Functional Illiteracy:
Four observations on reading development and syntactic development

機能的非識字：
読解発達と統語発達に関する四つの観察

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要旨

　アメリカの市内高校では機能的非識字率が高い。国の昨年の発表によると、フィラデルフィアでは 90% 以上の非識字率を示している。このような場合、読解教育は悲惨なものと考えられる。しかし、読解教育と言語発達が関係していることは 1 世紀もの間知られている。単に読解の教科書がふさわしい読み物を載せていないだけなのだ。この 30 年以上もの間、教科書は悪くなる一方であり、ある高校の英語の授業の教科書では、文構造の複雑さが小学校 3 年生のレベルしかない。学校側や教師が読み物を評価できるような道具は存在している。これを使えば、生徒の能力に合った読み物を与えることができ、生徒の能力が最大限発達するようにしてやれる

のだ。

Introduction

San Antonio, Texas, is the eighth largest city in the USA, with a population that is approximately 62% of Hispanic heritage. San Antonio is unfortunately also known as the city with the 1st or 2nd highest rate of illiteracy. New Orleans, Louisiana, and San Antonio change positions from year to year in terms of the highest illiteracy percentage of their populations. In San Antonio, research at Trinity University has observed that whole neighborhoods have no reading materials in the home, either in English or in any language. This lack of reading ability is seen also in the schools in those areas of the city. Some of the schools average up to six years behind in reading competency. The situation can justly be called a disaster for those areas, as well as for San Antonio at large and the country as a whole.

One example of the low reading competency a few years ago was Escobar Middle School (that is, the 6th, 7th and 8th grades with students usually 11, 12, and 13 years old). Trinity University was asked to send its Teacher Corps Project to help raise the quality of education. The Project is a nationwide one that sends teams of university educators from different disciplines to help the development of teaching and administrative skills at the school.

According to the state's evaluation of student reading competency, the average reading level at the school as a whole was grade 1. While many students were reading at expected grade level, a far too high percentage was unable to read anything beyond the simplest sentences possible. These students were usually passed on to the next grade level and on to high school under a policy of "social promotion." As

could be predicted, these socially promoted students usually stayed in school only until the legal age (16) at which they could drop out of school and try to get a job.

The dropout rate nationwide reveals some startling statistics. In 1999, the national press reported that Cleveland's dropout rate was about 45%. That figure is close to an average for many large cities. San Antonio's dropout rate is reported by the mayor's office as about 50%. In addition, of those who graduate from high school only 50% go on to at least some college experience. The dropout figures can be seen in another way as well. Since some districts graduate almost 100% of their students, the overall percentage means that a few of the seventeen San Antonio school districts have a dropout rate of about 70%.

The policy of social promotion makes it difficult to evaluate actual reading competency in many cases. Although there are standardized tests, the results are often not made available on an individual basis. As a result, it is difficult to get statistics on functional literacy in San Antonio. "Functional literacy" refers to a level of reading competence at which the person can read and handle various city and governmental forms, employment contracts, guarantees, and the other documents encountered in adult life. The functional illiteracy rate for some American cities is available and may be found in the national press. One example occurred this past year when the press reported that the high schools in inner city schools in Philadelphia had a functional illiteracy rate of 94%. What may compound this educational disaster is that many of those who were illiterate may have dropped out of school before this statistic was final. The actual illiteracy rate of teenagers in the inner city there could be higher than 94%.

These statistics reflect a public education disaster of the highest

order. A very high percentage of students are prepared only for the most menial jobs and are not prepared to be fully participating citizens. This sort of educational disaster should be causing the population to raise their voices and demand accountability of the schools. Yet many if not most parents may not know this information. The information does not appear regularly in the news and, when it does, there is usually an accompanying statement from the educators that tries to explain away the problem. They point to alleged cultural bias in the test, or to lack of funding by the state, or to parent apathy, or so on. Yet there have been documented cases of "worse" situations in which learning occurred. As the famous Black economist and national columnist Walter Williams continually mentions in his columns, he was a youngster in inner city Philadelphia and he cannot remember a single other Black student at his school who could not read.

This comment of Williams leads toward the topic of this paper. Just as children learn the language or languages of their parent with ease in the early years, so also can youngsters learn to read with minimal difficulty when they are given even reasonably good instruction. Reading can be viewed in simplistic terms as transferring the already learned language ability in listening and talking to the same ability through the eyes and hands (writing). If the child can listen and can speak, the child can with rare exceptions read and write.

Many programs have been developed to help the situation of poor reading development. This article addresses itself to one particular area. But before moving to that specific topic, an example situation from the Escobar Middle School project is discussed.

One of the English reading teachers at Escobar had found the state-approved texts rather worthless for her students who were far behind in reading skills. She had tried supplementing the reading

development program with the Readers Digest's student edition. She let the students read whatever article they wished in order to encourage them to read more. One student reported that he wanted to stop his article soon, but she persuaded him to continue. He gave up soon thereafter. At this point in her report to me, I asked her to let me see the article. After spending a few minutes looking over the first two pages, I suggested that the student wanted to stop during the middle of the last paragraph of the first column on the first page and declined to go on in the first full paragraph on the second page. She reported that both observations were accurate. The demonstration was designed to show the teachers that there is an easy "rule-of-thumb" (that is, process that is simple to apply) to judge reading complexity and that they could apply it themselves and match the reading selection to the ability of the student. As we began looking at the reading complexity evaluation process, they thought the task would be difficult. By the end of the second session and some practice, they became confident in their ability to rather quickly judge — at least in gross terms — the reading difficulty of a selection.

Before some specifics in that Readers Digest article are given, this article moves on to Observation 2.

Observation 2

Research decades ago has shown us (Hoffer 1992a) the general pattern of language acquisition: the basics of phonology are generally acquired from ages 1 to 7 or 8, the basics of regular morphology involving the addition of inflectional morphemes are generally acquired from ages 2 to 7 or 8, and the basic 85-90% or so of syntax

is generally acquired from ages 1.5 to 7 or 8. The key point to be observed here is that the final 10-15% of syntax (that is, sentence construction and re-construction capabilities) is best learned within the next 4 to 5 years. A reading development point that has been ignored in the USA too often in the past few decades is that the reading material in school must address those last stages of the learning of syntax.

The explanation of the last point can be made as follows. The child will hear the full set of basic sounds needed to learn the phonology of his native language or languages and will learn them automatically. The child will hear all the basic morphology (plurals and past tenses and so on) in the first several years of growth and will learn them naturally. Basic syntax develops in the same way. The child will easily learn syntax ability if he encounters them at the right time during the developmental process. However, the examples of more complicated syntax which is needed to handle even reasonably difficult reading material are often not encountered. The appropriate examples of more complicated syntax are not used by the child's peers and are not found in the daily conversations around the house or school and are not heard on the television or radio. (Hoffer 1994) The question is: how can the child learn (in the sense of automatic language acquisition as opposed to learning as memory) if the child never encounters the more complicated constructions? Another question is: why is it that educators often do not know that the child needs to be exposed to these constructions in speech or writing at the appropriate stages of language development?

One reason for the lack of information is that adult speakers of English handle these constructions easily, so they do not realize their complication level. A few examples might include:

the appropriate use of who / who and whoever / whomever in

relative clauses;

preposition-based relative clauses as in this construction ...

to which I am referring and

about which I will say more later and

of which you have already heard too many examples; and

subjunctive-as in "If that were true" as different from "If that was true".

In addition to the lack of the more complicated syntactic constructions in the child's environment, the is the lack of "practice" — for want of a better term — in encountering and understanding sentences with four or five or more clauses. Such complicated sentences occur with regularity in the kind of documents mentioned above.

In their language developmental sequence in the normal situation, children learn to read and catch up in terms of reading to their own internalized syntactic level by grade 3 or 4 or so (age 8-9). They can continue learning syntax if they encounter the more complicated constructions in their reading. It is not necessary that the more complicated constructions be encountered through the ear. While many textbook series in the USA handle the first two or three years of reading development well, they do not do so well in the very years during which the reading texts are crucial to prepare the student for adult life. Thus, reading education needs to concentrate on these years and be sure that the reading material encountered in later elementary school and in middle school has enough examples so that the children acquire these syntactic capabilities in their basic language competence.

Here then is where a measure of syntactic complexity would be most useful to check progress. The measure needs to be one that can be mastered and applied in a reasonable time by teachers who are called upon to do all sorts of jobs in school and have little time and energy

to work on a complicated system.

The system for evaluating the complexity of a reading selection that has been devised at Trinity University (Hoffer 1992b) is an Index of Syntactic Complexity (ISC) that can be learned and applied at ever increasing levels of accuracy. The full form of ISC gets rather detailed and requires more time to master. However, the basic ISC, that is, the "rule-of-thumb" level, is not difficult to master for someone who has had even elementary training in English grammar. The level of that training is no more than would be expected in a college class for future reading teachers.

In general terms ISC consists of counting the number of clauses in a sentence, both dependent and independent. An average over a ten sentence span is calculated. Using this simple level of ISC to evaluate book series used in reading education reveals some interesting data. The following few paragraphs deal with an investigation of the old and a current reading series used in the USA and a somewhat old series used in Japan.

The first example comes from the McGuffey (1879) series of Eclectic Readers-first published in the 19th century and still in print and used in some private schools in the USA. The chart below shows the average gradation of ISC in the McGuffey series side by side with the same average in a current series (used by most schools in the San Antonio area).

The figures represent the average complexity level of ten consecutive sentences found near the end of each of the six readers. (The numbers listed are approximate, since various selections of ten sentences gave somewhat different results.) The important ISC figure is the higher mark at the end of each text, because it indicates that the complexity level of the book has slowly risen in a sequenced pattern to that final average.

Average ISC-final pages of text

	Current texts	McGuffey
Grade 1	0.4-0.6	1
Grade 2	1.0-1.1	1.8
Grade 3	1.4+	2.7+
Grade 4	1.8	3.8+
Grade 5	2.4+	4.5+
Grade 6	3.0	5.3+

The current series develop syntactic complexity at approximately 1/2 the McGuffey rate. The minimal competency of today's students, if they develop no further than given in the series, is 1/2 that of their grandparents, according to this chart. An eighth grade reading education that completed the 6th Reader of earlier days was at a far higher level than some of our current high school reading programs. The disturbing part is that many educators and alleged language experts see or claim to see little wrong with current programs and — especially relevant to this paper — see no connection between the growth in syntactic complexity of reading selections and the development of reading competence.

One reason for their lack of understanding is that there are current readers that are sequenced in complexity. However, the complexity to which they refer is that of vocabulary. The sequence of more and more difficult vocabulary items is also crucial in a good reader, but it needs to be supplemented with a solid sequencing of syntactic complexity as well.

A short analysis of some of the books in the Sanseido series of reading texts used in Japan some thirty years ago gives a similar pattern of sequenced development. The numbers in terms of ISC

rise to the same level as the McGuffey series and the Japanese series moves to that level even more quickly.

For example, the first book develops through a series of simple sentence patterns and then starts including various simple dependent clauses, such as quoted material with the verb of saying, verb in the -*te* form or with a verb ending in -*shitemo* or so on with following independent clause. As with the McGuffey series, the first reader includes some three clause sentences using the easier dependent clause constructions. The last chapter of that first book includes a sequence of sentences with an average of 1.65 clauses per sentence, which is well above the McGuffey average.

In fact, a check of the end of the 2nd and 3rd readers gives a similar number, although the types of dependent clauses have become somewhat more complex. The 4th year reader, which is at or near our crucial point in terms of finishing the acquisition of syntax, has a late sequence of sentences averaging 2.45 clauses per sentence, but with sentences of five and six clauses. Thus, the overall syntactic complexity develops quite well. According to this analysis, the end of the 6th reader has a complexity which is almost exactly the same as the end of the 4th reader, but the length of each sentence (which is also a part of the overall complexity rating) is significantly long. Sentences of near forty to fifty words are not uncommon.

The outline of ISC given above should make it clear how the Escobar student's difficulty points were found so quickly. According to the teacher, the young man in question was reading about 2nd grade level in terms of today's competency level. A short inspection of the sentences showed that one paragraph had a few sentences of three and four clauses. He hesitated at that paragraph, which unfortunately would be reading level six or higher in today's American schools. He gave up when he reached a sentence of eight clauses. He was at a

total loss. The complexity of that same sentence to an adult who has finished all levels of syntactic and reading development only seems easy. To a student with no competence in such complicated syntax, it is far too difficult. The teacher noted that the topic of the article was cars, in which the young was intensely interested. The vocabulary was within his grasp as well. The only difficulty was the crucial one, that of his own level of syntactic development.

If that young man had been promoted to high school and transferred to a high school in another school district and had somehow been mistakenly placed in an honors English class, he might have encountered some 19th century prose such as the selection from Charles Dickens' Bleak House below. (Dickens 1853)

"A few months ago, on a public occasion, A Chancery Judge had the kindness to inform me, as one of a company of some hundred and fifty men and women not labouring under any suspicions of lunacy, that the Court of Chancery, though the shining subject of much popular prejudice (at which point I thought the Judge's eye had a cast in my direction), was almost immaculate."

The huge difference in reading development within San Antonio schools can also be demonstrated by comparing the young man's trouble in reading a popular magazine and the young man's potential trouble if he were to encounter this passage.

One reason for including the difficult example from Dickens is an indirect one. A middle school / high school sequence of readers which led up to and then included examples of more and more complex selections, ending with 18th and 19th century authors, would enable such a young man to acquire all the competence needed in any situation. Furthermore, if the sequencing were appropriate, he would acquire the competency in a natural fashion. Unfortunately, the recent history of textbook selection in the USA is not encouraging.

This point leads to the next section.

Observation 3

Observation 3 concerns the findings at Trinity University over the past 30 years in the investigation of various types of reading material used by youngsters and of the readers used in Texas schools. The textbook publishers keep a close eye on Texas because the state has a large number of students and the Texas textbook approval process is very programmed. A publisher who gets approved in Texas will almost always get approved elsewhere, or so it is reported in our press.

As noted earlier, a great deal more attention has been paid to the early stages of the acquisition of syntax than to the later stages. What has been found in the text which is supposed to relate to late acquisition may not be useful. As an example, even a book that is designed to analyze syntactic maturity has as a high level example the sentence "Aluminum is an abundant metal with many uses." This sentence is treated as a high level example although of eight words and one clause. Heaven help us if this comment is representative of reading teachers in other schools! If we compare this suggestion of maturity with a Nathaniel Hawthorne sentence that has fifteen clauses, negative conditionals, a set of three preposition-based relative clauses, and a few appositives, we might conclude that there is much work to do on the later stages of syntactic acquisition. Unfortunately, some of the relatively small amount of research on the topic uses an analysis which may be characterized as a mere count of the number of clauses in a sentence without any consideration of whether those clauses are independent or independent and whether they are simple,

intermediate or complex in terms of acquisition. For example, a sentence of five independent clauses connected by "and" should not be analyzed with a complexity of 5 on the ISC scale. Even four year old children handle such sentences as "I went to school and I saw my teacher and I read and I went to the cafeteria and I ate some spaghetti." The ISC evaluation of syntactic complexity does not assign any complexity to simple compound clauses.

The development of multi-clausal sentences does correlate with syntactic maturity to a degree, but the more important data are the types of syntactic constructions developed and the complexity of the clauses in the multi-clausal sentence. Four and five year old children can play various word games in which almost every noun adds a relative clause. The complexity level of a five year old child's ability in the game "This is the house that Jack built" may be judged, for example, as an eight-or nine-clause sentence. In this game, each child in turn repeats the preceding sentence and builds in the extra word suggested by the preceding child. A sequence might be:

1. This is the house that Jack built. Straw
2. This is the straw that lay in the house that Jack built. Mouse.
3. This is the mouse that lived in the straw that...
   [and so on for several rounds]

However, the syntactic complexity in terms of syntactic constructions involved is only that of the subject-based relative clauses in the structure. The ISC evaluation does not count sentence ending relative clauses as a complexity. Such constructions at the end of a sentence are of little extra complexity, while the same constructions between, for example, the subject and verb of the main clause are very complex. The field of language acquisition and development has advanced enough so that we should be making more accurate observations of the general sequence of the acquisition of the more

complex constructions and of the multi-clause sentences that use more and more of the complex constructions learned later in the sequence.

Instead of progress toward the goal outline above, the textbooks in use in some schools are still far too easy. Some high school reading texts have an average ISC of 1.1 clauses other than the main clause. That figure correlates to a third to fourth grade reading level. A text used in an honors English class was investigated by Leal and Maya (1992) and found to have a complexity level more appropriate to the middle years of elementary school. The average number of clauses-including the main clause-per sentence in the text was 1.35, which is about 2nd or 3rd grade level in complexity. Yet that low level suggested by the ISC number is not the whole story. The types of syntactic constructions in the full version of this selections consist of subject- and object-based relative clauses, a simple appositive, a time clause. All these syntactic constructions are of the simple syntax category. Far from suggesting a senior honors literature class, the selection is at the complexity level of the third McGuffey Reader of the 19th century. In many of the paragraphs throughout the book, there are only a few easy relative clauses found other than the basic sentences themselves. Teachers and future teachers who learn to evaluate the reading complexity in terms of ISC are almost without exception horrified — as were Leal and Maya — at the low level of reading materials which they are forced to use in the schools.

What is especially discouraging about this last example is that this honors English text is indeed at a higher level of syntax and vocabulary than the regular English text used in the same high school. Although in the past 10-15 years there have been more school texts which include sections of the more developed syntactic complexity, most still remain at an elementary school level.

Some of the Texas schools are choosing texts which include several selections from the major authors of the 19th century. These texts do provide the students with examples of the syntactic constructions needed for full development. The vocabulary level of Hawthorne's *The Scarlet Letter* is high enough that the student who knows all the lexical items will do well on the SAT examination which is used to determine readiness for college. The syntactic constructions and the combinations of the different types of constructions are good training in developing competence in syntax. There are examples of sentences in which Hawthorne uses fourteen clauses, some of which are prepositionally-based relative clauses or complex relative clauses, conditionals, clauses within clauses within other clauses. The level of syntactic complexity in some sections of the novel are at and above the level of the McGuffey Sixth Reader. Even where the learning of new syntactic constructions by the child has ceased, there is still much learning of the combinations of those constructions to learn. Prose such as Hawthorne's is appropriate for such development.

Two points must be made here. First, the texts just discussed do not have a sequencing of complexity. That is, there are easy and relatively easy selections and there are the Hawthorne-like selections. Some but not all students will be able to bridge the rather large gap in complexity. Second, the disparity between the syntactic level in the high school readers which do not contain selections such that from Hawthorne and the syntactic level of the major documents of American history is rather great. The first sentence of the Declaration of Independence has some twenty clauses, including clauses within clauses, a prepositionally based relative clause and so on.

"We hold these Truths to be self-evident, that all Men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the Pursuit of

Happiness — That to secure these Rights..." [and so on]

Some sentences in the Constitution also have several clauses, clauses within clauses, two "if" clauses, and prepositionally-based relative clauses. A typical example is given here.

"If after such reconsideration two-thirds of that house shall agree to pass the bill, it shall be sent, together with the objections, to the other house, by which it shall likewise be reconsidered, and if approved by two-thirds of that house, it shall become a law. (I.7)"

Parents certainly want their children, the younger generation, to be able to read and understand the basic documents of our culture, to read a job description upon graduation, to read warranties / guarantees, and so on. Unless the children are reading widely outside school, there is little to be optimistic about in their syntactic development in the school curriculum.

Parents who are concerned about the lack of appropriate reading materials in the school curriculum can be encouraged to provide interesting reading material for their children. The question is whether such material helps develop their reading competency level as discussed herein. This point leads to Observation 4.

Observation 4

The final observation concerns the attempts to supplement the anemic reading texts in schools with other types of reading. One big push is for students to use newspapers as part of the curriculum. The positive points are that the students might know more of current events and they might read more material which in turn can only help some areas of reading.

In the terms outlined here, however, the use of newspapers will

not help syntactic acquisition in any fashion. Newspaper reading levels are of special interest because of their daily presence in our lives. My own introduction to the reading complexity of San Antonio (which, recall, essentially has the lowest literacy rate of any large city in USA) newspapers came in an interview for a feature story wherein the reporter said he had to write at a 4th grade level as part of his editor's policy. Since that event in 1971 my classes have cataloged the slow down-gradation to grade 2+. On the chart below you will note some random ISC for different parts of the two San Antonio papers.

	Light		Express-News	
	ISC	Grade	ISC	Grade
Sports	0.0	1–	0.2	1–
Front Page	0.9/ 1.3	2+	0.5	1
Editorials	1.8	4–	0.4	1
Columnist	1.0+	2	0.8	1+
Average	1.0	2	0.5	1

Next, note a random sampling of other papers done by ISC procedures:

Paper	Front page	Editorial	Sports
Wall Street Journal	0.9	1.2	1.7
Houston Post	1.6	1.1	2.0
Atlanta Journal	2.0	2.43	1-2
New Orleans States-Item	2.0	2.5	1-2
New Orleans Times-Picayune	2.0	2.5	1-2
Baltimore Sun	2.15	2.0	1-2
New York Times	3.75	0.7	2.3

The above figures are not meant to be negative, since the papers are aimed at different audiences, audience expectations and so on. They do provide evidence, however, which testifies against the current school proposal which proposes the teaching of reading and reading development by means of the newspaper as textbook. In terms of developing syntax in reading skills, many papers — but not all — are essentially wastes of time.

This fourth observation about supplements to reading programs can be extended to various popular books and book series. The good news is that there are fine series that help with language acquisition and which are of perennial interest to students. *The Little House on the Prairie* series is one example. Two older series are also reasonably good: the Nancy Drew mystery series and the Hardy Boys series. Several other books have been published and the list is too long to include here.

The purpose of this article is not to list all the bad and good examples of reading material that will promote language and reading development. The purpose is to show how relatively easy it is to evaluate the reading level of a story or book and how it can be used to help with your own child or with students in the classroom.

Summary Observation

The last comment is a sort of summation. We know how language and reading development ought to be sequenced and the broad range of ages which correlate to various levels. The critical importance of syntax in reading needs to be understood better. An extension of this point is that we are here talking about human acquisition of language and development, not just English speakers acquiring

them. The same general process is at work in language and reading acquisition around the world.

The worst point to contemplate is that although this information seems clear enough, American schools still have far too many incredibly low level reading programs and produce a sinfully high level of functional illiterates. Our high illiteracy rates in the USA and the large number of functionally illiterate high school graduates will not be affected by the usual reading education. Until a majority of teachers and a majority of the legislators who control much of the education process understand the ideas discussed above, our students and our country will continue to suffer.

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