevo Leon state of Mexico, Switzerland, and the US) participated by surveying representative samples of their populations of adults, ages 16-65. There were a few variations in the conduct of the survey. For example, Mexico used the IALS materials rather than the new materials, and the US and Switzerland did not administer the problem-solving section of the survey at all.

In most of the participating countries, then, four domains were tested: prose, document, numeracy, and problem-solving. Numeracy expands the quantitative literacy measure used in IALS (quantitative literacy was mostly about arithmetic operations, such as balancing a check book or determining loan interest (OECD, 1997, p. 14). Prose and document literacy were defined in the same ways as in NALS and the other more recent studies. By contrast, numeracy is defined this way in ALL:

Numerate behaviour is observed when people manage a situation or solve a problem in a real context; it involves responding to information about mathematical ideas that may be represented in a range of ways; it requires the activation of a range of enabling knowledge, factors and processes. (*Learning*, 2005, p. 293)

Problem-solving was a second new element in ALL not included in prior studies. It is defined as a series of stages: “define the goal; analyze the given situation and construct a mental representation; devise a strategy and plan the steps to be taken; execute the plan, including control and—if necessary—modification of the strategy; evaluate the result” (*Learning*, 2005, p. 304). A typical task on the survey entailed planning a one-day family reunion.

Finally, the measure of ICT skills was a last new feature of the ALL research. This measure was carried out through a background survey that included questions on a Likert scale concerning usefulness and attitude toward computers, questions on type and amount of computer use (for email, news, online banking and shopping, games, etc.), and questions on frequency of computer use for various purposes like word processing or searching (pp. 186-87). The procedure used for data collection was a bit different in the ALL survey than in prior work. The report describes the revised approach:

The respondents were first asked a series of questions to obtain background and demographic information on educational attainment, literacy practices at home and at work, labour force information, information communications technology uses, adult education participation and literacy self-assessment.

Once a background questionnaire had been completed, the interviewer presented a booklet containing six simple tasks (Core task). Respondents who passed the Core tasks were given a much larger variety of tasks, drawn from a pool of items groups into blocks, [sic] each booklet contained 2 blocks which represented about 45 items. No time limit was imposed on respondents, and they were urged to try each item in their booklet. Respondents were given a maximum leeway to demonstrate their skill levels, even if their measured skills were minimal (*Learning*, 2005, p. 321).

All countries did all four domains except Mexico, Italian-speaking Switzerland, and the US. In Mexico, the instrument used was the IALS survey, not ALL, but the ALL background questions were used (p. 316). Italian-speaking Switzerland and the US did not administer the problem-solving section of ALL (p. 316) as noted previously. The ALL results for the US include these findings in prose literacy:

At Level 3 on the prose scale, persons can make low-level text-based inferences by locating several pieces of information from a few to a number of different sentences or paragraphs, and integrating or contrasting information across sections of text that contain few to several distractors. This level is deemed as a minimum for persons to understand and use information contained in the increasingly difficulty texts and tasks that characterize the emerging knowledge society and information economy. ... [J]ust under 50 per cent of persons in...the United States [reach this level] (*Learning*, 2005, p. 35).

In document literacy, the results are similar to those on prose literacy, i.e., about 50% of the population is at Level 3 or above (p. 38). The report of this most recent survey compares IALS and ALL results (surveys taken in 1994 and 2003 respectively) and shows this outcome:

The United States has also reduced the percentage of adults at Level 1 on the document scale (-3.4 percent); [sic] but there is also a marked reduction in the proportion at document Level 4/5 (-5.0 per cent). The net result is an increase of persons at Level 2 (7.5 per cent). The pattern is similar on the prose scale but with an even sharper reduction at Level 4/5 (-9.1 per cent) as well as a larger increase at Level 2 (+8.1 per cent). Therefore, on the prose scale, it appears that there is a small improvement among low-skilled adults only, and a comparatively high decline among high skilled adults. The result is a lower proportion (-7.3 per cent) of adults with medium to high skills (Levels 3 and 4/5) on the prose scale (*Learning*, 2005, p. 41).

On the whole then, these national and international surveys, limited though they are, do not present a picture of a nation that is improving the numbers of people who have the highest level of prose and document literacy skills. Moreover, because all of these different surveys follow the same essential methodology, a reminder of the nature of the materials being used and the skills being tested is in order. The exercises in these studies in the US and around the world entail subjects reading brief passages of prose or looking at documents and answering questions. While the tasks call for finding, using and sometimes evaluating information in these materials, they do not ask readers to follow a sustained argument or character development in extended

text, to compare two arguments, or to analyze, synthesize and evaluate materials from different sources. In short, none of these measures ask readers to perform at the top levels of Bloom's taxonomy of cognitive skills (even those revised by Anderson and Krathwohl, and their contributors, 2001). And none of these tests addresses subjects' abilities to work with online materials at any level of skill. In an increasingly digital world, we know remarkably little about the online literacy abilities of students or the population at large.

### **Studies of College Students in the United States**

The studies reviewed thus far provide a broad picture of adult literacy in the United States and around the world, with the limitations noted in the preceding paragraph. They also give a picture of students nearing the end of public school around the world. The picture that emerges from these surveys of adult reading ability on limited passages of printed prose texts and documents reveals that a majority of students and adults lack the reading skills needed to succeed and participate fully in society. Of particular interest to those teaching in post-secondary institutions is the status of students' abilities when they enter and when they leave two-year or four-year colleges and universities. Two studies address college student abilities and provide a similar picture of limited reading ability. These studies suffer from the same limitations noted in the national and international surveys, namely, their focus on brief passages of non-fiction prose with no attention to extended reading on paper or any kind of reading of digital materials.

The first of these reports is a study done by the American College Testing (ACT) organization, which is the purveyor of the ACT test used for college admissions and placement purposes by many schools and colleges in the US. The ACT organization did a study of reading abilities using the thirty-five minute multiple choice test that comprises the reading portion of the ACT (ACT, 2006). The ACT researchers set about to try to learn what student performance on the reading portion of the test would reveal about student success in college. They examined reading test scores and college performance and success for 563,000 students who took the ACT test over three years, fall 2003 through spring 2005. The study used the seven forms of the ACT reading section administered as part of the regular ACT exam. The detailed description of the test itself as provided by the organization appears at <http://www.actstudent.org/testprep/descriptions/readdescript.html>. This material describes the test as:

A 40-question, 35-minute test that measures your reading comprehension. You're asked to read four passages and answer questions that show your understanding of:

- what is directly stated
- statements with implied meanings

Specifically, questions will ask you to use referring and reasoning skills to:

- determine main ideas
- locate and interpret significant details
- understand sequences of events
- make comparisons
- comprehend cause-effect relationships
- determine the meaning of context-dependent words, phrases, and statements
- draw generalizations
- analyze the author's or narrator's voice and method

The test comprises four prose passages that are representative of the level and kind of reading required in first-year college courses; passages on topics in social studies, natural sciences, prose fiction, and the humanities are included. Each passage is accompanied by a set of multiple-choice test questions. These questions do not test the rote recall of facts from outside the passage, isolated vocabulary items, or rules of formal logic. Instead, the test focuses on the complementary and supportive skills that readers must use in studying written materials across a range of subject areas (American College Testing, 2006).

Although the ACT reading test does a little better at testing students' ability to go beyond getting meaning from print to the higher level skills that are essential to success in college, this instrument still does not look at extended reading of printed texts or any online reading ability.

Moreover, even this limited test shows the weaknesses of student reading abilities and their clear relationship to college success. Of 563,000 students, only 51% attain the ACT benchmark score of 21 and were deemed ready for the kind of reading required in college. Above and below the benchmark, students showed similar performance on comprehension (both literal and inferential) and textual elements (main idea, details, relationships, vocabulary, and generalizations) but in terms of text complexity, that is, dealing with more challenging and complex texts in terms of relationships, richness, structure, style, vocabulary and purpose (RSVP), proficiency in understanding complex texts most clearly distinguishes those ready for college (i.e., those with test scores of 21 and higher) from those not ready (ACT, 2006, p. 16). The study finds these results to be consistent across genders, race/ethnicity, and income levels (p. 16).

The text elements that ACT measures deserve a careful examination, since most scholars would probably agree that they are consistent with the national and international surveys' definitions of proficient literacy. Students with lower ACT scores show weaknesses in understanding and being able to work with these key features of complex texts identified by the ACT test writers:

**Relationships:** Interactions among ideas or characters in the text are subtle, involved or deeply embedded.

**Richness:** The text possesses a sizable amount of highly sophisticated information conveyed through data or literary devices.

**Structure:** The text is organized in ways that are elaborate and sometimes unconventional.

**Style:** The author's tone and use of language are often intricate.

**Vocabulary:** The author's choice of words is demanding and highly context dependent.

**Purpose:** The author's intent in writing the text is implicit and sometimes ambiguous (ACT, 2006, p. 17).

These features are ones that skilled readers must be able to handle if they are to work well with printed material, whether it appears in published books, magazines, journals, newspapers and so on, or whether it appears on a website or in some other electronic form. These are the features that half the population of the nation at large cannot comprehend effectively, as measured by the adult literacy surveys. Despite its weaknesses, the ACT findings show that

many students do not have the reading skills needed to be successful in college or in their lives, in their work, or as citizens.

One further key weakness of the ACT study must be kept in mind, its failure to examine reading in a digital format. Students and all citizens need reading skills that incorporate new technologies because they are essential to reading in all venues. However, to build digital literacy, students and citizens both must have the essential skills described by the ACT researchers. This point has been made clearly by University of Connecticut reading scholar Donald Leu and his colleagues, who show that the new digital literacies require foundational reading skills:

It is essential, however, to keep in mind that the new literacies... almost always build on foundational literacies rather than replace them. Foundational literacies include those traditional elements of literacy that have defined almost all our previous efforts in both research and practice. These include skill sets such as phonemic awareness, word recognition, decoding knowledge, vocabulary knowledge, comprehension, inferential reasoning, the writing process, spelling, response to literature, and others required for the literacies of the book and other printed material. Foundational literacies ... will become even more essential because reading and writing become more important in an information age (Leu, Kinzer, Coiro, & Cammack, 2004, pp. 1590-1591).

Leu's colleague, Coiro and her colleagues (part of the New Literacies Research Team at the University of Connecticut, including Leu) point out that while literacy is in an essential and on-going state of flux in the face of new technologies, both print and digital literacy must be considered together from a number of different perspectives to get a complete picture of contemporary literacy (Coiro, Knobel, Lankshear, & Leu, 2008, pp. 1-21).

Not only does ACT's testing strategy need careful attention, its definition of success also warrants a close look. The ACT researchers found that those with scores of 21 or higher are more likely to achieve an overall GPA of 2.0 or higher, to be successful in reading intensive courses like history or psychology, and to return for a second year. These outcomes constitute success according to ACT, and only half of the students in the group studied earned the benchmark score and were successful by this definition. Since half of students who enter college in the US do not graduate (US Department of Education, 2005), it seems likely that there may be some relationship between weak reading ability and success. The ACT study thus gives a picture of the status of students coming to college, and like the national and international surveys, the picture of reading ability it provides is not as strong as it could be or should be.

Yet another recent study, conducted by the Pew Charitable Trusts on college students' literacy levels in 2003, shows that college students' reading abilities do not improve much over the course of their time in college. The Pew study used the methodology of the NALS, NAAL, and IALS surveys, and for the purposes of measuring prose and document literacy, the same approach as the ALL study as well. The Pew organization is a charitable foundation that works to improve public policy through research partnerships according to its website (Pew, 2008).

The researchers who conducted the Pew study set about to learn "how prepared these students are to continue to learn and use the skills that they will need in the years to come..." as well as "the relationship among educational experience, literacy and preparedness for the job market" (Pew, 2006, p. 4). To explore this question, they conducted a survey of "1827 graduating students at 80 randomly selected 2-year and 4-year colleges and universities (68 public and 12 private) from across the United States" (p. 4). The survey was conducted by

stratified random sample in two stages—first to choose institutions and then to choose students (p. 66).

The survey made use of the same instruments as were used in the NAAL survey of the population at large in 2003, and followed the same procedure as NAAL as well, except for a small change to the preliminary part of the survey. Student participants were asked background questions that included demographic information more pertinent to college student experience: “educational and language background, previous educational experience, career plans and current college experiences” (Pew, 2006, p. 5).

As I have reported elsewhere (Horning, 2007), the full results show that while college students generally have higher literacy levels than the population at large, they are still not as skilled in prose, document and quantitative literacy as they could be or should be (pp. 20-21). In particular, fewer than half of college students and much fewer than half of the population at large attain scores at the “proficient” level on any of the three dimensions of literacy according to both the Pew and the national assessments (p. 19). Moreover, the Pew study was designed to help colleges and universities, but also looks at the preparedness for the workforce. All of these studies look at aspects of literacy that are not only essential to performance in college, but also to performance on the job, so there are economic and employment reasons as well as educational reasons to be concerned about the overall findings.

Taken together, the ACT and Pew studies do not paint a positive picture of student literacy skills or of the impact of college on the development of literacy in the United States. The ACT has found that half the students entering college do not have the skills they need to be successful (even using a very limited definition of success) while there, and the Pew work shows that fewer than half of students at the end of college reach the highest levels of literacy measured by the instruments used. Because the Pew study used the same instruments and approach as the NAAL and NALS and IALS before it, it suffers from the same flaws as those studies. The levels of literacy measured are based on readings of brief passages of non-fiction prose and reveal nothing of deeper reading ability with extended passages, with fiction and other types of writing, or with digital texts and documents of various kinds.

## **CATEGORY 2: SELF-REPORT DATA FROM THE US STUDIES (NEA AND NSSE)**

Studies relying on self-report data, publishing company statistics, and a variety of other resources to be discussed next, can shed some light on the matter of the reading of extended texts and on the levels of activity online. Though these studies rely primarily on self-report data and statistics from publishers and a variety of other sources, they do nonetheless provide some sense of what is happening with reading-related activity in the US. The two major studies of this kind that draw on surveys of samples of the entire US population were conducted by the National Endowment for the Arts in 2004 and 2007. The titles alone give a clear indication of the overall findings: the 2004 report is called *Reading at Risk*, and the 2007 report is called *To Read or Not to Read*. Both studies show significant declines in all kinds of reading among teens, college students, and adults. The NEA claims that these declines have important national implications in that the loss of reading activity and ability relates to overall participation in society, attendance at cultural and sporting events, levels of volunteer work, salaries, and participation in voting (US National, 2007, pp. 18-20). Because these two studies were done in different ways and capture

different aspects of the issues under discussion here, they will be discussed separately in chronological order.

Beginning then with the 2004 NEA study, the reading findings were gathered in the course of an investigation of the levels of participation in the arts and related activities. The study reports findings from a survey of a stratified sample of 17,135 respondents ages 18 and older in August 2002 drawn from 60,000 households surveyed by the US Census Bureau in the Current Population Survey (US National, 2004, p. 33). The Survey of Public Participation in the Arts includes questions on literary participation: books read (not for work or school), novels or short stories, plays, poems, or listening to a reading of novels, books, or poetry. The survey also asks about whether respondents do any creative writing that leads to publication, whether they take classes in creative writing, or whether they have engaged in these activities in the past year. A final set of questions of interest deal with the use of the Internet to learn about, read, or discuss literature (p. 1). The survey was conducted by telephone interview with a response rate of 70% (p. 1), relying entirely on respondents' self-report data.

There are ten key findings that are consistent with the direct measures of reading ability reported above. The trends overall, based on comparisons with surveys conducted in the 1980s and early 1990s, show drops in literary reading and in total book reading across both genders, all racial groups, all educational levels, and all age groups. The declines are most substantial among the 18-24 year old group. Relying on self-report data, the NEA study notes that declines in reading correlate with increasing electronic activity, including all media, the Internet, TV, and spending on electronic materials (hardware and software); at the same time book buying declined (p. xii). Thus, self-report data show that people are spending less time reading, doing less reading of extended texts; this information helps to explain why reading skills are not improving. If people do not read, they cannot develop or improve their skills.

The NEA study in 2007, called *To Read or Not to Read* draws on a larger body of data to report similar findings (US National, 2007). In this study, the NEA set out to investigate the current trends in reading behavior in America and the implications of those trends for both literature and the arts in general and also for civic, social, cultural, and economic life. Here again, the findings are consistent with those direct measures of reading ability in NALS, NAAL and the Pew study of college students. This report is a type of meta-analysis, as it draws on both the earlier NEA work and NAAL, along with various school studies such as the National Assessment of Educational Progress, studies of college student reading and writing, work by the College Entrance Exam Board, and data from the book publishing industry as well as the Bureau of Labor Statistics (US National, 2007). It relies chiefly on self-report data, though it does take some direct tests into account.

There are three major findings in the 2007 NEA study, the findings of which are consistent with the 2004 NEA study and all others reported here: First, Americans are reading less overall, especially teens and young adults; these groups are likely to engage in multi-tasking while reading, thereby making their reading less fully engaged. Second, Americans on the whole do not read as well now as in earlier times; those who are in school do not perform as well as previously. Finally, the declines in reading correlate with poor job performance, fewer career opportunities, and less participation in civic life (volunteer activities, voting, and cultural participation). In addition, weaker reading skills correlate with unemployment and imprisonment (US National, 2007, pp. 7-22). It seems clear that the overall trends in the self-report data as well as information from various other kinds of sources are consistent with the direct tests of reading ability. On the whole, reading activity and reading skill is declining in the US population at

large. There are serious implications in many aspects of life suggesting that the decline in reading must be addressed in a widespread and effective fashion.

A final body of self-report data comes from the National Survey of Student Engagement (NSSE). This survey asks college students about many aspects of their educational experience and their personal lives. It is administered to college students at a variety of institutions on paper or online and takes about fifteen minutes to do (*Experiences*, 2007, p. 11). The survey involves students' reports of their experiences and time spent on various types of activities related to their college enrollment. NSSE's goal, since 2000 when it began, has been to help colleges and universities improve undergraduate education. It is a well-regarded survey, created, tested, and administered by experts. NSSE gets an overall response rate of 36% (p. 11). The participants are first-year and senior students at twelve hundred four-year colleges and universities across the United States; altogether, over the eight years that NSSE has been done, more than a million students have responded to the survey, including 300,000 in 2007 alone (p. 13). The colleges and universities involved "generally mirror the national distribution of the 2005 Basic Carnegie Classifications" (p. 11), that is, they include all types of institutions from research universities to small four-year colleges.

While the NSSE findings contain many useful insights for anyone working in higher education, it is important to keep in mind that the results are based on self-report survey data from students. Thus, NSSE is similar to the NEA studies discussed previously, but quite different from NAAL, IALS, and ALL in that it does not entail direct testing of reading ability. However, it will be clear from the results on questions pertaining specifically to literacy activities such as reading, writing, and preparing for classes that students report spending less time and doing less work in these types of activities than they could or should to be successful in college. The NSSE findings are thus consistent with the findings of the direct tests and the NEA survey data as noted previously.

The 2007 Annual Report on NSSE, the most recent year for which data is available (*Experiences*, 2007), presents overall results that will not surprise most readers of this paper. NSSE reports that first-year students expected to spend more time preparing for class than relaxing or socializing, but the actual hours spent by full-time students is 13-14, "only about half what many faculty say is necessary to do well in their classes" (p. 13). The amount of time students spend preparing for class is about the same as it has been in all the time the NSSE has been done.

More specific results focus on reading and writing assignments, which shed some light on materials students are expected to read and tasks they are expected to complete. Student responses for 2007 are presented in Appendix A. The two columns of numbers at the right are the percentages of student response in each category from first-year students and from seniors. In terms of reading, the table shows that students are assigned a reasonable number of textbooks, books, and book-type course packs in their courses. Whether they actually read them or not is a separate matter. In terms of writing tasks, more than 75% of students report writing between 1 and 10 papers or reports of between 5-19 pages in length.

Additional findings address the amount of critical thinking required or expected in students' perceptions of their coursework. NSSE asks specifically about analysis, synthesis, evaluation, and application, the top levels of Bloom's taxonomy of cognitive skills. More than 60% of both first-year and senior students see their coursework as having either quite a bit or very much emphasis on these skills. Again, an emphasis on these matters as perceived by

students is a good sign, but whether students actually develop these abilities and can use them effectively is not being measured here.

Finally, there is the specific question of how much time students spend preparing for classes by reading, studying, writing, doing lab work, and so on. Using the well-established formula that students should be spending two hours outside of class for every hour in class, and assuming that full-time students have 12-16 hours per week of class time, their class preparation time should be 24-32 hours per week. Less than 20% of students report spending that much time preparing for their classes. This finding will not surprise faculty at any college or university nationwide.

The NSSE results overall are consistent with the direct measures. College students at both the beginning and end of their time in college are spending less time on reading than they should by their own reports. In particular, the students' reports are confirmed by the NSACS survey results, which show only about 30% of students reach the top two levels of prose and document literacy on a direct test of their abilities (Pew, 2006).

### **CATEGORY 3: ALTERNATIVE APPROACHES**

A different kind of self-report information about literacy appears in the work of literacy scholar Deborah Brandt, who conducted interviews with 80 mid-westerners reported in *Literacy in American Lives* (2001). While this study focused more directly on writing than on reading (2001, pp. 9, 12), Brandt examined literacy in the overall context of how people have lived, worked, played, and learned over time in the twentieth century, so both aspects of literacy appear in her study. She interviewed participants ranging in ages from 10 to 98 living in the area around Madison, Wisconsin; the respondents vary in terms of race, ethnicity, gender, language background, occupation, and so forth. They were interviewed for one to three hours in their homes or places of residence (nursing homes, for example, in some cases), and all the interviews were transcribed for analysis. Brandt used an oral history approach to the process, following a script that is presented in an appendix to her book (pp. 2008-2010). Her goal was to examine literacy learning, including both schoolwork and work outside of or beyond for school-based study, literacy development, including the uses of literacy across a person's whole lifetime, and literacy opportunity, including individuals' chances for learning and development in social and economic frameworks (pp. 6-7).

Brandt acknowledges various constraints on her findings, the most notable of which for the purposes of this analysis is that she did not "measure people's literacy skills against any kind of standard (although it notices, at times, how such measurements are made)" (p. 9). As mentioned above, she chose to focus mostly on writing, rather than reading, partly to address the absence of this kind of research on writing and partly because of the increasing need for and role of writing in contemporary life. In addition, she did not look specifically at any of her subjects' written work, trying to avoid the role of "teacher," and skipping the practical problems of asking for writing that no longer exists. Finally, she left out most personal information that people provided, to protect confidentiality and to avoid embarrassment for any subject. Volunteers were solicited through a variety of local settings and organizations and through her personal connections in the area around Madison.

Even though Brandt did not engage in direct measurement of people's literacy skills or examine measures of them from other sources, she comes to conclusions that are consistent with

the outcomes of direct measures of literacy skills and with the more formal self-report studies by NSSE and NEA. She notes that there is a direct connection of literacy to economic development and that in the current economic environment, literacy is “more vulnerable than ever before to the restless logics of capitalist competition” (p. 188). There is no sense in which present demands for speed, efficiency, profitability, and productivity support encourage or require widespread inclusion in literacy that makes economic gain possible (p. 189).

An illustration of this point appears in one case where, reflecting on an interviewee’s report of the use of reading of the newspaper to be informed about current events, Brandt notes that the subject thought of this reading as defining literacy and intelligence. Then she learned that newspapers are written at a sixth-grade level and re-assessed her judgment of what it meant to be smart and well-informed. Brandt (2001) comments that

this status was subject to harsh reinterpretation against scientific measurements of reading that emerged in America by mid-century: readability formulas and precise categories of skills developed by psychologists first to sort American soldiers and then later, to sort Cold War era students. These new bureaucratic definitions of literacy and learnedness eventually infiltrated the popular consciousness. (p. 193)

The result of these more formal measures, then as now, gives a sense of the decline of reading ability. These changing views of literacy are not the only way in which people’s views of literacy have declined over time. There is also the matter of sponsorship, one of Brandt’s key insights from her study. She defines sponsors of literacy this way:

Any agents local or distant, concrete or abstract, who enable, support, teach, and model, as well as recruit, regulate, suppress, or withhold, literacy—and gain advantage by it in some way. ... The concept of sponsors helps to explain, then, a range of human relationships and ideological pressures that turn up at the scenes of literacy learning—from benign sharing between adults and youths to euphemistic coercions in schools and workplaces, to the most notorious impositions and deprivations by church or state. (pp. 19-20)

Sponsors, then, can work positively or negatively. Their positive effects are reported often in the interviews Brandt conducted, but the negative impact also appears in her findings (p. 194). She suggests that educational institutions, in particular, consider ways to provide more and better support for literacy learning when economic conditions limit people’s options in many ways (p. 194).

There are four major implications from this work according to Brandt, and all of them lead to needs suggested by the meta-analysis and review of self-report studies presented previously in this paper. To summarize these implications briefly, Brandt begins by noting that literacy sponsorship has changed so that rather than coming mostly from education, religion, and local business, sponsorship comes from a wide variety of sources (p. 197). The by-product of this development in literacy, especially insofar as it occurs outside of schools, means that people must be more flexibly literate to deal with new forms of literacy in new and ever-changing environments, electronic and otherwise. A second implication of Brandt’s findings is that the role of home literacy, including in particular parents’ work as an exemplar of the role of literacy in people’s lives, is important in helping children understand why literacy is essential. While the impact of parents’ reading to children along with the presence of books and other reading

material at home has long been well understood, Brandt points out that this finding suggests that family literacy programs can draw more effectively on parents' own literacy to help children (pp. 199-200). She writes: "When we appreciate the connection between parental work and household literacy, we might better see why it is so urgent to make expanding education and employment opportunities (and not just bedtime story reading) a cornerstone of family literacy programs" (p. 200). Schools and workplaces can contribute to this goal by donating computer equipment as well as expanding access to literacy resources.

A third key implication arises from the force of change in society generally and in the technology of literacy specifically. New technologies have challenged reading and writing over the whole of the past century, as first radio and then television and now digital technologies have challenged the paper-based literacy of earlier times. The fundamental nature of literacy is different for parents than for children and for teachers than for students. Reading and writing on paper compete more and more with screens and different kinds of communication options—cell phones, social networking systems, and so forth, create more and faster changes to the nature of literacy. These changes have both positive and negative effects, as Brandt says: "...the twentieth century is a virtual junkyard of recessive and abandoned communication materials; the twenty-first century will be the same. The difficulties inherent in literacy learning and teaching under these unprecedented conditions should not be simplified" (p. 202). The pressure of constant change supports the observation presented earlier that we do not have a clear picture of where overall literacy skills are because the broad surveys do not examine the newer forms or venues of literacy learning and use.

Finally, Brandt calls attention to the fact that the economics of literacy (a motivation for a number of the studies reported above, notably those sponsored by the OECD) raise "crucial ethical and policy questions for public education" (p. 202). She points out that literacy arose early on through publicly-funded education; over the twentieth century, the levels of education attained, at least by white citizens in the United States, increased steadily. But there is a clear racial divide that has always been part of our history and continues to have a clear impact on the growth of ever-changing literacy needs and the demand for a more flexibly literate citizenry and workforce (pp. 203-206). To address this aspect of literacy, Brandt says "...the new economic order presents American literacy educators with a much bigger agenda than increasing the productivity of future workers. From all angles—policy to pedagogy—literacy needs to be addressed in a civil rights context" (p. 206). Doing so, she argues, is the way to increase literacy achievement. It would allow public schools to resume control over the development of literacy as a tool to build and support the broader democracy. And it would open up opportunities for effective sponsorship to support the development of literacy (p. 207).

## **Protocol Analyses**

In studies of reading, a different approach that has been taken is to examine what readers are thinking and doing as they move through a text, accessing this information by asking readers to speak aloud as they are reading. These protocol analyses (sometimes called verbal protocols or think-alouds) provide key insights into the nature of text processing by both skilled and novice readers. Concluding their review of research on cognitive strategies in the *APA Handbook of Educational Psychology*, reading researchers Pressley and Harris (2006) note the usefulness of protocol analysis as a research technique:

We note that one methodology has been more illuminating than any other with respect to the complex strategies used by the academically competent versus those who struggle with learning—verbal protocol analysis. ...This methodology allows documenting the use of conscious cognitive processing... [of] the complex orchestration of strategies by skilled learners and the less complete orchestration of processing by less skilled learners.

Such work is decidedly qualitative rather than experimental, and we note that far more qualitative research is needed to further our understandings of strategies and strategies instruction. (pp. 280-81)

Pressley has published extensively on the use of verbal protocols, so he is obviously in favor of them as a technique for investigating reading. In 2004, together with Katherine Hilden, he summarized the various techniques and issues in using this approach. Drawing on his own work and yet another publication to be discussed in detail below, with Peter Afflerbach (1995), Pressley and Hilden (2004) conclude that protocol analysis, particularly with adult expert readers, shows that they

Are massively active as they read. They are also massively aware, with their awareness affecting their processing of text. Such awareness is not cold cognition, with expert readers often evaluating the style of the text (e.g., deciding whether it was poorly or well written) and its content (e.g., whether or not points made are valid). (pp. 309-311)

In their summary of insights resulting from protocol analysis research, Pressley and Hilden list a wide array of processes consciously used by adult expert readers before, during, and after reading (pp. 310-311). These include such processes as previewing the text to plan reading and set goals or formulate a hypothesis about the content, skimming, reading aloud, noting key points, reacting to the content and evaluating it, and, finally, monitoring understanding, rereading, listing main ideas or information, summarizing, and reflecting. Because this summary captures insights from a substantial number of studies, these writers believe they have listed “just about all the conscious processes during reading, at least those that can be verbalized” (p. 312).

From this summary of prior work, Pressley and Hilden go on to raise some key methodological questions. The first of these has to do with whether protocol data should be collected concurrently with reading or retrospectively. They suggest that this decision be made based on the ability level of the subjects; more capable readers will provide better data concurrent with reading, while less adept readers will provide more valid data if the text is marked in some way to signal the need to report. In addition, protocols may lead readers to report just what they are thinking or to provide an analysis or interpretation of their mental activities. Pressley and Hilden suggest that readers be asked just to report what they are thinking, leaving analysis to the researcher after data collection is complete (p. 314).

Finally, Pressley and Hilden take up the matter of whether an investigator should inform subjects about the kind of data being sought, such as asking for main ideas or a summary. If the goal of a study is to capture natural reading, it is of course preferable not to cue the reader to a particular goal or focus. General instructions are the best option if this is the goal of the study (pp. 314-315). If a study is looking for how readers perform a particular kind of reading task (such as reading for main ideas), then it seems appropriate to tell readers that this is what they are going to be asked to do. In conjunction with this point, Pressley and Hilden go on to a detailed review of design issues, noting that verbal protocol analysis is a flexible strategy for

research, so the exact design of any study must be reported in detail with regard to such matters as the text(s) being read, the participants, the directions given, whether or not to cue the reader to a specific type of reading focus, and analytical strategies.

Given this description, it should be clear that protocol analyses constitute qualitative rather than quantitative research. They do not provide numerical data of the kind examined in the first section of this report, but do provide a more direct look at how readers interact with text than either the self-report data collected by surveys like the ones done by the NEA or the kind of oral history data collected by Brandt (2001), discussed in the previous section. Moreover, a detailed analysis of protocol analyses, such as that done by Pressley and Afflerbach (1995) clearly isolate the key characteristics of expert readers.

Pressley and Afflerbach (1995) examined 38 protocol analysis studies conducted from 1963 to 1993 done with adults and older adolescents, that is, generally the same population examined in the large-scale studies discussed first in this report, and summarized their findings in their theory of “constructively responsive reading” (p. 98). This theory has direct relevance for the teaching and learning of reading; it provides clear support for the need for both intensive and extensive work on reading to help novice readers become experts. Virtually all the studies examined the reading processes of good readers (p. 32). Pressley and Afflerbach make a point of saying repeatedly that their summary suggests that reading is linear, when it is *not*; and that it is highly interactive and recursive (pp. 30-31). As readers engage, they work at learning text content, monitoring and evaluating text, processing the text before, during and after actually reading it (p. 60). It is clear that good readers are flexible in their strategies, shifting approaches as the text unfolds (pp. 60, 75).

Drawing on their very detailed review of these 38 studies, Pressley and Afflerbach conclude that there are four signals suggesting that readers engage in constructive response in reading. These include the goal of getting overall meaning through specific activities, the occurrence of errors in prediction about the text leading to a need for revision of hypotheses about content, the deep and passionate engagement with the text, and the use of prior knowledge as an aid to comprehension and response. Not every reader shows these signals, just as not every reader uses all of the strategies and approaches found in the studies under review. However, it is clear that in general, good readers do use an array of active strategies in normal reading. Pressley and Afflerbach (1995) summarize their findings this way:

Constructively responsive reading has many of the characteristics of expert performance. There is definitely a lot of planning as part of reading, consistent with the observation that experts plan extensively before attempting cognitive operations. Although the individual reading processes are each carried out efficiently, constructively responsive reading is short-term capacity demanding, a type of reading requiring the ability to hold a great deal of information in consciousness at one time. Constructively responsive readers monitor their reading and characteristics of the text, with this monitoring undoubtedly contributing to their ability to take advantage of meaning construction opportunities afforded by text. (p. 110)

Given these insights, it is easy to see how Pressley and Afflerbach suggest ways for readers to develop and enhance their expertise. Furthermore, on the issue of development, the authors note that this kind of reading would naturally be difficult for beginning readers, but should be common among adult, experienced readers. They point out that children who have rich reading backgrounds and ample experience with print are more likely to become constructively

responsive readers (p. 111). In addition, though, experts become experts in part by engaging with challenging and demanding texts on a regular basis, an approach found by Bazerman (1988) in his study of physicists reading specialized articles as one of many examples (Pressley & Afflerbach, 1995, p. 112). In general, experts become experts by practicing in their area of expertise, no matter what it is. To achieve this outcome, students must be encouraged to read progressively more demanding materials of different types, for different purposes. Drill and practice on strategies to easy passages will not help students develop skill in constructively responsive reading (Pressley & Afflerbach, 1995, p. 112). Moreover, instruction to help students develop their abilities in reading must occur over the long term and across disciplines (pp. 112-114).

Pressley and Afflerbach end this very comprehensive review of protocol analysis in reading with four key claims about constructively responsive reading and with a set of important methodological insights about further protocol studies. In drawing together all of the findings of protocol studies, they note that the results are consistent with theoretical insights about text processing, including reader response, use of strategies through monitoring, use of both top-down and bottom-up processing of text, and the use of contextually-based, goal-driven inferences (p. 117). In drawing together the strengths and weaknesses of all the studies analyzed in the book, they see a need for much more rigor in the design and execution of protocol-based studies of reading. In particular, there is a need for more specific reporting of methods used with regard to subjects' backgrounds, texts used, directions, pre-study practice, scoring and analytical strategies, reliability, and reporting of results (pp. 120-124).

In addition, there are a number of other issues and problems with the data Pressley and Afflerbach found in the studies they reviewed. For example, there are issues with the validity of self-report data, with the choice and variation between concurrent and retrospective reporting of processing, with whether subjects report just what they are thinking as they move through a text or their interpretations of their text processing, and with the nature of the instructions given to readers, either requesting specific activities or providing more neutral guidance (pp. 127-133). Furthermore, there are problems in protocol analysis methodology with the situational context in which the reading is done, problems with comparisons between or among subjects who differ on one or more key characteristics (age, gender, ability, and the like), problems with drawing conclusions based on small studies of few subjects as opposed to larger populations, problems with transcriptions of protocols in terms of situation, problems with use of short texts as opposed to what happens in reading longer works such as full-length scholarly articles or books, and problems with the categorization of reader behavior (pp. 133-139). It should be clear that there is much work to be done to improve protocol analysis from a methodological point of view. However, these writers say that these issues are ones that can and should be addressed as research continues. Protocol analysis offers a viable approach to learning about what readers actually do when they read.

To see what has happened in protocol analysis research since 1995, a search of ERIC, LLBA, PsychInfo, and the MLA Bibliography was run, using the following search terms: 'protocol analysis or verbal protocol or think aloud and adult read\* not second language' as a strategy (the asterisk truncates the form 'read' to draw reader, readers, reading, and so forth). The years 2000-2009 were the search parameters. This search returned only one study, published by Jennifer Berne in the journal *Adult Basic Education* in 2004. Berne (2004) attempted to model and use think-aloud as an instructional tool with 14 community college students placed in a pre-college reading and writing course. Her analysis of complete data sets for eight of the students in

her study suggested that think-aloud was not immediately helpful to this group, but Berne suggests that it has potential to help students see how to monitor and develop their abilities to engage in text (pp. 169-171). In particular, she suggests that having students write out their thoughts as they read rather than speak them aloud may be more appropriate for struggling adult readers. Overall, Berne notes that there were a number of affective variables among her students that may have limited the potential usefulness of this technique such as having a history of failure and school difficulties (pp. 158, 169). While think-aloud has been successful as a research tool, Berne's experience suggests that it may also be useful in the classroom if students can apply the technique successfully.

Despite relatively limited use of protocol analysis for both research and teaching purposes, the technique provides key insights into what is happening to readers as they move through a text. Expert readers' deep engagement with a text and their active analysis, questioning, searching, summarizing, and connecting ideas support theories of reading presented in the research literature. Protocol studies also show clear differences between expert and novice readers. The findings point to the need for more intensive work with novices, using think-alouds as well as other approaches, to develop fuller engagement with texts. Protocol analysis also points to the need for more extensive reading, since expert readers become experts by virtue of their reading experiences with ever more challenging texts.

## CONCLUSIONS

This review of the many different approaches to the measuring and analysis of adult reading skills shows that the overall situation with respect to adult reading in the United States and around the world is not encouraging. Whether reading ability is measured by direct testing or through self-report data, results suggest that adults are reading less and reading less well. The most widespread kind of reading that people do now may well be reading on the screen, and most of the direct tests and self-report data do not report on this kind of reading. And no measure looked at here, whether direct test, self-report, or protocol analysis looks at the reading of book-length texts. Virtually no test examines whether readers can engage in the skills of critical literacy, such as comparing and contrasting two writers' positions on an issue or evaluating texts for accuracy, currency, relevancy, or bias. Clearly, as protocol analysts Pressley and Afflerbach (1995) suggest, much more research is needed.

Meanwhile, however, some goals are clear for college and adult readers. There are clear needs for intensive work on reading to improve readers' abilities to get meaning, to monitor their progress, strategies, and predictions, to engage with texts, and to evaluate content as they move through reading. If the goal is to have constructively responsive readers as proposed by Pressley and Afflerbach, instruction to develop these abilities is needed. Their further point that such instruction must take place over extended periods of time suggests that a move toward 'reading across the curriculum' would help to improve students' abilities. In addition, for all adults to become expert readers, there is a need for extensive work on reading as a companion to the intensive work. Not only do readers need to know the strategies and techniques for more fully engaged reading, but they must actually do real reading of increasingly challenging texts. Pressley and Afflerbach's findings with expert readers also support this point. Programs like community reading projects for adults, book groups, and other similar approaches move in this direction. Public institutions of various kinds like public libraries and state humanities councils,

the National Endowment for the Arts and other organizations can, and should be, sponsoring events and activities that support and encourage the further development of reading abilities among all adults. The NEA 2007 study and Brandt's (2001) work reveal the importance of reading in people's lives because it is the key to active citizenship, career success and satisfaction, and other elements of a satisfying adulthood. Intensive and extensive work on reading can help all adults become expert readers and citizens.

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**Appendix A.** Data from NSSE, 2007 (adapted from *Experiences*, 2007, p. 42)

<b>Number of assigned textbooks, books, or book-length packs of course readings</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
None	1	1
Between 1 and 4	22	28
Between 5 and 10	44	39
Between 11 and 20	24	20
More than 20	10	12
<b>Number of written papers or reports of 20 PAGES OR MORE</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
None	83	51
Between 1 and 4	13	41
Between 5 and 10	3	6
Between 11 and 20	1	2
More than 20	1	1
<b>Number of written papers or reports BETWEEN 5 AND 19 PAGES</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
None	15	9
Between 1 and 4	52	45
Between 5 and 10	24	31
Between 11 and 20	6	11
More than 20	1	4
<b>Number of written papers or reports of FEWER THAN 5 PAGES</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
None	3	7
Between 1 and 4	32	35
Between 5 and 10	34	28
Between 11 and 20	20	17
More than 20	11	14
<b>Coursework emphasized: ANALYZING the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
Very Little	2	2
Some	20	15
Quite a Bit	45	43
Very Much	32	40
<b>Coursework emphasized: SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
Very Little	5	4
Some	30	23
Quite a Bit	42	41
Very Much	24	33
<b>Coursework emphasized: MAKING JUDGMENTS about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
Very Little	6	5
Some	29	24
Quite a Bit	41	39
Very Much	24	31

<b>Coursework emphasized: APPLYING theories or concepts to practical problems or in new situations</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
Very Little	4	3
Some	23	18
Quite a Bit	40	38
Very Much	32	42
<b>Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)</b>	<b>% 1<sup>st</sup> Yr.</b>	<b>% Sr.</b>
0	0	0
1-5	17	18
6-10	27	26
11-15	22	19
16-20	16	15
21-25	9	9
26-30	5	5
More than 30	4	6